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THE EFFECT OF AN ONLINE MINUTE PAPER AND INSTRUCTOR RESPONSE ON STUDENT LEARNING MOTIVATION IN A FLIPPED BLENDED NUTRITION COURSE

by

Kathleen Cook

A dissertation

submitted in partial fulfillment

of the requirements for the degree of

Doctor of Philosophy in Instructional Design

Idaho State University

Spring 2015

Committee Approval

To the Graduate Faculty:

The members of the committee appointed to examine the dissertation of Kathleen Cook find it satisfactory and recommend that it be accepted.

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August 27, 2014

Kathy Jo Cook
35 N 3210 East
Idaho Falls, ID 83401

RE: Your application dated 8/27/2014 regarding study number 4145: The Effect of an Online Minute Paper and Instructor Response on Student Learning Motivation in a Flipped Blended Nutrition Course

Dear Ms. Cook:

I agree that this study qualifies as exempt from review under the following guideline: 1. Research on educational practices in educational settings. This letter is your approval, please, keep this document in a safe place.

Notify the HSC of any adverse events. Serious, unexpected adverse events must be reported in writing within 10 business days.

You are granted permission to conduct your study effective immediately. The study is not subject to renewal.

Please note that any changes to the study as approved must be promptly reported and approved. Some changes may be approved by expedited review; others require full board review. Contact Tom Bailey (208-282-2179; fax 208-282-4723; email: humsubj@isu.edu) if you have any questions or require further information.

Sincerely,

Ralph Baergen, PhD, MPH, CIP
Human Subjects Chair

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August 29, 2014

Dear Kathy,

Your request to use human subjects for the study entitled *The Effect of an Online Minute Paper and Instructor Response on Student Learning Motivation in a Flipped Blended Nutrition Course* is approved for 12 months from the date of this letter.

Please notify the IRB if you intend to make any significant modifications to the study's design or implementation.

Good luck with your study.

Regards,

Scott J. Bergstrom, Ph.D.
Chair, BYU-Idaho Institutional Review Board

Scott J. Bergstrom *Director, Institutional Research & Assessment, Kimball 290C*
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Acknowledgements

There are many who have helped me along the journey of completing my doctoral program. I would like to express my gratitude and deep appreciation for my advisor, Dr. Dotty Sammons. Her patient mentoring inspired me to become an instructional designer and researcher. I am also thankful for the support and guidance of the other members of my dissertation committee: Dr. Sue Schou, Dr. Cynthia Blanton, Dr. Jane Strickland, Dr. Karen Appleby, and Dr. Craig Johnson.

I would like to thank the members of my cohort for their support and comradery as we strived to learn and apply the principles of instructional design, statistics, and research. A special thanks to Don Campbell, James Helfrich, Paul Roberts, and Bruce Kusch for their support in group projects and study groups.

I am thankful for the support of my colleagues. I am indebted to my former dean, Dr. Rhonda Seamons, for the enlightenment she gave me on education and instructional design. Her dedicated service to others will forever be an example to me. I am grateful for the continuous encouragement of my department chair, Dr. Jim Lamb, and the contributions of my fellow-faculty: Kelly McCoy, Melissa Everett, Jennie Oler, Jay Keller, Susan Clark, Amanda Christensen, and Steve Winkel.

I am very thankful for the unwavering support of my husband, Rulan. He is my eternal pal and partner. This dissertation would not have been possible without his loving patience and encouragement. I am also grateful for the love and support of my children and grandchildren.

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Abstract

The prevalence of flipped blended learning, where part of the lecture and face-to-face class time is moved from the classroom to online instruction prior to class, has increased in prevalence on college campuses throughout the United States. One concern with flipped blended learning is the reduced student-instructor contact time, which could decrease communication and learning motivation.

This study evaluated, from a Self-Determination Theory (SDT) perspective, the impact of an online Minute Paper with and without online instructor response on students' learning motivation in a flipped blended course. The Minute Paper is a very short writing activity that has been used in face-to-face classrooms as a formative assessment strategy.

The study took place in nine sections of an introductory nutrition course taught in a flipped blended learning format. The flipped blended instruction was designed using the ADDIE model of instructional design and formatted to adhere to the standards in the Quality Matters Rubric. Of the 410 students enrolled in the course, 137 met the inclusion criteria and participated in the study. The beginning student perception of instructor autonomy support (measured by the Learning Climate Survey) and student motivation to attend a university (measured by the Academic Motivation Survey) was determined at the beginning of the study. Students were then randomly assigned into the control and two treatment groups. The control group did not complete an online Minute Paper at the end of their online instruction. The first treatment group completed an online Minute Paper. The second treatment group completed an online Minute Paper and received and online instructor response that used autonomous support language. The ending student

perception of instructor autonomy support and student motivation to complete the online instruction (measured by the Situational Motivation Survey) was determined at the conclusion of the study.

After controlling for student motivation to attend college, gender, year in school, teacher, previous online learning, whether the course was required for major, and beginning perceived instructor autonomy support, the results indicated there was not a significant difference in either student perceived instructor autonomy support or motivation to complete online instruction between the control and treatment groups. Gender, year in school, teacher, previous online learning, and whether the course was required for major did not significantly explain the variance in either ending perceived instructor autonomy support or motivation to complete online instruction.

Chapter I

Introduction

Statement of the Problem

Technology advances during the past decade have facilitated the growth of blended learning on college campuses throughout the United States (Graham, Woodfield, & Harrison, 2013). The blended learning format where part of the traditional face-to-face classroom time is replaced with online instruction has been promoted as offering "the best characteristics of online education and the interactivity that typically characterize[s] face-to-face classroom instruction" (Martyn, 2003, p. 18). Some courses using blended learning have incorporated a flipped learning approach, where direct instructional content is delivered online prior to meeting in the classroom and application-centered activities are conducted during the face-to-face class (Strayer, 2012; Thoms, 2013).

Although blended learning has the potential to provide the best elements of online instruction and group interaction in face-to-face classes, Osguthorpe and Graham (2003) caution there is also potential to merge the worst elements. In order to avoid this problem, instructional designers need to be aware of potential weaknesses in blended learning. Some of these weaknesses include student concerns with reduced classroom time resulting in decreased quality in the communication between student and instructor, a decreased sense of belonging, and confusion about online course material (Jackson & Helms, 2008; Lin, 2008; Parkinson, Greene, Kim, & Marioni, 2003; El Mansour & Mupinga, 2007; Tabor, 2007). These concerns may negatively influence students' motivation to learn (Osguthorpe & Graham, 2003; Wu & Hwang, 2010; Hoch & Dougher, 2011).

One way instructional designers may compensate for decreased instructor contact time is using online communication strategies. Babb, Stewart, and Johnson (2010) found students' perceptions of performance and satisfaction in blended learning contexts were improved when the instructor gave prompt, helpful responses to their questions. Babb et al. recommended instructors use online communication tools in addition to classroom discussion to support student-instructor interactions.

The Minute Paper has been promoted as both a successful formative assessment strategy and communication tool in college classrooms (Kloss, 1993; Stead, 2005; Lightbody & Nicholl, 2013; Vonderwell & Boboc, 2013). This strategy can provide instructors with important insight regarding their students' emotional reactions to instruction (Kloss, 1993; Vonderwell & Boboc, 2013). However, Angelo and Cross (1993) identified a potential concern that students may view the Minute Paper activity as a pro forma exercise in polling, therefore, may not meaningfully participate. Responses by the instructor to students' Minute Papers may minimize this concern because students are more willing to give feedback when they feel the instructor listens and responds to their feedback (Watson, 2003; Bloxham, 2010).

There is preliminary evidence based on case studies that instructor response to Minute Papers can be beneficial. Lucas (2010) sent personalized emails to students answering their Minute Paper questions. Shee reported these responses built student-instructor relationships and helped clarify concepts taught. Similar benefits were reported by Vonderwell (2004) who used an online Minute Paper with instructor response in two sections of an online course for preservice teachers. However, there is limited empirical

research evaluating the effectiveness of instructor response to Minute Papers on students' motivation to learn.

Purpose of Study

The purpose of this study was to evaluate, from a Self-Determination Theory (SDT) perspective, the impact of an online Minute Paper with and without online instructor response on students' learning motivation in a flipped blended course. This theory identifies six types of motivation for regulating behavior that differ in the degree of self-determination (see Figure 1). SDT posits an instructor can positively influence the quality of students' learning motivation by providing *instructor autonomy support*, which is characterized by the instructor understanding the students' perspectives, acknowledging their feelings, and providing pertinent information and opportunities for choice (Ryan & Deci, 2000b).

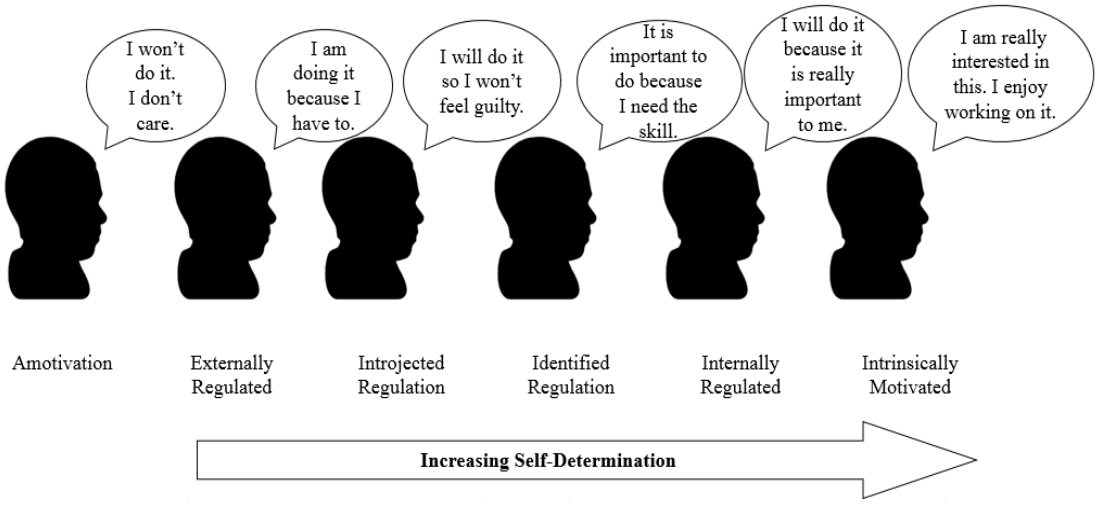

Figure 1. Levels of motivation in the Self-Determination Theory.
Adapted from "Intrinsic and extrinsic motivations: Classic definitions and new directions" by R. M. Ryan and E. L. Deci, 2000, *Contemporary Educational Psychology, 25*(1), p. 61. (Silhouette. Simon Waldherr, http://commons.wikimedia.org/wiki/File:Head_silhouette.svg)

The study was conducted in an introductory nutrition course taught in a flipped blended format where one of the three weekly face-to-face classes was replaced with online instruction. Twice a week a 30-minute online instruction module was completed prior to the face-to-face class. In conjunction with the online portion of the blended class, the control group only received online instruction; the first treatment group received online instruction and an online Minute Paper; and the second treatment group received online instruction, an online Minute Paper, and instructor response to the online Minute Paper (see Figure 2).

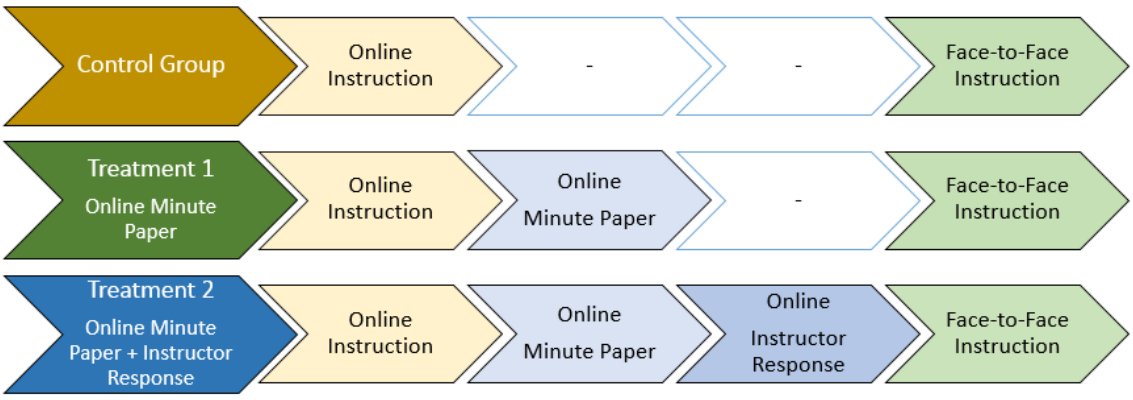

Figure 2. Sequence of instruction for control and treatment groups

Research Questions

The research questions for this study were:

1. Is there a significant difference in perceived instructor autonomy support, as measured by the Learning Climate Questionnaire (LCQ), between the No Minute Paper group, the Online Minute Paper group, and the Online Minute Paper with Online Instructor response group, after controlling for the following factors: (a) student academic motivation, as measured by the Academic Motivation Scale (AMS), (b) gender, (c) year in school, (d) teacher,

(e) previous online learning, (f) whether the course was required for major, and (g) entry level perceived instructor autonomy support?

2. How much of the variability in perceived instructor autonomy support could be explained by: (a) student academic motivation, (b) gender, (c) year in school, (d) teacher, (e) previous online learning, (f) whether the course was required for major, and (g) entry level perceived instructor autonomy support?
3. Is there a significant difference in student motivation to complete online instruction, as measured by the Situational Motivation Scale (SIMS), between the No Minute Paper group, the Online Minute Paper group, and the Online Minute Paper with Online Instructor Response group, after controlling for the following factors: (a) student academic motivation, (b) gender, (c) year in school, (d) teacher, (e) previous online learning, and (f) whether the course was required for major?
4. How much of the variability in student motivation to complete online instruction could be explained by: (a) student academic motivation, (b) gender, (c) year in school, (d) teacher, (e) previous online learning, and (f) whether the course was required for major?

Research Design

The proposed study was experimental because the participants were randomly assigned into the control and experimental groups (Gall, Gall, & Borg, 2007). The study used a pretest-posttest control-group design (see Table 1). The pretest-posttest control-group design was used because it can effectively control for the internal validity threats

of history, maturation, testing, instrumentation, statistical regression, differential selection, experimental mortality, and selection-maturation interaction (Gall et al., 2007).

Table 1

Experimental Pretest-Posttest Control Group Design

	Random Assignment	Pretest	Treatment	Posttest
No Minute Paper	R	O_1		O_2
Minute Paper	R	O_1	X_1	O_2
Minute Paper with instructor online response	R	O_1	X_2	O_2

Note. R = random assignment
O_1 = Entry survey (Pretest)
X_1 = online instruction with online Minute Paper
X_2 = online instruction with online Minute Paper and online instructor response
O_2 = Post survey (Posttest)
Adapted from "Educational Research" by M. D. Gall, J. P. Gall, and W. R. Borg, 2007.

The entry-level observation (O_1) was a survey that included two demographic questions (age and previous online learning), AMS (a 28-item survey that measured motivation to attend college), and the LCQ (a 15 item survey that measured pre-treatment perceived instructor autonomy support). The second observation (O_2) represented a post survey and contained the LCQ (measured post-treatment perceived instructor autonomy support) and the SMS (a 16-item survey that measured post-treatment motivation to complete the online preparation). The AMS, LCQ, and SMS are described more fully in Chapter 3.

Nine sections of the University's Fall Semester 2014, 3-credit, introductory nutrition course were used in the study. Historically, 350 to 420 students enroll in this course each semester. The inclusion criteria for the study required the participants to:

(a) be enrolled in the course by the end of the first week of the semester, (b) be at least 18 years old, (c) give consent for their data to be used in the study, (d) complete at least five of the six online instruction modules, and (e) attend at least five of the six face-to-face classes.

Limitations

Limitations are the potential weaknesses of the study that are outside the researcher's control and may decrease the internal validity of the study (Creswell, 2003). Gall et al. (2007) defined *internal validity* in experimental studies as "the extent to which extraneous variables have been controlled by the researcher, so that any observable effects can be attributed solely to the treatment variable" (p. 642). The possible limitations for this study are described below.

History. Experimental treatments that extend over time may provide opportunity for events other than the experimental treatment to occur (Campbell & Stanley, 1963). This study will span the first four weeks of the semester. There is a possibility other random events in the students' lives may influence their perceived instructor autonomy support and motivation for the class. However, the confounding by random life events is likely to be similar across the groups.

Differential selection. The potential for confounding factors increases when the participants' characteristics that may act as an extraneous variable are not equivalent in the control and experimental groups. Year in school, gender, and age may be potential confounders (Stewart, Clifton, Daniels, Perry, Chipperfield, & Ruthig, 2011). The time frame by which students at the University register for courses is based on the number of credits they have completed. Students with the highest number of credits are allowed to

register first which may disproportionally place freshmen in sections taught at the least popular times.

Experimental mortality. Participants leaving the study prior to its completion may threaten the study's internal validity if there is a differential loss among the treatment groups (Gall et al., 2007). Experimental mortality may occur during the study because the experiment will take place during the second, third, and fourth weeks of the semester when students still have the opportunity to drop the course.

Resentful demoralization of the control group. Members of the control group may become discouraged if they perceive the treatment groups are receiving a desirable treatment that is being withheld from them. Three actions were taken to minimize this risk. First, during the orientation to the study students were informed all the participants would receive the same online instruction. Second, students would only have access to the online activities through the University's password protected learning management system (LMS). Third, students will be asked to complete the online activities on their own.

Poor instructional design. A potential threat to internal validity lies in the quality of the instruction itself. Poorly designed and implemented instruction may affect student motivation and perceived instructor autonomy support. In order to mitigate this potential threat, the researcher created the online instructional modules using the ADDIE instructional model, a systematic design process that employs the steps of Analyze, Design, Develop, Implement, and Evaluate (Gagné, Wager, Golas, & Keller, 2005) (see Appendix A). Subject matter experts and instructional design experts reviewed all aspects of the instruction to assure its quality.

Poor online design. Another potential threat to internal validity is a poorly designed online format in the LMS. The students' motivation levels may decrease if they have problems navigating the online materials or using the online content. In order to diminish this concern, the researcher completed a Quality Matters certification workshop on designing blended courses and designed the online format to adhere to the Quality Matters™ Higher Education Rubric standards (Quality Matters, 2013). Quality Matters is a non-profit organization dedicated to the continuous improvement of online instruction.

Delimitations

Delimitations are established by the researcher to narrow the scope of a study and may affect *external validity* (Creswell, 2003) which is "the extent to which the results of the research study can be generalized to individuals and situations beyond those involved in the study" (Gall et al., 2007, p. 640). The delimitations established for this study and their possible effect on external validity are discussed below.

Target population. The generalizability of the study's results to the target population depends on the degree to which the experimentally accessible population represents the target population (Bracht & Glass, 1968). The target population is defined as the "total group of subjects about whom the experimenter is empirically attempting to learn something" (Bracht & Glass, 1968, p. 440) and the experimentally accessible population is the "population of subjects that is available to the experimenter for his study" (Bracht & Glass, 1968, p. 440). The target population for this study was defined as the students enrolled in introductory courses (100 level) taught in a blended format at the University, a private four-year university in the Intermountain West area of the United States. The experimentally accessible population for the study was defined as the students

enrolled in the blended sections of the introductory nutrition course during the Fall Semester 2014. Variations across the semesters in age, gender, year in school, and ACT scores may influence the generalizability of the study results.

Other Universities. The population for this study was limited to undergraduate students in introductory blended courses at the University. The cultural background of the majority of students at the University is relatively homogeneous. Hence, the results of the study may not be generalizable to students enrolled in introductory nutrition courses in other universities that have a more diverse cultural background.

Assumptions

The following assumptions were made concerning this study:

- The study participants would complete the online activities and online Minute Paper with the consideration due a class assignment.
- The study participants would complete the surveys with honest responses.

Definitions of Terms

1. **Academic motivation**. A student's motivation to attend college based on the motivation categories in the SDT (Vallerand, Pelletier, Blais, Briére, Senecal, & Vallieres, 1992).
2. **Blended learning.** A combination of face-to-face instruction combined with computer-mediated instruction to facilitate interactive and reflective higher-order learning (Graham, 2006).
3. **Face-to-face instruction.** A traditional approach where the instructor and learners meet at the same time in the same geographical location for instruction (Redmond, 2011).

4. **Feedback.** Information provided by the student to the instructor in the online Minute Papers.
5. **Flipped learning.** A pedagogical approach where direct online instruction is given to the individual prior to meeting as a group in the face-to-face setting (Flipped Learning Network, 2014).
6. **Instructor response.** The online written response of the instructor to students' online Minute Papers.
7. **Minute Paper.** A very short writing activity where the student reflects on instruction by giving feedback to two or three prompt questions from the instructor. (Angelo & Cross, 1993).
8. **Motivation.** The "process whereby goal-directed activity is instigated and sustained" (Schunk, Pintrich, & Meece, 2008, p. 4).
9. **Online Instruction**. Instructional materials, including videos, quizzes, digital documents, and interactive tutorials, which are posted in a LMS and completed prior to the face-to-face class.
10. **Perceived Instructor Autonomy Support.** The students' perception of the extent to which the instructor listens to their perspectives, acknowledges their feelings, and provides them with pertinent information and opportunities for choice, while simultaneously minimizing the use of pressure and demands (Black & Deci, 2000). In this study, perceived instructor autonomy support is measured by the LCQ (see Chapter 3).

11. **Situational Motivation.** The motivation individuals experience when they are currently engaging in an activity. Situational motivation is based on the motivation categories in the SDT (Guay, Vallerand, & Blanchard, 2000).

Significance of Study

Blended courses, where part of traditional classroom time is replaced with computer instruction, are increasingly prevalent (Hiltz & Turoff, 2005). There is a need for research to discover the best practice design features that can lead to increased student intrinsic motivation in blended courses (Drysdale, Graham, Halverson, & Spring, 2013). One factor that may decrease student motivation in flipped blended learning is the reduced face-to-face time with the instructor. There is a need for effective student-instructor communication strategies to compensate for the reduced face-to-face interaction time (Babb et al., 2010). Findings from this study may provide instructional designers with an evidenced-based online student-instructor communication strategy that will enhance students' learning motivation.

Summary

This study evaluated from a SDT perspective the impact of an online Minute Paper with and without online instructor response on students' learning motivation in a flipped blended course. The review of literature for this study are described in Chapter Two.

Chapter II

Review of Literature

Blended courses may replace part of the traditional face-to-face classroom time with online instruction, which results in decreased student-instructor contact time. To compensate for this, instructors are encouraged to use communication technology to support student-instructor communication (Babb et al., 2010). This study evaluated the impact of an online Minute Paper with and without online instructor response on students' learning motivation in a flipped blended course from the Self-Determination Theory perspective. This literature review describes flipped blended learning in higher education, Self-Determination Theory, and Minute Papers in undergraduate courses.

Flipped Blended Learning in Higher Education

Blended learning. The adoption of blended learning as an educational model is increasing in higher education (Graham et al., 2013). Historically, the academic literature referred to blended learning as *hybrid* (Graham, 2006); however, over the last decade there has been a transition to the term *blended learning*. Garrison and Vaughn (2008) explained, "the word *blended* is used to suggest that it is more than a bolting together disparate technologies with no clear vision of the result" (p. 148). The blended learning model has evolved from simply adding online instruction to face-to-face instruction to focusing on the pedagogical considerations. Osguthorpe and Graham (2003) expounded on this idea:

> Those who use blended approaches base their pedagogy on the assumption that there are inherent benefits in face-to-face interaction (both among learners and between learner and instructor) as well as the understanding that there are some

> inherent advantages to using online methods in their teaching. Thus, the aim of those using blended learning approaches is to find a harmonious balance between online access to knowledge and face-to-face human interaction (p. 228).

Types of blended learning. Twigg (2003) described four models of blended learning: (a) replacement model, (b) supplemental model, (c) emporium model, and (d) buffet model. The *replacement model* adds online instruction to replace part of the class-meeting time. The replacement model of blended learning is the most common form used in higher education. The *supplemental model* maintains the amount of required class-meeting time and adds out-of-class technology-based activities. The *emporium model* replaces classroom time with online instruction and provides a learning resource center where students can seek help from faculty and teaching assistants if needed. The *buffet model* is the most complex and offers a variety of options in both the online and face-to-face formats where the students can select a unique combination of materials to meet their objectives and learning style. The last two models are not commonly used by universities because they require extensive resources.

Benefits of blended learning. Vaughan (2007) reported a key benefit of blended learning from the student perspective was the flexibility in completing the online instruction. Students reported they liked being able to control the pace and location of their online learning. Another aspect of flexibility was a greater range of course scheduling options due to the reduction in the face-to-face time.

Currently, it is difficult to identify from the research whether blended learning is more effective than online learning because what is meant by *online* or *blended* is not consistent across the studies (Lack, 2013). For example, Twigg's (2003) supplemental

model of blended learning did not replace face-to-face time with online instruction, yet the Sloan Consortium definition of blended learning required 30-79% of the content to be delivered online (Allen, Seaman, & Garrett, 2007). Although there is insufficient evidence to declare online or blended as more effective, there is evidence to show that the performance level for these two forms of delivery is at least the same as the face-to-face format (Osguthorpe & Graham, 2003; Lack, 2013). For example, Sitzmann, Kraiger, Stewart, and Wisher (2006) conducted a meta-analysis on the effectiveness of declarative and procedural instruction in the face-to-face, online, and blended learning formats. They found that blended learning was more effective than only face-to-face for teaching declarative and procedural knowledge when students were given control over the pace of online instruction, opportunities for practice, and feedback.

There are advantages of blended learning to the university. There is potential for blended learning to lower the university's cost of instruction. Furthermore, blended learning can be used to accommodate projected increased enrollments when there is a set amount of classroom space by increasing classroom availability (Niemiec & Otte, 2010).

Concerns regarding blended learning. Recently, Dahlstrom (2012) surveyed over 100,000 students in higher education and found the majority of students (70%) felt blended learning best supported how they learned. However, other studies have shown students may have difficulty with blended learning (Sitzmann et al., 2006; Tabor, 2007). Vaughan (2007) identified the following four key challenges students encounter with blended learning: (a) work expectations, (b) inadequate time management skills, (c) problems with accepting responsibility for personal learning, and (d) difficulty with more sophisticated technologies.

Work expectations were common problems for blended learning (Vaughan, 2007). Several students struggled with blended learning because they did not understand what was expected of them. One key obstacle was that students viewed online learning activities as supplemental options to their learning in face-to-face activities (Shea, 2007). Another obstacle was that some students equated fewer in-person classes with less coursework and did not expect the workload involved with online instruction (Vaughan, 2007).

Time management can be a struggle for undergraduate students in blended learning (Vaughan, 2007). Although time flexibility was reported by students as a key benefit, many students had difficulty completing online activities prior to the face-to-face class. Steel (2007) reported procrastination was prevalent on college campuses. He found approximately 70% of college students considered themselves as procrastinators and 50% of college students procrastinated consistently and problematically.

The third factor that affected many undergraduate students was learning how to take responsibility for their own learning. Students tend to be passive learners within the traditional lecture format. They need to learn how to take an active learning role (Vaughan, 2007).

The fourth factor identified by Vaughan (2007) was technology problems. This is an ongoing concern. Dahlstrom, de Boor, Grunwald, and Vockley (2011) surveyed 3000 students at 1,179 colleges and found 32% of the students felt their skills using the school's LMS needed improvement. Thompson (2013) found that although students entering college usually have good social communication technology skills, they often

need their instructors to provide scaffolding for them to master the technology tools used in class.

There is a need for good communication between students and instructor during the online portion of the blended learning to help students understand the course structure and their role in the learning process. Adding an online communication strategy where students and the instructor discuss their perceptions and experiences, such as reflections, can increase students' satisfaction with the online learning experience (Bangert, 2005; Henninger & Hurlbert, 2006; Kim, Kim, Khera, & Getman, 2014).

Communication in blended learning courses has been criticized as less effective than traditional courses due to less direct contact between student and instructor (Babb, Stewart, & Johnson, 2013). Although some studies show students had an increased sense of community and interactivity with instructors (Story & DiElsi, 2003; Riffell & Sibley, 2003; Rovai & Jordan, 2004), other studies found students had a decreased sense of belonging and communication with the instructor (Parkinson et al., 2003; El Mansour & Mupinga, 2007; Tabor, 2007; Jackson & Helms, 2008). One reason for the disparity may be the students' level of academic experience: the former studies involved graduate students; whereas, the latter studies involved undergraduates.

Flipped Learning. A current trend in higher education is flipping the class lecture from the face-to-face class to an online setting to free up class time for active learning and higher-level cognitive skills (Lage, Platt, & Treglia, 2000; Bergmann & Sams, 2012). The Flipped Learning Network (2014) defined *flipped learning* as:

> A pedagogical approach in which direct instruction moves from the group learning space to the individual learning space, and the resulting group space is

> transformed into a dynamic, interactive learning environment where the educator guides students as they apply concepts and engage creatively in the subject matter. (p. 1)

Strengths of flipped learning. From students' point-of-view, there are several strengths with flipped learning. Enfield (2013) found undergraduate students in her multimedia course felt more confident in their ability to learn from outside sources because of their experience with flipped learning. McLaughlin et al. (2013) surveyed 22 students in a flipped learning pharmaceutical course at the beginning and end of the semester and found students preferred learning content before class so they could spend more time on application in class. Other benefits of flipped learning from the students' viewpoint were time flexibility, working at their own pace, and a sense of greater control over their learning (Rovai & Jordan, 2004; Goldberg, Haase, Shoukas, & Schramm, 2006; Strayer, 2012; Mason, Shuman, & Cook, 2013; McLaughlin et al., 2013).

An advantage for flipped learning from a university point-of-view is the consistency of online instruction across multiple sections of a course. The Cinema and Television Arts department in Enfield's (2013) study utilized many adjunct instructors for a multimedia course and found the use of online videos in the flipped learning ensured all students were instructed in the same prerequisites skills needed for subsequent courses.

Concerns regarding flipped learning. As with blended learning, flipped learning requires students to manage their time well and avoid procrastination. Herreid and Schiller (2013) surveyed members of the National Center for Case Study Teaching in Science listserv who used flipped learning. Two hundred teachers participated in the

survey and reported the biggest difficulty was students not completing the preparation instruction because they perceived flipped courses were more work. Research has shown there is a need for structure in flipped learning courses to help students know what is expected of them and when it needs to be completed (Strayer, 2012; Davies, Dean, & Ball, 2013). Tune, Sturek, and Basile (2013) found low-stakes quizzes and online homework are usually required to help motivate students to complete the online preparation, such as watching video lectures prior to class (see also Kim et al., 2014).

Another concern reported in flipped learning research was the need to shift undergraduate students' paradigm from viewing the instructor as a lecturer to viewing him or her as a facilitator and taking more responsibility for their learning. Mason et al. (2013) surveyed senior-level engineering students in a flipped learning course at the end of week four and week ten to gather student feedback on their perceptions of blended learning. Students reported it took up to four weeks for them to realize the need to complete online preparation prior to coming to class. Mason et al. concluded students needed to be oriented early in the course to view the instructor as a facilitator rather than a dispenser of knowledge.

Flipped blended learning. Strayer (2012) characterized flipped learning as a specific type of blended learning since technology was used to move lectures outside the classroom. Flipped blended learning integrates Twigg's (2003) replacement blended model with the flipped learning approach of providing the direct instruction online to individual students and applying the concepts in the face-to-face group setting.

Self-Determination Theory

The theoretical framework for this study will be Deci and Ryan's (1985) Self-Determination Theory (SDT), a meta-theory of human motivation that provides insight into the interpersonal and intrapersonal influences on a person's behavior. The SDT aims to explain the whys of a person's motivation to complete a goal-directed behavior. An underlying assumption of the SDT is that people are driven by a need to grow and gain fulfillment; in fact, Ryan and Deci (2002) insist that people are "active, growth-oriented organisms that innately seek and engage challenges in their environments, attempting to actualize their potentialities, capacities, and sensibilities" (p. 8).

Ryan and Deci (2000a) contrasted SDT with other motivation theories. They explained most motivation theories measure motivation using a scale based on low to high levels of motivation. In contrast, the SDT places the primary emphasis on the quality of motivation by identifying different types of motivation. The SDT distinguishes between *amotivation* (lacking any intention to engage in a behavior), *extrinsic motivation* (engaging in a behavior to achieve an outcome separate from the behavior itself), and *intrinsic motivation* (engaging in a behavior because it is inherently interesting or enjoyable).

SDT has five subtheories that address different facets of motivation. Vansteenkiste, Niemiec, and Soenens (2010) described the subtheories as pieces of the puzzle that fit together to explain motivation. The five subtheories are:

- Cognitive Evaluation Theory (CET);
- Organismic Integration Theory (OIT);
- Causality Orientations Theory (COT);

- Basic Psychological Needs Theory (BPNT); and
- Goal Contents Theory (GCT).

These subtheories will be described in more detail in the following sections.

Cognitive Evaluation Theory. The CET subtheory addresses factors in a social context that can affect intrinsic motivation (Deci & Ryan, 1985). Events that increase a person's feelings of competence and sense of autonomy while performing an action will foster intrinsic motivation. In other words, people need to feel they have competence to complete the action and choice in deciding their actions in order to have intrinsic motivation (Ryan & Deci, 2000b). CET argues social-contextual events such as positive feedback and communication contribute to a feeling of competence and enhance intrinsic motivation; whereas, if people perceive they are in a controlling environment, such as one having deadlines and evaluations, there is a negative impact on their intrinsic motivation.

Organismic Integration Theory. SDT's second subtheory, OIT, distinguishes between four types of extrinsic motivation based on the degree to which the choices were self-determined. This can be represented as a continuum of actions that were *controlled* (non-self-determined) to *autonomous* (having inner endorsement for the action). Ryan and Deci (2000a) identified the following four types of extrinsic motivation:

- *external regulation* (doing something for a reward or to avoid punishment),
- *introjected regulation* (actions based on internal feelings of obligation or to avoid guilt),
- *identified regulation* (the person values the consequence of the action), and

- *integrated regulation* (actions are in full congruence with the person's values and needs).

Ryan and Deci (2000a) noted there was a high degree of autonomy with integrated regulation and that it was similar to intrinsic motivation; nonetheless, they defined integrated regulation as extrinsic motivation because the behavior was motivated by an external factor and not by enjoyment or interest.

Causality Orientations Theory. In contrast to the first two subtheories, which examine motivational dynamics, COT focuses on people's personalities and how they perceive the source of their behavior initiation (Vansteenkiste et al., 2010). Deci and Ryan (1985) identified three causality orientations: autonomy orientation, control orientation, and impersonal orientation. They note that people high on the *autonomy orientation* will usually act in accord with their self-endorsed values and "use available information to make choices and to regulate themselves in pursuit of self-selected goals" (p. 154). In contrast, Deci and Ryan describe how people high on the *control orientation* will tend to act in accord with external demands or internally controlled imperatives, such as *should*, *have to*, *ought to*, and *must*. Finally, Deci and Ryan describe people high on the *impersonal orientation* as perceiving they are incompetent to deal with life's experiences. They are prone to feelings of helplessness and often have high anxiety.

Basic Psychological Needs Theory. The fourth subtheory, BPNT, postulates there are three innate psychological needs that, if satisfied, will allow for optimal growth and sustained intrinsic motivation: competence, autonomy, and relatedness. It is important for people to meet these needs in order to have a sense of well-being and higher levels of intrinsic motivation.

Competence is "feeling effective in one's ongoing interactions with the social environment and experiencing opportunities to exercise and express one's capacities" (Ryan & Deci, 2002, p. 7). Competence is not a skill but a sense of confidence in the social environment and a feeling of mastery over the things that are important. The need for competence motivates people to seek for challenges that will enhance their capacities.

Autonomy refers to the person perceiving oneself as the origin of one's own behavior (Ryan & Deci, 2002). Chirkov, Ryan, Kim, and Kaplan (2003) describe a person as *autonomous* when "his or her behavior is experienced as willingly enacted and when he or she fully endorses the actions in which he or she is engaged and/or the values expressed by them" (p. 98). Furthermore, they noted *autonomy* is not synonymous with *independence*, which means the person does not rely on other people for support or needs. People can autonomously depend on another person if they willingly make that decision. *Dependence* in the SDT is defined as reliance on others for guidance, support, or needed supplies (Ryan & Lynch, 1989).

Relatedness is feeling connected to others and having a sense of belonging with them (Ryan & Deci, 2002). The sense of relatedness can be enhanced when a person is able to give back to the group or community. People who feel a sense of belonging to a group tend to internalize the values of the group (Niemiec & Ryan, 2009).

Goal Contents Theory. The final subtheory distinguishes between life goals people pursue that are extrinsically based, namely money and fame, and goals that are intrinsically based, such as personal growth, close relationships, and physical health (Vansteenkiste et al., 2010). People who have intrinsically based life goals are more

likely to enhance well-being and fulfill the three basic psychological needs of autonomy, competence, and relatedness.

Applying Self-Determination Theory to Education. Ryan and Deci (2000a) found intrinsic motivation often leads to high-quality learning and creativity. However, they also noted instructors could not rely on intrinsic motivation to promote learning because many of the instructional activities are not inherently interesting and enjoyable. Often, a person who is a novice at a subject needs to rely on deliberate practice rather than intrinsic motivation to learn the subject. Ryan and Deci (2000a) stated, "Knowing how to promote more active and volitional (versus passive and controlling) forms of extrinsic motivation becomes an essential strategy for successful teaching" (p. 55).

Autonomous motivation. Guay, Ratelle, and Chanal (2008) classified *autonomous motivation*—this is, the intrinsic, integrated, and identified—in the education context as high quality because it was associated with positive outcomes at school. Students who were regulated with autonomous motivation were more persistent with their schoolwork, had increased retention and depth of learning, and preferred optimal challenges. In contrast, *controlled motivation*—the external and introjected regulation—was classified as poor quality because it was associated with higher cognitive anxiety, lower academic performance, and lower creativity.

Instructor Autonomy Support. Niemiec and Ryan (2009) found instructors' support of autonomy, competence, and relatedness will lead students to a more autonomous motivation. They recommend replacing controlling conditions where the student relies on the teacher to be the motivator with items that offer choices on learning tasks, setting limits and expectations in ways that support students' interests and needs.

Reeve and Jang (2006) defined *autonomy support* as "the interpersonal behaviors one person provides to involve and nurture another person's internally locused, volitional intentions to act, such as when a teacher supports a student's psychological needs (e.g., autonomy, competence, relatedness), interests, preferences, and values" (p. 210).

To identify autonomy supportive instructional behaviors, Reeve and Jang (2006) randomly assigned 72 pairs of same-sex preservice teachers into the role of either teacher or student and videotaped them in a 10-minute instructional episode. Those in the student role completed a perceived autonomy survey at the end of the instruction. Raters identified and scored the teacher's instructional behaviors. A correlational analysis was then completed to identify autonomy supportive instructional behaviors and contrasted them with controlling instructional behavior. Reeve and Jang found autonomy supportive instructors spent time listening to the students to see things from the students' perspective and acknowledged negative feelings. In contrast, controlling instructors made "should" or "ought to" statements. Second, autonomy supportive instructors provided rationales for the activities and offered encouragement. Controlling instructors issued directives or demands. Third, autonomy supportive instructors were responsive to student-generated questions, offered hints, allowed time for the student to work in his/her own way, and gave positive informational feedback. Conversely, the controlling instructors criticized the student, gave answers, and gave praise as a contingent reward.

Minute Paper in Undergraduate Courses

Angelo and Cross (1993) described the Minute Paper (also known as "half-sheet response" and "One-Minute Paper") as a very short writing activity that can be used as a formative assessment strategy in the classroom. Wilson (1986) attributed the origin of the

Minute Paper to Charles Schwartz, a physics professor at the University of California, Berkeley, who ended his lecture early four or five times a semester and asked his class to respond to the following two questions:

- What was the most significant thing you learned today?
- What question is uppermost in your mind at the end of this class section?

The Minute Paper was popularized by Cross and Angelo (1988) in their book on classroom assessment techniques. They recommended the instructor ask some variation of the following questions during the last few minutes of class:

- What was the most important thing you learned during class?
- What important question remains unanswered?

The instructor would then review the responses and either answer the frequently asked questions at the beginning of the next class, adjust the classroom instruction, or respond to the individual student.

Benefits of Minute Papers. The great advantage of the Minute Paper is the timely and useful feedback from students with a minimal investment of time and energy (Angelo & Cross, 1993). The Minute Paper is useful for large classes where it is difficult for the instructor to interact individually with the students (Weaver & Cotrell, 1985; Craig, 1995). The time required to review the Minute Papers is minimal; Craig (1995) reported it only took 15 to 20 minutes to review 70 responses.

The Minute Paper can be used across a wide range of disciplines and settings. For example, it has been used in courses as varied as economics (Erickson & Erickson, 2013), art history (Steele, 1995), multicultural awareness (Ludwig, 1995) and nursing (Anderson & Burns, 2013). Benefits of the Minute Paper have been reported in

undergraduate introductory courses (Orr, 2005), upper division courses (Fisher, 2006), and post-graduate courses (Ashakiran & Deepthi, 2013). In addition, the strategy has been successfully implemented in classroom (Chizmar & Ostrosky, 1998) as well as online settings (Vonderwell, 2004).

Ashakiran and Deepthi (2013) identified the following benefits of the Minute Paper in their course. First, it provided instant feedback to the instructor on how well the students were learning the topic covered in the instruction. Second, it kept the students alert during the instruction because they knew they would need to respond on the content. Last, it allowed students who were shy or hesitant to participate in class equally with their more out-spoken peers.

Concerns regarding Minute Papers. Cross and Angelo (1993) cautioned against using the Minute Paper poorly, such as not using questions which were clearly comprehended and quick to answer. They found students who do not see the benefits of this short writing activity will often view the technique as a gimmick and not seriously reply to the instructor's prompt questions. In a review of the Minute Paper literature, Stead (2005) reported students' opinions were generally favorable toward this activity if they did not have to complete it at the end of every class. However, Flood (2013) and Lucas (2010) recommended Minute Papers be used at the end of each class to establish good student-instructor communication. They encouraged orienting the student to the rationale of the Minute Paper at the beginning of the course and providing responses to the students' questions.

A struggle with Minute Papers is developing the appropriate questions to use as prompts. Cross and Angelo (1993) warned it could be difficult to write prompts that

could be immediately and clearly comprehended and quickly answered. Vonderwell (2004) used online Minute Papers during the first five weeks of her online course for preservice teachers. Each week she asked the following three questions:

1. What are the most important things you learned this week?
2. What are the points still remaining that you would like to learn after this week's activities?
3. Do you have any suggestions or ideas with respect to the class activities, documents, and assignments?

At the end of the first five weeks, several students indicated the questions seemed too repetitive and too general. Vonderwell revised the questions to focus on how they could apply the activities in their teaching. She reported goal-oriented and diverse questions helped students avoid fatigue and information overload.

Summary

Much of the published work for designing blended learning has focused on best practices and case studies rather than empirical studies (Picciano & Dziuban, 2007). Drysdale et al. (2013) call for more empirical research studies based on theoretical foundations in the area of blended learning and student motivation. They felt it important to identify evidence-based design features that would lead to greater student motivation and engagement. They stated, "Whether a student is intrinsically or extrinsically motivated, certainly an understanding of design approaches that feed student motivation would increase the effectiveness of blended environments" (Drysdale et al., 2013, p. 98).

The purpose of this study was to evaluate, from a SDT perspective, the impact of an online Minute Paper with and without online instructor response on students' learning

motivation in a flipped blended course. The methodology for this study is described in Chapter Three.

Chapter III

Methodology

The purpose of this study was to evaluate, from a Self-Determination Theory (SDT) perspective, the impact of an online Minute Paper with and without online instructor response on students' learning motivation in a flipped blended course. The blended course format may reduce the students' face-to-face time with instructors, which may negatively affect students' motivation to learn. Babb et al. (2010) stated there is a need for effective student-instructor communication strategies to compensate for the reduced face-to-face interaction time in class.

In order to meet the stated purposes of this study, the following research questions were proposed:

1. Is there a significant difference in perceived instructor autonomy support, as measured by the LCQ, between the No Minute Paper group, the Online Minute Paper group, and the Online Minute Paper with Online Instructor Response group, after controlling for the following factors: (a) student academic motivation, (as measured by the AMS), (b) gender, (c) year in school, (d) teacher, (e) previous online learning, (f) whether the course was required for major, and (g) entry level perceived instructor autonomy support?
2. How much of the variability in perceived instructor autonomy support could be explained by: (a) student academic motivation, (b) gender, (c) year in school, (d) teacher, (e) previous online learning, (f) whether the course was required for major, and (g) entry level perceived instructor autonomy support?

3. Is there a significant difference in student motivation to complete online instruction, as measured by the SMS, between the No Minute Paper group, the Online Minute Paper group, and the Online Minute Paper with Online Instructor Response group, after controlling for the following factors: (a) student academic motivation, (b) gender, (c) year in school, (d) teacher, (e) previous online learning, and (f) whether the course was required for major?
4. How much of the variability in student motivation to complete online instruction could be explained by: (a) student academic motivation, (b) gender, (c) year in school, (d) teacher, (e) previous online learning, and (f) whether the course was required for major?

In this chapter, the methods and procedures that were used for this study are presented. Specifically, the participants, sampling strategy, research design, procedures, survey instruments, data collection, and data analysis methods are described.

Participants

The subjects for this study were undergraduate students enrolled in an introductory nutrition course at a private four-year University in the Intermountain West area of the United States during the Fall Semester 2014. The introductory nutrition course is a food-oriented study of nutrition facts and principles with an emphasis on evaluating dietary intake and promoting healthy eating behaviors. The course does not have any prerequisites and is a required class for Exercise Physiology and Health Science majors from the College of Agriculture and Life Sciences, and Family and Consumer Science majors from the College of Education and Human Development.

Nine sections of the nutrition course were offered during the Fall Semester 2014 in a blended format where one of the three weekly face-to-face classroom instruction hours was replaced with online instruction. Thirty minutes of online instruction was completed prior to each face-to-face class. Historically, the campus course enrollment ranged from 350 to 420 students per semester and approximately 60% of the students in the class were freshmen.

Sampling

The study's target population was students enrolled in introductory courses taught in a flipped blended format at the private four-year University. There were 14 introductory (freshman level) courses taught in a blended format at the University. The experimentally accessible population was students enrolled in the introductory nutrition course during the Fall Semester 2014. The introductory nutrition blended course was selected to be the study's sample because both its online and classroom instruction were systematically designed and validated (see Appendix A) which minimized a potential internal validity threat of poor instructional design.

This study used convenience sampling, a nonprobability sampling technique, as the sampling design because the participants were not randomly selected from the target population. As a result, this study was susceptible to selection bias because it did not guarantee all eligible members of the target population would have an equal chance of being included in the study (Gall et al., 2007). Although some researchers argue inferential statistics require random selection for meaningful interpretation, Gall et al. (2007) maintain that inferential statistics may be used with convenience sampling if the sample was representative of the target population. However, they recommend caution

about “making generalizations from them on the basis of one study. Repeated replication of the findings is much stronger evidence of their validity and generalizability than a statistically significant result from one study” (Gall et al., 2007, p. 176).

The projected demographic data for the introductory blended courses and the nutrition blended courses for Fall Semester 2014, based on June 25, 2014 registration data, indicated that the convenience sample for this study was representative of the students enrolled in the University’s introductory blended courses: they were typically 18 to 19 years of age, approximately 67-69% female, primarily single, and had an average ACT score of 20. The sample differed from the target population by having a lower proportion of freshmen, 65% versus 81% respectively (see Table 2).

On the first day of the course, the students enrolled in the introductory nutrition blended course were informed of the study and given a copy of the informed consent (see Appendix F for informed consent). Students were given the opportunity to choose whether their data would be included in the study in an informed consent/entry survey sent after the first day of class using the Qualtrics online survey tool.

After the second class, all students enrolled in the course were randomly assigned to the control and treatment groups at the class level so that each class would have an appropriate proportion of the three group scenarios. Each student’s name in a class was posted in an Excel spreadsheet and assigned a random number using Excel’s RAND function. The numbers were then sorted from lowest to highest using Excel’s SORT function. The lowest third of the numbers were assigned to the No Minute Paper group, the next third were assigned to the Online Minute Paper group, and the highest third were assigned to the Online Minute Paper with Online Instructor Response group.

Table 2

Target Population and Introductory Nutrition Course Demographics

	Target Population (n = 1,485)	Experimentally Accessible Population (n = 402)
Age		
Range	16-48 years	17-31 years
M (*SD*)	18 (2.5) years	19 (2.4) years
Gender		
Male	31%	33%
Female	69%	67%
Year in school		
Freshman	81%	65%
Sophomore	11%	17%
Junior	5%	11%
Senior	3%	6%
Non-Matriculating	0%	1%
High School GPA		
M (*SD*)	3.37 (.42)	3.42 (.42)
ACT		
M (*SD*)	20.39 (3.55)	20.13 (3.28)
Marital Status		
Single	94%	91%
Married	5%	8%
Divorced	0%	0%
Unknown	1%	1%

Note. Demographic data were obtained from the University's academic office on June 25, 2014.

Research Design

The study used a pretest-posttest control group design (Gall et al., 2007) (see Table 3). The pretest-posttest control-group design will be used because it can effectively control for the internal validity threats of history, maturation, testing, instrumentation,

statistical regression, differential selection, experimental mortality, and selection-maturation interaction (Gall et al. 2007).

Table 3

Experimental Pretest-Posttest Control Group Design

	Random Assignment	Pretest	Treatment	Posttest
No Minute Paper	R	O_1		O_2
Minute Paper	R	O_1	X_1	O_2
Minute Paper with instructor online response	R	O_1	X_2	O_2

Note. R = random assignment
O_1 = Entry survey (Pretest)
X_1 = online instruction with online Minute Paper
X_2 = online instruction with online Minute Paper and online instructor response
O_2 = Post survey (Posttest)
Adapted from "Educational Research" by M. D. Gall, J. P. Gall, and W. R. Borg, 2007.

Procedures

This section will describe the experimental treatments and development process of the online instruction and course design. The online instructional materials were administered through the University's LMS.

Experimental treatments. The independent variable had three levels: No Minute Paper, Online Minute Paper, and Online Minute Paper with Online Instructor Response. All students enrolled in the flipped blended course received the same online instructional materials. The Online Minute Paper group concluded the online instruction with an online Minute Paper and the Online Minute Paper with Online Instructor Response group concluded the instruction with an online Minute Paper and received an online instructor response.

Online Minute Paper. The online Minute Paper provided the instructor the students' perceptions of the instruction's significance and the students' questions on the material. The online Minute Papers in this study were designed according to guidelines given by Angelo and Cross (1993), who recommended instructors use the questions "What was the most significant thing you learned during class?" and "What important question remains unanswered?" as a starting point to develop two to three prompt questions tailored to meet the needs of their instruction.

Online Minute Paper prompts were designed for the students to reflect on the online instruction and were beta-tested in four sections of the flipped blended introductory nutrition course during the first half of Spring Semester 2014. At the end of the semester students were asked in an online survey, "What aspect (if any) of the reflections did you find most helpful?" and "What aspect (if any) of the reflections did you find least helpful?" Several students found the online Minute Paper helpful and most of the students liked the opportunity to ask questions. One student stated, "What I liked about it is that it made me do my work. I know the questions on the reflection weren't very tough, but I felt more accomplished for reading and doing the preparation. There wasn't anything that I didn't like about it." Another student said, "I sometimes found the reflections helpful because I could ask specific questions, because honestly I forget very quickly and it gave me the opportunity to ask."

Some students reported they did not like the similarity of the first prompt or the prompt was not meaningful for the lesson. After the student survey, a Delphi survey was conducted with five nutrition instructors to establish prompts that were more meaningful for the six blended lessons was used in this study. The nutrition instructors came to a

consensus after four revisions. Each Minute Paper had three prompts. Examples of the first prompts were:

- Lesson One: What was the most interesting concept you learned in the "Science of Nutrition" preparation activity?
- Lesson Two: What was the most useful idea for you in the "Evaluating Nutrition Information" preparation activity?
- Lesson Three: What was the most surprising thing you learned in the "Evaluating Nutrient Intake" preparation activity?

The second and third prompts were the same for each online Minute Paper:

- What questions do you have from the preparation? (You may put a period if you don't have a question.)
- Do you have any other comments you would like to share and/or ideas that could improve the online preparation in the future? (You may put a period if you don't have a comment.)

Instructor response. The second treatment group received an online instructor response to the online Minute Paper. The instructor response began with the student's first name, included a brief comment on the student's reflection/questions using autonomy supportive language, and concluded with the instructor's name. A training session on how to give instructor responses along with a resource list of commonly asked questions and possible responses was given to the instructors one week prior to Fall Semester 2014 (see Appendix G).

Prior to the beginning of the study, all the students in the course were informed on how to access instructor feedback to their assignments. The LMS used in this study

provided students' with a summary of their scores when they logged into the system. A yellow "comment" symbol appeared next to the score when the student had instructor comments (see Figure 3).

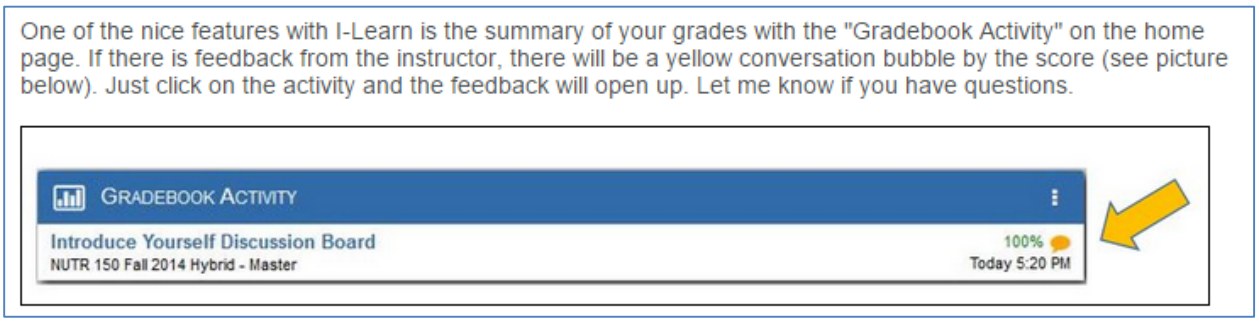

Figure 3. Instructions on how to access instructor comments to assignments.

Blended instruction. The online and face-to-face instructional material were developed by the researcher using the ADDIE Instructional design process, a systematic design process that employs the steps of Analyze, Design, Develop, Implement, and Evaluate (Gagné et al., 2005). The alignment of the instructional goals, objectives, assessment, instructional materials, and learner interaction/engagement was evaluated by subject matter and instructional design experts using the Delphi method. Descriptions of the instructional development process are described in Appendix A.

The online format in the LMS was designed to adhere to the standards in the Quality Matters Rubric (Quality Matters, 2013). Quality Matters is a non-profit organization dedicated to the continuous improvement of online instruction. The QM Rubrics have been developed and regularly updated through a rigorous process that examines relevant research, data, and practitioner perspectives. They consist of Standards supported by detailed Annotations explaining the application of the Standards and are intended to support the continuous improvement of courses with constructive feedback provided by trained and certified Peer Reviewers using a specific review protocol.

Instrumentation

This research study used three instruments. The AMS was used to measure student motivation to attend school, one of the independent variables. The LCQ was used to determine students' perceived instructor autonomy support, one of the dependent variables. The SMS was used to measure the dependent variable of students' motivation level to complete the online instruction.

Academic Motivation Scale. The AMS was designed to measure a students' motivation to attend college based on the motivation categories in the SDT (Vallerand, Pelletier, Blais, Briére, Senecal, & Vallieres, 1992). The instrument is made up of the following subscales:

- intrinsic motivation – motivation to know,
- intrinsic motivation – motivation to achieve,
- intrinsic motivation – motivation to experience stimulation,
- extrinsic motivation – identified regulation,
- extrinsic motivation – introjected regulation,
- extrinsic motivation – external regulated learning, and
- amotivation.

The AMS consists of 28 items (four items per subscale) and uses a 7-point Likert scale (1 = does not correspond at all, 7 = corresponds exactly). The items answer the overarching question "Why do you go to college?" (see Appendix B). The following are sample items from the instrument for each motivational category:

- intrinsic motivation – motivation to know: "Because I experience pleasure and satisfaction while learning new things."

- intrinsic motivation – motivation to achieve: “For the pleasure I experience while surpassing myself in my studies.”
- intrinsic motivation – motivation to experience stimulation: “For the pleasure that I experience when I read interesting authors.”
- extrinsic motivation – identified regulation: “Because I think that a college education will help me better prepare for the career I have chosen.”
- extrinsic motivation – introjected regulation: “To prove to myself that I am capable of completing my college degree.”
- extrinsic motivation – external regulated learning: “Because with only a high-school degree I would not find a high-paying job later on.”
- amotivation: “Honestly, I don’t know; I really feel that I am wasting my time in school.”

Vallerand and Bisonnette (1992) evaluated the AMS reliability with university students and reported satisfactory internal consistency with a mean Cronbach alpha of .81 and a temporal stability over a one-month period with a mean test-retest correlation of .79. Other studies have supported Vallerand and Bisonnette’s (1992) findings for reliability (Chen & Jang, 2010; Smith, Davy, & Rosenberg, 2010; Rienties, Giesbers, Tempelaar, Lygo-Baker, Segers, & Gijselaers, 2012). A reliability test on this study’s data indicated that the AMS has a satisfactory internal consistency across the subscales, with the Cronbach alpha ranging from .76 to .87. The AMS has been validated for construct and concurrent validity (Vallerand, Pelletier, Blais, Briére, Senecal, & Vallieres, 1993; Fairchild, Horst, Finney, & Barron, 2005; Grouzet, Otis, & Pelletier, 2006; Miller, 2007; Chen & Jang, 2010; Akoto, 2014).

The level of the student's overall self-determination to attend a university can be estimated by the Relative Autonomy Index (RAI). The RAI is calculated from the AMS motivational profile (scores from the seven subscales) and has a range of -72 to 72 (Grolnick & Ryan, 1987). The RAI is calculated using the following equation:

RAI = External*(-2) + Introjected*(-1) + Identified*(1) + Intrinsic*(2)

Other studies have successfully utilized the RAI to represent the motivation level to attend a university (Black & Deci, 2000; Chen & Jang, 2010; Ryan & Deci, 2010).

Learning Climate Questionnaire. The LCQ was designed to assess the degree to which the student perceives the instructor to be autonomy supportive versus controlling. Williams and Deci (1996) defined autonomy support as a person in an authority role taking the students' perspective, acknowledging their feelings and perceptions, and providing them with information and choice while minimizing the use of pressure and control. The LCQ consists of 15 items and uses a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). It was adapted from the Health Care Climate Questionnaire (Williams & Deci, 1996) (See Appendix C). Sample items from the instrument include:

- I feel that my instructor provides me choices and options.
- My instructor conveyed confidence in my ability to do well in the course.
- I don't feel very good about the way my instructor talks to me. [Note: negatively scored item]

The LCQ has a single underlying factor and has consistently shown high internal consistency with the Cronbach alpha ranging .9 or above (Williams & Deci, 1996; Black & Deci, 2000; Williams, Saizow, Ross, & Deci, 1997). The LCQ Cronbach alpha in this study was .95. Williams and Deci (1996) reported construct validity for this instrument.

Situational Motivation Scale. The SIMS is designed to measure students' motivation to complete an activity based on the motivation categories in the SDT (Guay, Vallerand, & Blanchard, 2000). The instrument is made up of the following four subscales:

- intrinsic motivation,
- identified regulation,
- external regulation, and
- amotivation.

SIMS consists of 16 items (four items per subscale) and uses a 7-point Likert scale (1 = does not correspond at all, 7 = corresponds exactly). The items address a single overarching question "Why are you engaged in this activity?" (see Appendix D). The following are sample items from the instrument for each motivational category:

- intrinsic motivation: "Because I think that this activity is interesting."
- identified regulation: "Because I am doing it for my own good."
- external motivation: "Because I am supposed to do it."
- amotivation: "There may be good reasons to do this activity, but personally I don't see any."

Brooks and Young (2011) made a similar modification to the stem question to read, "Why are you doing the work for this class?" They reported good internal consistency with a Cronbach alpha of .892 for intrinsic motivation, .807 for identified regulation, .799 for external regulation, and .841 for amotivation. In this study, the calculated Cronbach alpha was .870 for intrinsic motivation, .862 for identified regulation, .763 for external

regulation, and .848 for amotivation. Guay et al. (2000) reported construct validity for the SIMS instrument.

The Self-Determination Index (SDI), calculated from the SIMS subscale scores, is a measure of a person's self-determination to complete a specific activity (Vallerand & Ratelle, 2002; Lonsdale, Sabiston, Raedeke, Ha, & Sum, 2008). The SDI represents the students' level of self-determination to complete the online instruction in this study. The SDI formula is calculated using the following equation:

SDI = External*(-2) + Introjected*(-1) + Identified*(1) + Intrinsic*(2)

Data Collection

The study took place during the first four weeks of Fall Semester 2014. One the first day of class, students enrolled in the nine flipped blended sections of the introductory nutrition course were informed of the study and given a copy of the informed consent (see Appendix F for informed consent). At the end of the first week, students were sent an entry survey via the online survey tool Qualtrics. The survey contained the informed consent and questions for demographic data (age, gender, year in school), extent of students' prior online experience, the Academic Motivation Survey (28 items), and the Learning Climate survey (15 items). At the conclusion of the three weeks of instruction, the participants were sent the summary survey via Qualtrics which contained the LCQ (15 items), and the SIMS (16 items).

Survey data was downloaded from Qualtrics as an Excel file and information regarding participant treatment group, course section, number of absences, and missed class preparations were added. The password protected survey file was sent to the institutional research department where the demographic data provided by the Registrar's

Office was merged with the survey data and students' identifying information was replaced with an identification number. The data was given to the researcher as an Excel file for analysis.

Data Analysis

There were several variables in this study. The dependent variables were student perception of instructor autonomy support at the end of the study and student motivation to complete online instruction (see Table 4). The independent variables were the treatment groups and the following covariate and fixed factor variables: academic motivation to attend a university; gender; year in school; teacher; previous online learning; if the course was required; and pretest perception of instructor autonomy support (see Table 5).

Table 4

Dependent Variables Description

	Description	Indicator
Motivation to Complete Online Instruction	Participant's degree of self-determination to complete the online instruction	SDI (range -72 to 72)
Posttest perceived instructor autonomy support	Posttest participants' perception of extent instructor listens to their perspectives and provides pertinent information	Posttest LCQ (range 15 to 105)

Table 5

Independent Variables and Covariate/Fixed Factor Descriptions

	Description	Indicator
Treatment groups	No Minute Paper Online Minute Paper only Online Minute Paper with online teacher response	
Academic motivation	Participant's degree of self-determination to be at college	RAI (range -72 to 72)
Gender	The gender of the participant	Male, Female
Year in school	Number of completed college credits	Freshman (<30 credits) Sophomore (30-59 credits) Junior (60-89 credits) Senior (90+ credits)
Teacher	To control for possible "teacher effect" among three instructors	Teacher 1 Teacher 2 Teacher 3
Previous online learning	Number of online classes the participant has taken	0 online classes 1-2 online classes 3+ online classes
Required course	Course required for the participant's major	Yes, No
Pretest perceived instructor autonomy support	Pretest participants' perception of extent instructor listens to their perspectives and provides pertinent information	Pretest LCQ (range 15 to 105)

To answer the first research question, an Analysis of Covariance (ANCOVA) procedure using SPSS 21 was conducted to determine if there was a significant difference for posttest perceived instructor autonomy support while controlling for pretest perceived instructor autonomy support, academic motivation, gender, year in school, teacher, previous online learning, and if course was required. ANCOVA is a statistical procedure that uses the F-ratio to test the overall fit of a linear model while controlling for the effect

that one or more of the covariates on the dependent variable (Field, 2009). The following ANCOVA assumptions were checked: (a) independence of observations, (b) normal distribution of the dependent variable, (c) homogeneity of variances, (d) linear relationships between the covariates and the dependent variable, and (e) homogeneity of regression slopes. A Kolmogorov – Smirnov test revealed the assumption of normality was violated, $D(137) = .10$, $p < .01$. After the dependent variable was transformed by squaring, the assumption of normality was met, $D(137) = .07$, $p = .08$. There was not a difference in the conclusions from these two tests. Hence, the results of the ANCOVA using the dependent variable and the transformed dependent variable support Rutherford's (2012) statement, the ANCOVA analysis is robust with respect to violation of the normality assumption, especially when there is a larger sample size (see Appendix H).

To answer the second research question, eta squared was calculated from the posttest instructor autonomy support data. Eta squared measures the proportion of the variation in the dependent variable that is associated with the membership of the different groups defined by an independent variable (Richardson, 2011).

To answer the third research question, an ANCOVA procedure was used to determine if there was a significant difference between the groups for motivation to complete online instruction, controlling for academic motivation, gender, year in school, teacher, previous online learning, and if course was required. The following ANCOVA assumptions were checked and met: (a) independence of observations, (b) normal distribution of the dependent variable, (c) homogeneity of variances, (d) linear relationships between the covariates and the dependent variable, and (e) homogeneity of

regression slopes. The Levene test of equality of error variances indicated the assumption of homogeneity of variances was violated. However, Moore, McCabe, and Craig (2009) recommend an alternative guideline of "the largest standard deviation is less than twice the smallest standard deviation" (p. 646) for evaluating homogeneity of variances. Using this criterion the assumption of homogeneity of variances was satisfied.

To answer the fourth research question, eta squared was calculated from the motivation to complete online instruction data to determine the proportion of the variance for motivation to complete the online instruction that was attributable to academic motivation, gender, year in school, teacher, previous online learning, and if course was required.

Summary

This chapter presented information about the methodology used in this study. It described the subjects, sampling strategy, research design, procedures, instrumentation, data collection, and data analysis methods. The results from this study are described in Chapter Four.

Chapter IV

Results

The purpose of this study was to evaluate, from a Self-Determination Theory (SDT) perspective, the impact of an online Minute Paper with and without online instructor response on students' learning motivation in a flipped blended course. The study was conducted during the Fall Semester 2014 at a private four-year University in the Intermountain West area of the United States. The following research questions guided the study:

1. Is there a significant difference in perceived instructor autonomy support, as measured by the LCQ, between the No Minute Paper group, the Online Minute Paper group, and the Online Minute Paper with Online Instructor Response group, after controlling for the following factors: (a) student academic motivation (as measured by the AMS), (b) gender, (c) year in school, (d) teacher, (e) previous online learning, (f) whether the course was required for major, and (g) entry level perceived instructor autonomy support?
2. How much of the variability in perceived instructor autonomy support could be explained by: (a) student academic motivation, (b) gender, (c) year in school, (d) teacher, (e) previous online learning, (f) whether the course was required for major, and (g) entry level perceived instructor autonomy support?
3. Is there a significant difference in student motivation to complete online instruction, as measured by the SIMS, between the No Minute Paper group, the Online Minute Paper group, and the Online Minute Paper with Online Instructor Response group, after controlling for the following factors:

(a) student academic motivation, (b) gender, (c) year in school, (d) teacher, (e) previous online learning, and (f) whether the course was required for major?

4. How much of the variability in student motivation to complete online instruction could be explained by: (a) student academic motivation, (b) gender, (c) year in school, (d) teacher, (e) previous online learning, and (f) whether the course was required for major?

This chapter will present a description of the sample used in the study and data analysis for each of the four research questions.

Description of the Sample

During the first week of Fall Semester 2014, an informed consent with the entry surveys was sent to the 410 students enrolled in the nine sections of the blended introductory nutrition course using the online Qualtrics survey tool. Of the 410 students, 212 agreed to participate in the study (51.7%). Eight of the 212 students were not 18 years of age or older and were excluded from the study. The remaining 204 students completed the entry survey.

At the conclusion of the study, the final survey was sent to the 204 participants who completed the initial survey using the online Qualtrics survey tool. Of the 204 participants, 152 (75%) completed the final survey. Of the 152 participants who completed the final survey, 15 were excluded from the study because they had missed either more than one class or more than one online instruction preparation. The attrition in the No Minute Paper group, Online Minute Paper group, and Online Minute Paper with Online Instructor Response group were similar (30%, 31%, and 38% respectively).

The participant demographics for the control, treatment one, and treatment two groups were very similar: they were typically 19 to 21 years of age, 67 to 71% female, 55 to 62% freshmen, and 45 to 56% were required to take the class for their major. There was a higher percentage in the No Minute Paper group that had not taken an online class than Online Minute Paper group, 62% versus 46% respectively (see Table 6).

Table 6

Participant Demographics by Group

	No Minute Paper (n = 42)	Minute Paper (n = 46)	Minute Paper with Instructor Response (n = 49)
Age			
Range	18-45 years	18-33 years	18-44 years
M (*SD*)	21.0 (4.6) years	20.1 (3.1) years	20.7 (4.3) years
Median	20 years	19 years	20 years
Gender			
Male	29%	33%	29%
Female	71%	67%	71%
Year in school			
Freshman	62%	61%	55%
Sophomore	7%	19%	18%
Junior	19%	11%	17%
Senior	12%	9%	10%
Online classes taken			
No online classes	62%	46%	51%
1 to 2 online classes	26%	26%	37%
3 or more online classes	12%	28%	12%
Required course for major			
Yes	50%	56%	45%
No	50%	44%	55%

Research Question 1

The perceived instructor autonomy support was evaluated using the LCQ, which has a range of 15 to 105. The descriptive statistics for posttest perceived instructor autonomy support is listed in Table 7.

Table 7

Group Means and Variability for Posttest Perceived Instructor Autonomy Support

	n	*M*	*SD*
No Minute Paper	42	88.7	12.4
Minute Paper	46	84.1	13.1
Minute Paper with Instructor Response	49	86.5	12.6

One of the independent variables, motivation to attend a university, was evaluated using the RAI, a score calculated from the AMS subscale scores.

An analysis of covariance (ANCOVA) was used to assess whether there was a significant difference in posttest perceived instructor autonomy support between the no Minute Paper, online Minute Paper only, and online Minute Paper with online instructor response groups, while controlling for student academic motivation, gender, year in school, teacher, previous online learning, if the course was required, and pretest perceived instructor autonomy support. The assumption of normality was not met until the dependent variable, posttest perceived instructor autonomy support, was transformed by squaring the values. Results indicated there was not a significant difference between the groups for perceived instructor autonomy support, $F(2,123) = 1.94$, $p = .16$ (see Table 8).

Table 8

Analysis of Covariance for Posttest Perceived Instructor Autonomy Support

Source	*df*	*MS*	*F*	*p*	Eta^2
Group	2	5159962	1.94	.15	.02
Pretest Perceived Instructor Autonomy Support	1	196096085	73.65	.00	.32
Academic motivation	1	540757	0.20	.65	.00
School Year	3	1463148	0.55	.65	.01
Instructor	2	3679984	1.38	.26	.01
Gender	1	489222	0.18	.67	.00
Online courses	2	1211144	.45	.64	.00
Required Course	1	3179463	1.19	.28	.01
Error	123	2662633			

Note. $R^2 = .465$

Research Question 2

The independent variables used in the ANCOVA analysis for the posttest perceived instructor autonomy support explained 46.5% of the variability. Eta squared was calculated from the posttest instructor autonomy support data to determine the proportion of the variance that was attributable to the covariate/fixed factors. The pretest perceived instructor support explained 32% of the variability. The factors of school year, instructor, and if the course was required explained only 3% of the variance. Motivation to attend a university and online course experience did not explain any of the variability (see Table 8).

Research Question 3

The student motivation to complete online instruction was evaluated using the SDI, a score calculated from SIMS subscale scores, and has a range of -72 to 72. Descriptive statistics for the SDI were determined for each treatment group and listed in Table 9.

Table 9

Group Means and Variability for Motivation to Complete Online Instruction

	n	*M*	*SD*
No Minute Paper	42	19.3	16.5
Minute Paper	46	11.4	22.9
Minute Paper with Instructor Response	49	10.6	19.9

An ANCOVA was used to assess whether there was a significant difference in motivation to complete online instruction between the No Minute Paper, Online Minute Paper, and Online Minute Paper with Online Instructor Response groups, while controlling for student academic motivation, gender, year in school, teacher, previous online learning, and if the course was required. Results indicated there was not a significant difference between the groups for student motivation to complete the online instruction, $F(2,124) = 1.91$, $p = .15$ (see Table 10).

Table 10

Analysis of Covariance for Motivation to Complete Online Instruction

Source	*df*	*MS*	*F*	*p*	Eta^2
Group	2	755.788	1.91	.15	.03
Academic motivation	1	2424.59	6.13	.01	.04
School Year	3	33.25	.09	.97	.00
Instructor	2	232.86	.59	.56	.01
Gender	1	106.99	.27	.60	.00
Online courses	2	568.09	1.44	.24	.02
Required Course	1	1.35	.01	.95	.00
Error	124	395.44			

Note. $R^2 = .123$

Research Question 4

The independent variables used in the ANCOVA analysis explained 12.3% of the variability in the student motivation to complete online instruction. Eta squared was calculated from the motivation to complete online instruction data to determine the proportion of the variance that was attributable to the covariate/fixed factors. Motivation to attend a university was significant ($p = .01$) and explained 4% of the dependent variable's variability. Previous experience with an online course explained 2% of the variability and instructor explained 1% of the variability. School year, gender, and whether the course was required did not explain the variability (see Table 10).

Summary

Chapter IV presented the results from this study. Descriptive statistics were provided to summarize the characteristics of the sample used in the study and the results of the data analysis for each of the four research questions.

The results indicated the online Minute Paper treatments did not have a significant impact on the student's perceived instructor autonomy support or motivation to complete the online instruction. The strongest factor explaining the variability in the posttest perceived instructor autonomy support was the pretest student perception of instructor autonomy support. The other factors did not explain much of the variance. The strongest factor explaining the variability on students' motivation to complete online instruction was the students' motivation to attend university, which explained only 3% of the variability. The discussion, implications, and areas for futher research are described in Chapter Five.

CHAPTER V

Summary and Conclusions

Blended courses, where online instruction replaces part of traditional classroom time, are becoming more prevalent in higher education (Hiltz & Turoff, 2005). There is concern that reduced student-instructor contact time will negatively affect students' motivation to learn. Babb et al. (2010) encourage instructional designers to implement online communication strategies that will help compensate for the reduced face-to-face interaction time in class.

This chapter will provide a summary of the study, finding and implications, discussion, limitations of the study, and recommendations for future research.

Summary of the Study

Purpose. The purpose of this study was to evaluate, from a Self-Determination Theory (SDT) perspective, the impact of an online Minute Paper with and without online instructor response on students' learning motivation in a flipped blended course. This study sought to answer the following questions:

1. Is there a significant difference in perceived instructor autonomy support, as measured by the LCQ, between the No Minute Paper group, the Online Minute Paper group, and the Online Minute Paper with Online Instructor Response group, after controlling for the following factors: (a) student academic motivation (as measured by the AMS), (b) gender, (c) year in school, (d) teacher, (e) previous online learning, (f) whether the course was required for major, and (g) entry level perceived instructor autonomy support?

2. How much of the variability in perceived instructor autonomy support could be explained by: (a) student academic motivation, (b) gender, (c) year in school, (d) teacher, (e) previous online learning, (f) whether the course was required for major, and (g) entry level perceived instructor autonomy support?
3. Is there a significant difference in student motivation to complete online instruction, as measured by the SIMS, between the No Minute Paper group, the Online Minute Paper group, and the Online Minute Paper with Online Instructor Response group, after controlling for the following factors: (a) student academic motivation, (b) gender, (c) year in school, (d) teacher, (e) previous online learning, and (f) whether the course was required for major?
4. How much of the variability in student motivation to complete online instruction could be explained by: (a) student academic motivation, (b) gender, (c) year in school, (d) teacher, (e) previous online learning, and (f) whether the course was required for major?

Literature Review. The review of literature identified gaps regarding flipped blended courses and Minute Papers in undergraduate courses. Specifically for blended learning, there was a lack of empirical research evaluating design strategies. Much of the literature for designing blended courses described best practices and case studies. Drysdale et al. (2013) called for more empirical research studies based on theoretical foundations to evaluate blended learning and student motivation.

In terms of Minute Papers, there was a paucity of research evaluating the online use of the Minute Paper strategy. Another gap was a lack of research evaluating the

impact of the Minute Paper on students' learning motivation. Most of the research focused on using Minute Papers in the face-to-face classroom and its impact on student performance. The reports of the impact of the Minute Paper on student-instructor interactions were based on case studies and were not empirically measured.

Methodology. This study used a pretest-posttest control group design (Gall et al., 2007) and took place during the second to fourth weeks of the Fall Semester 2014 at a private four-year University in the Intermountain West. The study examined the effect of online Minute Papers with and without online instructor response on the students' perceived instructor autonomy support and motivation to complete online instruction.

The following instruments were used to assess the dependent variables. The Learning Climate Questionnaire (LCQ) assessed students' perceived instructor autonomy support, the dependent variable in research questions 1 and 2. The Situational Motivation Survey (SIMS) assessed students' motivation to complete the online preparation, the dependent variable in research questions 3 and 4. The Academic Motivation Scale (AMS) assessed motivation to attend a university, an independent variable used in all the research questions.

Participants in this study were undergraduate students enrolled in an introductory nutrition course taught in a flipped blended format. The inclusion criteria were that the student: (a) be enrolled in the course by the end of the first week of the semester, (b) was at least 18 years old, (c) gave consent for their data to be used in the study, (d) completed at least five of the six online instruction modules, and (e) attended at least five of the six face-to-face classes.

Two hundred and four participants completed the entry survey containing questions regarding prior online courses taken, the LCQ, and the AMS. At the conclusion of the study, 152 completed the final survey containing the LCQ and SIMS. Of the 152 participants who completed the final survey, 15 were excluded because they had missed either more than one class or more than one online preparation.

Findings and Implications

Research Question 1. The results for the first research question indicated there was not a significant difference in students' perceptions of instructor autonomy support between the No Minute Paper group, Online Minute Paper group, and Online Minute Paper with Online Instructor Response group, after controlling for student academic motivation, gender, year in school, teacher, previous online learning, whether the course was required for major, and entry level perceived instructor autonomy support.

The use of an online Minute Paper with or without online instructor response during the second to fourth weeks of a semester in an introductory level course did not enhance the students' perceptions of the instructor's willingness to listen to their perspective nor providing support for them in their learning. These findings were differed from Lightbody's (2013) study where students reported online Minute Papers as useful during the first five week of the semester. Perhaps students in Lightbody's study perceived benefits of an online Minute Paper other than an enhanced perception of instructor autonomy support.

Research Question 2. The results for the second research question indicated the independent variables explained 46.5% of the variability in the dependent variable, posttest perceived instructor autonomy support. The pretest perceived instructor support

explained 32% of the variability of the dependent variable and was significant ($p < .01$). School year, instructor, and if the course was required explained only 3% of the variability. Students' motivation to attend a university and online course experience did not explain any of the variability.

The only significant confounding variable was the students' pretest perception of instructor autonomy support. This controlling variable should be included in future studies to optimize the prediction of students' posttest perception of instructor autonomy support. The independent variables of school year, instructor, whether course was required, motivation to attend a university, and online course experience were not significant confounding variables for the students' posttest perception of instructor autonomy support.

Research Question 3. The results for the third research question showed no significant difference in motivation to complete online instruction between the No Minute Paper group, Online Minute Paper group, and Online Minute Paper with Online Instructor Response group, after controlling for student academic motivation, gender, year in school, teacher, previous online learning, and whether the course was required for major.

It was hypothesized the online Minute Paper with online instructor response would enhance student motivation to complete online instruction. Two factors may explain why this did not occur. First, the SDT argues there is a link between perceived instructor autonomy support and autonomous learning motivation (Niemiec & Ryan, 2009). Since the Minute Paper had no effect on perceived instructor autonomy support, it is not surprising there was no difference in motivation to complete online instruction.

Second, the blended learning literature suggested increased student-instructor communication would decrease confusion about online course material, which in turn would increase learning motivation (Babb et al., 2010). However, the confusion about online course material may have been minimized through the careful design of the online instruction using the ADDIE model and design of the online format to adhere to the Quality Matters™ Higher Education Rubric standards (Quality Matters, 2013), which weakened the link between student-instructor communication and learning motivation.

Research Question 4. The results for the fourth research question indicated the independent variables explained only 12.3% of the variability in the dependent variable, motivation to complete online instruction scores. Academic motivation explained 4% of the variability of the dependent variable and was a significant (p = .01). Previous experience with an online course explained 2% of the variability and instructor explained 1% of the variability. The factors school year, gender, and whether the course was required did not explain any of the variability.

The model used to evaluate students' motivation to complete online instruction accounted for only 12.3% of the dependent variable's variability. There may be other confounding factors not accounted for in this study (see Discussion below). The only significant confounding variable was the students' motivation to attend a university. The independent variables of online course experience, instructor, school year, and whether the course was required were not significant confounding variables on the students' motivation level for completing online instruction.

Discussion

Online Minute Paper and instructor autonomy support. The SDT posits an instructor can positively influence the quality of students' learning motivation by providing instructor autonomy support, which is characterized by the instructor understanding the students' perspectives, acknowledging their feelings, and providing pertinent information (Ryan & Deci, 2000b). It was proposed that an online Minute Paper, in which students identified the relevance of the online instruction, could ask the instructor questions and receive an instructor response that used autonomy supportive language, would enhance students' perception of instructor autonomy support. The results from this study indicated that an online Minute Paper, with or without instructor feedback, did not have a significant impact on students' perceptions of instructor autonomy support.

The results for Minute Papers with instructor response on students' perceived instructor autonomy support ran counter to previous non-experimental reports. Vonderwell (2004) reported a Minute Paper online journal with online instructor response helped foster a learner-centered environment and improved connections with the instructor. Similarly, Lucas (2010) observed emailing individual responses to Minute Papers completed at the end of a face-to-face class built student-instructor relationships.

Several factors may explain the differences in this study's findings and the previous reports. One factor is that the reports by Lucas and Vonderwell were based on personal observations and were not objectively measured. Consequently, the reported impact of the Minute Paper may have been based on the instructor's perceptions and not the students' reactions. Another factor may be the process by which the instructor gave

feedback. An instructor response by email may close a communication gap more effectively than the online response format available in the LMS used in this study (refer to Chapter 3 for discussion on LMS instructor response format).

Another explanation of why there was not a significant impact may be students had already gained a sense of instructor autonomy support in the face-to-face class and the Minute Paper itself was insufficient to further enhance the perceptions of instructor autonomy support. The students may have viewed the Minute Paper as an assignment that had to be completed and not an opportunity to talk with the instructor. In other words, the Minute Paper may not have provided a meaningful communication with the instructor.

Online Minute Paper and motivation to complete online instruction. It was postulated the online Minute Paper with instructor response would enhance students' motivation to complete online instruction because the students would receive timely responses to their questions and information to guide their individual study. The results for Research Question 3 indicated an online Minute Paper, with or without an online instructor response, did not have a significant impact on the motivation to complete the online preparation.

It is interesting to note the independent variables of treatment group, motivation to attend a university, gender, year in school, teacher, previous online learning, and whether the course was required for their major, explained only 12.3% of the variability in the motivation to complete online instruction scores. The level of the students' competence, which was not measured in this study, may have been a factor that would explain more of the variability. As detailed in the SDT literature review in Chapter 2, the innate psychological needs of autonomy, competence, and relatedness must be met in

order for students to have higher levels of motivation (Ryan & Deci, 2000). Several of the participants were novices in studying nutrition. They may not have felt competent enough to communicate with the instructor. In other words, they may not have had the confidence in their ability to communicate with the instructor about concepts they did not understand. This may have influenced their willingness to communicate meaningfully with the instructor through the Minute Paper.

Implications for Instructional Designers. Students in blended courses often struggle with unclear work expectations, inadequate time management skills, problems accepting responsibility for their own learning, and difficulty with technology (Vaughan, 2007). Evidence-based communication strategies, both online and in class, should be developed to address these issues and support the students' learning motivation.

Online Minute Papers with an online instructor response may not be the most effective communication strategy for blended learning for most instructors. An online instructor response is a time-consuming venture for the instructor and may not give most instructors an appreciable "return on investment". If the online Minute Paper is incorporated in the online instruction, it may be more profitable for the instructor to give timely responses in the face-to-face class where verbal and non-verbal communication can be used.

It is important to recognize instructors have different styles of teaching. Although the results of this study indicate an online Minute Paper with online instructor response does not predict a significant impact on the students' perception of instructor autonomy support or motivation to complete online instruction, some instructors may effectively utilize an online Minute Paper to enhance instructor/student communication.

Limitations of the Study

This section will highlight the limitations of the current study. One of the limitations was the recruitment of participants. A convenience sample was used because the participants were not randomly selected from the study's target population. In addition, the study took place at a private four-year University in the Intermountain West where the cultural background of the majority of the students was relatively homogeneous. Therefore, the results of the study may not be generalizable to other universities with a more diverse cultural background or to other undergraduate flipped blended courses.

Other limitations of the study are the various confounding variables in authentic learning environments. For example, an instructor with a controlling communication style in the classroom could potentially negate the benefits from an autonomy supportive response to the Minute Paper. Similarly, even though the instructor used autonomy supportive language in the online response, there could be a negative effect if the answers to the questions were incomplete or of poor quality.

Lastly, a qualitative analysis of the students' and instructor's experience with the online Minute Paper was not included in the study design. Although the study findings indicated an online Minute Paper with online instructor response did not enhance the students' perception of instructor autonomy support or motivation to complete online instruction, there may have been other benefits. A qualitative study would provide more information to understand the possible benefits on an online Minute Paper.

Recommendations for Future Research

Learning motivation research for flipped blended classes is in its infancy. The results from this study provided some insights into factors affecting students' perception of instructor autonomy support and motivation to complete online instruction from a SDT framework. Other aspects of the SDT, such as the roles of competence and relatedness, should be explored to determine their role in promoting learning motivation in flipped blended courses.

Although the Minute Paper does not work for all instructors, it would be interesting to explore the possible Minute Paper benefits from an instructor's point-of-view. Future qualitative research could identify the types of teachers who would benefit from using the online Minute Paper and those who would not benefit. Additional research would also be beneficial to determine if other formats of providing an instructor response, such as an email to the student, text messaging, or a direct response by the instructor in the face-to-face class, would enhance the effectiveness of the Minute Paper as a communication strategy.

In conclusion, flipped blended learning is increasingly incorporated in college classrooms throughout the United States. There is a need for evidence-based strategies to support students' learning motivation. Future research can pursue the challenges students face with blended learning and help identify the strategies that will help them succeed.

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APPENDIX A

Instruction Development

ANALYSIS PHASE

Rationale for Development of NUTR 150 Flipped Blended Instruction

A private four-year University in the Intermountain West area of the United States has experienced rapid growth in student enrollment. The enrollment increased from 12,500 students in Fall Semester 2010 to over 16,000 students in Winter Semester 2013. To accommodate the increased demands for classroom space, the University needed to increase the efficiency of classroom utilization.

During the Spring Semester 2013, the University offered nine face-to-face and three online sections of an undergraduate introductory nutrition course, NUTR 150 Essentials of Human Nutrition. With the increased enrollment, it had become increasingly difficult to find classroom space to schedule the face-to-face sections. Since there was classroom space for two-hour per week classes, the department chair and nutrition faculty decided to develop a flipped blended format of the course where one hour of face-to-face class instruction each week would be replaced with two online instruction modules to be completed prior to the face-to-face classes.

A blended course can offer benefits to the student if properly designed (Graham, 2006). The online instruction portion of the blended course can provide the students more time flexibility and an opportunity to work at their own pace. The face-to-face instruction portion gives students opportunities to interact in person with the instructor and other classmates.

The purpose of this project is to develop six blended learning classes (online and face-to-face instruction) for the flipped blended course. The module's outcomes and assessments will be unified with the traditional face-to-face and the online sections of the course. The ADDIE model, a systematic instructional design process, will be used to establish the unified goals, objectives, and assessments and to create the blended course instruction. The project's outcomes will include unified goals, objectives, and assessments for the three delivery formats of the course (traditional, online, and blended) for the module, three online instruction units, and six face-to-face class lesson plans. The online instruction units and lesson plans will be incorporated in the blended introductory nutrition course during the second, third, and fourth weeks of the semester.

Instructional Goals and Objectives for the Six Flipped Blended Units of Instruction

1. Science of Nutrition

Goals: The student will explain how the scientific method is used to establish nutrition knowledge. The student will be able to integrate nutrition knowledge from the scientific process and from revelation.

O*nline instruction objectives*

Objective 1. The student will be able to explain the steps of the scientific method.

Objective 2. The student will be able to recognize the difference between association and causation.
Objective 3. The student will be able to discuss the characteristics of epidemiological studies, animal studies, and clinical trials.
Objective 4. The student will be able to describe the components of sound scientific research.

Face-to-face class objectives
Objective 1. The student will be able to rank the strength of the evidence for nutrition studies based on the type of scientific study and the components of sound scientific experiments.
Objective 2. Given the Dietary Guidelines 2010 chapter 5 and section 89 of the Doctrine and Covenants, the student will be able to compare and contrast current evidence based dietary recommendations to the Word of Wisdom.

2. Evaluating Nutrition Information

Goal: The student will begin to apply the process of evaluating nutrition information using the strength of the evidence approach.

Online instruction objectives
Objective 1. The student will be able to describe the characteristics of reliable and unreliable nutrition information.
Objective 2. The student will describe the role of the Federal Trade Commission in nutrition advertising.
Objective 3. The student will describe the requirements for the Registered Dietitian Nutritionist credential.

Face-to-face class objectives
Objective 1. Given a case study, the student will be able to distinguish between reliable and unreliable nutrition information.
Objective 2. The student will be able to debate the government's role in regulating nutrition information.

3. Evaluating Nutrient Intakes

Goal: The student will be able to identify nutrient amounts in food and evaluate the nutrient adequacy using the Dietary Reference Intake tables.

Online Instruction Objectives
Objective 1. Given online access to the USDA Nutrient Database, the student will be able to determine the nutrient levels in a food.
Objective 2. Given a food label and Daily Value table, the student will be able to determine the nutrient amount in a serving of the food.
Objective 3. Given a nutrient amount, the student will be able to evaluate the nutrient's adequacy using the Dietary Reference Intake tables.

Face-to-face class objectives

Objective 1. Given a food composition book and Dietary Reference Intake tables, the student will be able to evaluate the nutrient adequacy of a food.

Objective 2. Given a dietary intake, food labels, Daily Value tables, food composition book, and Dietary Reference Intake tables, the student will be able to evaluate the nutrient adequacy of the dietary intake.

4. Evaluating Food Intakes

Goal: The student will be able to evaluate a food intake using the ChooseMyPlate food guide (choosemyplate.gov), USDA Eating Patterns, and the Dietary Guidelines for Americans 2010.

Online instruction objectives

Objective 1. The student will be able to describe the purpose of the ChooseMyPlate food guide.

Objective 2. Given a list of foods and portion sizes, the student will be able to determine the cup or ounce equivalents using the ChooseMyPlate food guide.

Objective 3. The student will be able to explain the concept of Solid Fats and Added Sugars (SoFAS) from the USDA Eating Patterns.

Objective 4. The student will be able to state the types of food Dietary Guidelines for Americans 2010 encourages to increase and decrease in our food intake.

Face-to-face class objective

Objective 1. The student will be able to estimate the following portion sizes of a food: two tablespoons, three fourths cup, one cup, and three ounces of meat.

Objective 2. Given a 24-hour food intake and the USDA Eating Patterns, the student will be able to evaluate the food intake.

Objective 3. Given a 24-hour Super Tracker dietary analysis, the student will be able to determine if the Dietary Guidelines for Americans 2010 recommendations for sodium, fat, and saturated fat were met.

5. Digestion

Goal: The student will describe the process of digestion and absorption of carbohydrate, protein, and fat in the human body.

Online instruction objectives

Objective 1. Given a figure of the digestive system, the student will be able to identify the location of the digestive tract organs and structures.

Objective 2. The student will be able to explain the functions of the organs in the digestive system.

Objective 3. The student will be able to list the names of the digestive enzymes for carbohydrate, protein, and fat.

Objective 4. The student will be able to describe how nutrients are absorbed.

Face-to-face class objective

Objective 1. The student will be able to describe the difference between taste and flavor.

Objective 2. The student will be able to explain the role of digestive enzymes, bicarbonate, and bile in the digestive process.

Objective 3. The student will be able to predict what would happen if the digestive enzymes or bile were not present.

Objective 4. The student will be able to list the four ways waste products are eliminated from the body.

6. Digestive Disorders and Metabolism

Goal: The student will recognize how common digestive disorders can affect the digestive process and a person's well-being. The student will describe the basic steps in the cellular process of making ATP from carbohydrate, protein, and lipids.

Online Instruction Objectives

Objective 1. The student will be able to identify the underlying causes for ulcers, heartburn, constipation, and celiac disease.

Objective 2. The student will be able to list the two ways the energy nutrients can be used after they are absorbed.

Objective 3. The student will be able to identify the steps for cellular respiration.

Face-to-face class objectives

Objective 1. Given a case study, the student will be able to state the appropriate dietary treatment for the following conditions: ulcers, heartburn, constipation, and celiac disease.

Objective 2. Given a figure of the cell (textbook figure 3.19, page 90), the student will be able to diagram the steps of cellular respiration.

NUTR 150 Learner Characteristics Profile

The learner characteristics data were collected from a demographic analysis from the University Academic office for students enrolled in the Fall Semester 2012, Winter Semester 2013, and Spring Semester 2013 campus sections, past student course evaluations, the course syllabus, and informal instructor interviews. The characteristics are described in Table B1.

Table B1. *Learner Characteristics of Audience for Instruction*

1. General characteristics of audience for instruction		
	Data	**Resources Used**
1.1 Age range	Age range: 17-54 years Age median: 20 years	University academic office for Fall Semester 2013
1.2 Course level	Freshman college level	Syllabus
1.3 Content topic area	Introductory nutrition	Syllabus
1.4 Group characteristics	Class Freshmen 57% Sophomores 26% Juniors 17% Seniors 6% Gender Male 39% Female 61% Marital status Single 87% Married 13% Divorced <1%	University academic office for Fall Semester 2013
2. Entry behavior(s) of audience for instruction		
	Data	**Resources Used**
2.1 What is the attitude toward target content material?	Most of the students are interested in the subject. Approximately 55% take the nutrition course as an elective.	Informal instructor interviews, University academic office, Past student course evaluations
2.2 What is the learning preference(s) or modality?	Based on past semesters, the student learning preferences vary. Some students prefer group work while others prefer to work independently. Most of the students prefer visual and auditory explanations of concepts.	Informal instructor interviews

2.3 Is it reasonable to expect that the material be cognitively learned by these learners?	Yes, the course has been taught for several years and most of the students are able to learn the content material and pass the objective tests.	Informal instructor interviews, Test data from past courses.
2.4 What is a reasonable time- frame for the targeted population to learn the content?	The material has been successfully taught (based on test data) in past semesters in a three-week period.	Informal instructor interviews, Test data from past courses.
2.5 What is the motivation for the learner to complete this targeted content?	Extrinsic motivation: The scores on the assignments and test will be included in the course grade. Intrinsic motivation: The students can apply the knowledge in their live.	Informal instructor interviews, Past student course evaluations
2.6 What previous experience may the learner have that would inhibit success?	The learners may have had negative experiences with math that may make working with graphs and calculations difficult. A small number of the students may have experienced disordered eating or an eating disorder that may have an impact on them applying the principles taught in their life.	Informal instructor interviews, Past student course evaluations
3. Prior knowledge needed for learner success		
	Data	**Resources Used**
3.1 What prerequisite cognitive skills are needed for learner success?	Students will need basic computer skills, entry-level college reading, and writing skills. The course is taught at an entry college level and does not have required prerequisite courses.	Syllabus, Informal instructor interviews

3.2 What prerequisite motor skills are needed for learner success?	Students will need to be able to use a computer and web browser technologies either by their own physical motor skills or by assistive technologies.	Informal instructor interviews
4. Learner's entry performance level		
	Data	**Resources Used**
4.1 Entry performance level	Median ACT score is 22 with a range of 15-33. Overall, the students have college entry-level reading, writing, and math skills. Some students struggle with learning material from a textbook, writing clearly, understanding math graphs, and calculating basic math functions.	University academic office, Informal instructor interviews

NUTR 150 Audience for Instruction

The audience for instruction is students taking the introductory nutrition course taught in the flipped blended learning format. The audience can be grouped into two categories, the primary and secondary audience. The project's primary target audience will be students enrolled in NUTR 150 Essentials of Human Nutrition, an introductory nutrition course taking the course as a requirement for their major. The course is required for the Exercise Physiology and Health Science majors from the College of Agriculture and Life Sciences, and Family and Consumer Science majors from the College of Education and Human Development. The secondary audience will be students taking the course as an elective.

It is anticipated the student profile for students in the flipped blended course will be similar to the students enrolled in the traditional face-to-face campus sections. Approximately 45% of the students enrolled in the traditional face-to-face sections are taking it for their major. Although the outcomes and assessments are based on the major requirements for the primary target audience, the majority of the secondary audience successfully completes the course and in student end-of-semester evaluation surveys the majority consistently report having a good learning experience and rate the course at above University standards (J. Lamb, personal communication, July 22, 2013).

The primary and secondary audiences will be composed primarily of college freshman, degree-seeking students and will attend classes on campus. Although students may choose to take this course later in their academic career, the instruction will be created at a freshman level for students with entry-level reading and writing skills, little or no prior knowledge in the science of nutrition, and little or no prior experience with the University's learning management system LMS).

Learner Constraints

Learner constraints are specific obstacles students may experience while completing the instruction. The learner constraints that may impede effective learning in the course are:

Computer literacy level. The students need to be able to navigate the LMS. Specific navigation skills include downloading documents, submitting assignments, and accessing assessments. Although most freshmen students have technology skills for social media, some may need support for learning academic technology skills (Thompson, 2013). Basic tutorial videos for navigating the LMS will be available to the students. The students will also be informed on the first day of class and in the course syllabus of the free resources available at the University's student technology center.

High-speed internet. The students will need access to high-speed internet for the online videos and tutorials. The students will be informed in the course syllabus that they may use computers located in the University library if they have internet problems off-campus.

Basic skills. The students will need basic math, reading, and study skills. Online tutorials will be provided for the basic math skills used in the course. The students will also be informed on the first day of class and in the course syllabus of the free resources at the University's tutoring center.

Disabilities. A few students may have difficulties with hearing, vision, or other disabilities that need accommodations. The online instructional material will be ADA compliant by providing text descriptions for links/pictures and closed captions or transcripts for the videos and tutorials. The University's Disability Services Office oversees the additional needs for disabled students. Assistive listening devises and sign-language interpreters are available for students with hearing impairments and readers for students with visual impairments. The Disability Services Office also provides instructors with reasonable accommodations recommendations such as providing note-takers in class and additional time for assessments.

Learning Environment Requirements

Twice a week the students in the 3-credit flipped blended course will complete an online instruction module prior to meeting in a 60-minute face-to-face class. The learning environment specifications are as following:

Face-to-face classes. There are nine sections of the course with an enrollment of approximately 350 to 420 students per semester. The classrooms will have a physical capacity ranging from 40 to 48 students. Each classroom is equipped with student desks, a whiteboard, an instructor's computer, and a projector with a large screen at the front of the room. The instructor's computer has DVD capacity, internet access, and the Microsoft Office suite software.

Online instruction. Students will need to access to a computer that meet the following minimum specifications: (a) a Windows or Mac-based platform, (b) high-speed internet connection, (c) Adobe Acrobat Reader, and (e) word processor (such as Microsoft Word) and Microsoft Excel software programs. (Microsoft Office suite is available to University students at no additional cost.)

Physical disabilities. Students with physical disabilities may need additional resources. Students with hearing impairments may need assistive listening devices and closed-captions/transcripts for instructional materials using audio files. Students with motor disabilities may need speech recognition software, adaptive keyboards, and eye-tracking software. Students with visual disabilities may need braille or large print materials.

Pedagogical Considerations

Pedagogy is the art or science of teaching (Merriam-Webster's online dictionary). The pedagogical consideration statement describes the instructional strategies that will guide the instructional design. Instructional strategies are the tools or techniques used by educators and instructional designers to facilitate learning (Gagné, Wager, Golas, & Keller, 2005).

An advanced organizer (Ausubel, 1960) in the form of a graphic organizer will be given in the online materials at the beginning of each week. The advanced organizer will serve two purposes. First, it will assist the student in bridging the gap between previous learning and new learning. Second, it will help the student organize and interpret the objectives and new information.

Motivational sustaining strategies from Keller's ARCS Model of Motivation (Keller, 1987; Song & Keller, 2001) was used for gaining attention, showing relevance, maintaining confidence, and providing satisfaction in the instructional material. The specific strategies will be described later in the "Learning Influence" statement.

The online and face-to-face portions of the instructional material will follow an elaboration sequence (Reigeluth, 1999) of presenting simple tasks online (facts, definitions, concepts, procedures) that progress to complex tasks (more complicated procedures and problem solving) in the face-to-face class.

The sequential guidelines of Gagné's nine events of instruction as described by Gagné et al. (2005) will be used in the presentation of the instructional material. The nine events are: (a) gain attention, (b) present learning objectives, (c) recall prerequisites, (d) present new content, (e) provide for learner guidance, (f) provide for practice, (g) provide feedback, (h) assess performance, and (i) provide for retention and transfer. The first seven events of instruction will be used in the online portion of the blended instruction. An authentic task will be presented to capture the students' attention and give relevance to the material. The necessary facts, definitions, concepts, and simple procedures will be presented. Students will be expected to come to class fully prepared to participate in class activities by completing the online instruction prior to class. The face-to-face portion of the class will elaborate on the online instruction by expanding to tasks that are more complex.

At the conclusion of the module, the students' performance will be assessed in the summative module test. An application assignment will be given to provide for retention and transfer of the knowledge and skills.

Delivery Options Statement

The Delivery Options statement summarizes the options for student-teacher communication and the instruction materials storage and delivery. The course instruction materials will consist of the course textbook, *Visualizing Nutrition: Everyday Choices* (Grovenor & Smolin, 2012), pdf files, videos, and interactive online tutorials.

The digital course content, assessments, and grade book reports will be delivered to the student using the University's LMS, BrainHoney, which can be accessed by the instructors and students through an Internet browser. BrainHoney's assessments (assignments, quizzes, and tests) offer the instructor response options to provide the student with either automated or individualized feedback. The assessments can be linked to the course outcomes and provide the instructor and students with mastery performance reports.

The storage/delivery options for the specific course materials are as follows:

Course textbook. The student will be expected to have access to either a hard copy or digital copy of the course textbook.

Videos. The videos will be stored either in the University's digital repository, Equella, or on YouTube. The students will access the videos through hyperlinks posted in BrainHoney, the LMS used by the University.

Interactive tutorials. The Interactive tutorials will use the Flash and/or HTML formats. The files will be stored either on the University's server or on Equella, the University's digital repository, and accessed through hyperlinks posted in BrainHoney.

PDF files. The pdf files will be stored in the University's digital repository, Equella. The students will access the files through hyperlinks posted in BrainHoney.

Formative Assessments. There will be three routes for storing and delivering formative assessments. The first route will be comprehension checks in the tutorials. The second route will be practice quizzes with automated feedback that are stored and accessed through BrainHoney. The third route will be flashcard sets stored in Quizlet (www.quizlet.com), a free online study aid. The flashcard sets will be accessed through hyperlinks posted in BrainHoney. The formative assessment scores will not be collected.

Summative Assessments. The summative assessments will include in-class quizzes and module tests. The scores for the in-class quizzes will be inputted into the BrainHoney's gradebook. The module test will be stored in and accessed through BrainHoney. The module test will be password protected and taken at the University's proctored online testing center, located on campus.

Assignments. The assignments will be stored in in Equella and accessed through hyperlinks in the BrainHoney system. The completed assignments will be submitted by the student to BrainHoney.

The student-teacher communications will be facilitated by either email or the LMS. Email contact information for the instructor will be available in the LMS and on the course syllabus. The LMS provides an option for students to comment on the assignments when they are submitted and for teachers to post individualized feedback. An optional no-credit essay question will be included at the end of the summative assessments for students to give comments and/or feedback.

APPENDIX B

Academic Motivation Scale (AMS)

ACADEMIC MOTIVATION SCALE (AMS-C 28)

COLLEGE VERSION

Robert J. Vallerand, Luc G. Pelletier, Marc R. Blais, Nathalie M. Brière, Caroline B. Senécal, Évelyne F. Vallières, 1992-1993

Educational and Psychological Measurement, vols. 52 and 53

WHY DO YOU GO TO COLLEGE?

Using the scale below, indicate to what extent each of the following items presently corresponds to one of the reasons why you go to college.

not at all	a very little	a little	Corresponds moderately	enough	a lot	exactly
1	2	3	4	5	6	7

WHY DO YOU GO TO COLLEGE?

1. Because with only a high-school degree I would not find a high-paying job later on.	1	2	3	4	5	6	7
2. Because I experience pleasure and satisfaction while learning new things.	1	2	3	4	5	6	7
3. Because I think that a college education will help me better prepare for the career I have chosen.	1	2	3	4	5	6	7
4. For the intense feelings I experience when I am communicating my own ideas to others.	1	2	3	4	5	6	7
5. Honestly, I don't know; I really feel that I am wasting my time in school.	1	2	3	4	5	6	7
6. For the pleasure I experience while surpassing myself in my studies.	1	2	3	4	5	6	7
7. To prove to myself that I am capable of completing my college degree.	1	2	3	4	5	6	7

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8. In order to obtain a more prestigious job later on.	1	2	3	4	5	6	7
9. For the pleasure I experience when I discover new things never seen before.	1	2	3	4	5	6	7
10. Because eventually it will enable me to enter the job market in a field that I like.	1	2	3	4	5	6	7
11. For the pleasure that I experience when I read interesting authors.	1	2	3	4	5	6	7
12. I once had good reasons for going to college; however, now I wonder whether I should continue.	1	2	3	4	5	6	7
13. For the pleasure that I experience while I am surpassing myself in one of my personal accomplishments.	1	2	3	4	5	6	7
14. Because of the fact that when I succeed in college I feel important.	1	2	3	4	5	6	7
15. Because I want to have "the good life" later on.	1	2	3	4	5	6	7
16. For the pleasure that I experience in broadening my knowledge about subjects which appeal to me.	1	2	3	4	5	6	7
17. Because this will help me make a better choice regarding my career orientation.	1	2	3	4	5	6	7
18. For the pleasure that I experience when I feel completely absorbed by what certain authors have written.	1	2	3	4	5	6	7
19. I can't see why I go to college and frankly, I couldn't care less.	1	2	3	4	5	6	7
20. For the satisfaction I feel when I am in the process of accomplishing difficult academic activities.	1	2	3	4	5	6	7
21. To show myself that I am an intelligent person.	1	2	3	4	5	6	7
22. In order to have a better salary later on.	1	2	3	4	5	6	7
23. Because my studies allow me to continue to learn about many things that interest me.	1	2	3	4	5	6	7
24. Because I believe that a few additional years of education will improve my competence as a worker.	1	2	3	4	5	6	7

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KEY FOR AMS-28

 # 2, 9, 16, 23 Intrinsic motivation - to know

 # 6, 13, 20, 27 Intrinsic motivation - toward accomplishment

 # 4, 11, 18, 25 Intrinsic motivation - to experience stimulation

 # 3, 10, 17, 24 Extrinsic motivation - identified

 # 7, 14, 21, 28 Extrinsic motivation - introjected

 # 1, 8, 15, 22 Extrinsic motivation - external regulation

 # 5, 12, 19, 26 Amotivation

APPENDIX C

Learning Climate Questionnaire (LCQ)

Learning Climate Questionnaire

This questionnaire contains items that are related to your experience with your instructor in this class. Instructors have different styles in dealing with students, and we would like to know more about how you have felt about your encounters with your instructor. Your responses are confidential. Please be honest and candid.

Strongly disagree			Neutral			Strongly agree
1	2	3	4	5	6	7

1.	I feel that my instructor provides me choices and options.	1	2	3	4	5	6	7
2.	I feel understood by my instructor.	1	2	3	4	5	6	7
3.	I am able to be open with my instructor during class.	1	2	3	4	5	6	7
4.	My instructor conveyed confidence in my ability to do well in the course.	1	2	3	4	5	6	7
5.	I feel that my instructor accepts me.	1	2	3	4	5	6	7
6.	My instructor made sure I really understood the goals of the course and what I need to do.	1	2	3	4	5	6	7
7	My instructor encouraged me to ask questions.	1	2	3	4	5	6	7
8.	I feel a lot of trust in my instructor.	1	2	3	4	5	6	7
9.	My instructor answers my questions fully and carefully.	1	2	3	4	5	6	7
10.	My instructor listens to how I would like to do things.	1	2	3	4	5	6	7
11.	My instructor handles people's emotions very well.	1	2	3	4	5	6	7
12.	I feel that my instructor cares about me as a person.	1	2	3	4	5	6	7
13.	I don't feel very good about the way my instructor talks to me.	1	2	3	4	5	6	7
14.	My instructor tries to understand how I see things before suggesting a new way to do things.	1	2	3	4	5	6	7
15.	I feel able to share my feelings with my instructor.	1	2	3	4	5	6	7

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KEY FOR LCQ

Scores for the LMS are calculated by averaging the individual item scores. Before averaging the item scores, first reverse the score for item 13 (i.e., subtract the score on item 13 from 8 and use the result as the item score. For example, the score of 3 when reversed would become 5). Higher average scores represent a higher level of perceived autonomy support.

Note: Permission to use LCQ for academic research given at
http://www.selfdeterminationtheory.org/questionnaires/

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APPENDIX D

Situational Motivation Scale (SIMS)

Situational Motivation Scale

Read each item carefully. Using the scale below, place circle the number that best describes the reason why you complete the online preparations for class.

not at all	a very little	a little	Corresponds moderately	enough	a lot	exactly
1	2	3	4	5	6	7

Why are you doing the online preparation for this class?

1.	Because I think that this activity is interesting.	1	2	3	4	5	6	7
2.	Because I am doing it for my own good.	1	2	3	4	5	6	7
3.	Because I am supposed to do it.	1	2	3	4	5	6	7
4.	There may be good reasons to do this activity, but personally I don't see any.	1	2	3	4	5	6	7
5.	Because I think this activity is pleasant.	1	2	3	4	5	6	7
6.	Because I think this activity is good for me.	1	2	3	4	5	6	7
7.	Because it is something that I have to do.	1	2	3	4	5	6	7
8.	I do this activity but I am not sure if it is worth it.	1	2	3	4	5	6	7
9.	Because this activity is fun.	1	2	3	4	5	6	7
10.	By personal decision.	1	2	3	4	5	6	7
11.	Because I don't have any choice.	1	2	3	4	5	6	7
12.	I don't know; I don't see what this activity brings to me.	1	2	3	4	5	6	7
13.	Because I feel good when doing this activity.	1	2	3	4	5	6	7
14.	Because I believe that this activity is important for me.	1	2	3	4	5	6	7
15.	Because I feel that I have to do it.	1	2	3	4	5	6	7
16.	I do this activity, but I am not sure it is a good thing to pursue it.	1	2	3	4	5	6	7

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KEY FOR SIMS

 # 1, 5, 9, 13 Intrinsic motivation

 # 2, 6, 10, 14 Extrinsic motivation - identified

 # 3, 7, 11, 15 Extrinsic motivation - external regulation

 # 4, 8, 12, 16 Amotivation

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APPENDIX E

Permission to use the Situational Motivation Scale (SIMS)

Cook, Kathy Jo

From: Frédéric Guay <Frederic.Guay@fse.ulaval.ca>
Sent: Saturday, July 12, 2014 12:18 AM
To: Cook, Kathy Jo
Subject: Re: Permission to use the Situational Motivation Scale

Yes you can use it.

Frédéric Guay,

Ph.D
Professeur titulaire
Département des fondements et pratiques en
education Faculté des sciences de l'éducation
Université Laval
Québec, Qc,
Canada

Le 2014-07-11 à 21:38, "Cook, Kathy Jo" <COOKK@byui.edu> a écrit :

Dr. Guay,
I am a doctoral student from Idaho State University writing my dissertation tentatively titled "The Effect of an Online Minute Paper and Instructor Response on Student Learning Motivation in a Blended Nutrition Course" under the direction of my dissertation committee chaired by Dr. Dorothy Sammons.
I would like your permission to use the Situational Motivation Scale (SIMS) in my research study. Please let me know if this is acceptable.

Kathy Jo Cook, MPH RD LD
Brigham Young University - Idaho
Animal and Food Science
Department Clarke 223 L
Rexburg, ID 83460-0665
(208) 496-4007

APPENDIX F

Informed Consent

Informed Consent

Introduction
This semester a new approach will be implemented in the NUTR 150 course where a portion of the instruction will be given online and a portion will be given the classroom. We want to learn more about teaching strategies that may help students learn more effectively. You have the opportunity to participate in this study because of your enrollment in NUTR 150.

This study is being conducted by Kathy Jo Cook, Animal and Food Science Department, BYU-Idaho and will form the basis for a doctoral degree at Idaho State University under the supervision of Dr. D. Sammons.

Procedures
If you agree to participate in this study, the following will occur:

- During the first week of the course, you will respond to survey questions for approximately 10 minutes.
- During the second through fourth week of the semester, you will complete the online instruction and attend the face-to-face class.
- At the end of week four, you will respond to another set of survey questions for approximately 10 minutes.

Benefits of Study
Although you will not receive direct benefits from this study, your participation will add to the scope of knowledge of student-instructor communication strategies to support motivation in blended courses.

Risks of Study
There are no anticipated risks to participants in this study. Neither the instructor nor the researcher will see your name associated with the survey data. Research data will be kept on a password protected computer and only researchers will have access to the data. Only group data will be reported in the study and there will not be any information included which will reveal your identity.

Participation
Participation in the survey is voluntary. You have the right to withdraw at any time or refuse to participate entirely without jeopardizing to your standing in this course or the university.

Questions about the Research
If you have any questions regarding this study, you may contact Kathy J. Cook at cookk@byui.edu or Dr. D. Sammons at sammdott@isu.edu.

Questions about your Rights as Research Participants
If you have questions regarding your rights as a research participant, contact Idaho State University Human Subjects Committee office at 208-282-2179

I have been fully informed by the researcher about the research to be performed and am participating in the researcher's study voluntarily.

APPENDIX G

Instructor Response Training Lesson

How to Write Autonomy Supportive Instructor Responses to Online Minute Papers

Goal
The instructors will write autonomy supportive responses to student Minute Papers.

Attention
Establish relevance by discussing importance of communication in flipped blended courses.

Present Learning Objectives
At the end of the training, you will be able to:

- Describe the purpose of online Minute Papers.
- Identify the components of autonomy supportive language.
- Apply the components of autonomy supportive language when writing responses to student Minute Papers.

Direct Instruction

1. Introduce the Minute Paper
    a. Communication strategy between instructor and students
    b. A very short writing activity that takes place at the end on the online instruction
    c. Student responds to three prompts about the online instruction

    Comments from previous semester about the Minute Paper

    "What I liked about it is that it made me do my work. I know the questions on the reflection weren't very tough, but I felt more accomplished for reading and doing the preparation. There wasn't anything that I didn't like about it."

    "I didn't really find too much that was helpful in them for me. To me it was just another assignment but there was a plus if I did have a question I could just ask you right there and you were able to answer me in email or in class. I thought that was pretty sweet."

    "I sometimes found the reflections helpful because I could ask specific questions, because honestly I forget very quickly and it gave me the opportunity to ask."

2. Describe the Components of Autonomy Support Language
    a. Listen to the student's perspective
        i. Identify how the material is relevant to them
        ii. Identify material they will be interested in learning

    Example of instructor response to student's comment about nutrition is a fascinating study.

Hi _____,
I agree, nutrition is a fascinating subject. As we go through the semester, we will focus on the different nutrients, their functions, and food sources.
See you in class,
Instructor Name

b. Acknowledge their feelings
   i. Empathize with them
   ii. Communicate value in "uninteresting activities"

Example of an instructor response to student's comment about the large amount of terminology to learn

Hi _____,
It can seem overwhelming learning the "language of nutrition" at first. Several students found it helpful to use Quizlet to learn the terms. It gets easier with practice.
See you in class,
Instructor's name

c. Minimize use of pressure and demands
   i. Use supportive words such as "can", "may", "could"
   ii. Avoid controlling words such as "should", "ought", "must", "need to"

Example of an instructor response to a student who wants to improve

You may want to try….

Avoid *"If you want to succeed, you need to…"*

3. Format for writing an instructor response
   a. List student's name
   b. Give an autonomy supportive response to the student's comments and/or questions.
   c. Sign off with your name
4. Answering questions
   a. Acknowledge question and give guidance of how to find answers.

Examples of student questions and instructor responses

Q: Are all of the articles on pubmed.gov good sources of information? Can all of the studies on the sight be trusted to be accurate science?
A: The PubMed site is an excellent resource to look up research. You need to remember the published peer-review articles need to be viewed as a "conversation" among the scientist. It takes more than one study to develop facts and theories.

Q: Where can I find more information about dietary supplements?

A: Supplements are an interesting topic to explore. A couple of websites you may be interested in reviewing are: http://ods.od.nih.gov/factsheets/list-all/ and http://ods.od.nih.gov/HealthInformation/DSWhatYouNeedToKnow

Practice writing Instructor Responses

Give examples of students' comments and have instructors practice writing responses.

APPENDIX H

LCQ ANCOVA and Normality Assumption

Posttest LCQ ANCOVA and Normality Assumption

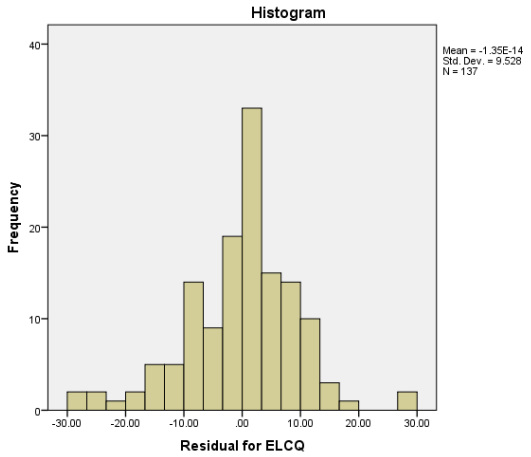
An ANCOVA for the posttest perceived instructor autonomy support was used for Research Question 1. The ANCOVA model for the posttest perceived instructor autonomy support using the Ending LCQ (ELCQ) did not meet the assumption for normality.

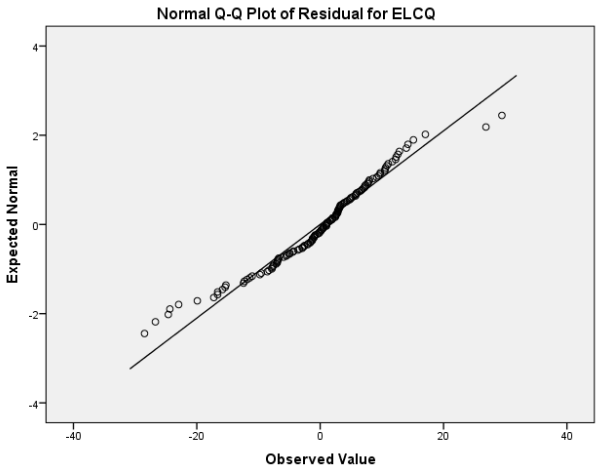
Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Predicted Value for ELCQ	.071	137	.086	.981	137	.047
Residual for ELCQ	.097	137	.003	.966	137	.002

a. Lilliefors Significance Correction

Residual for ELCQ





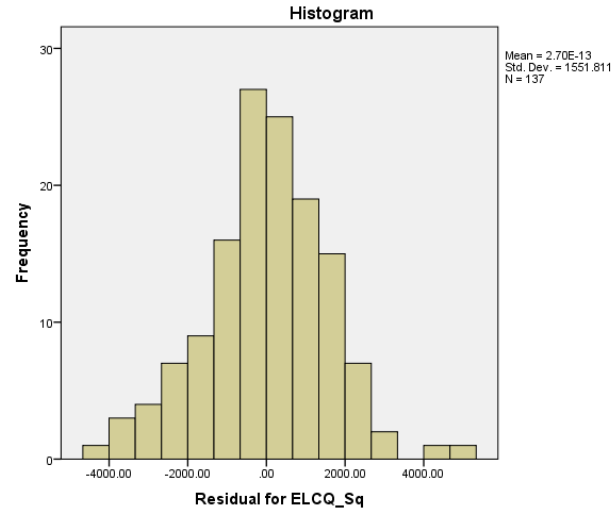
The ANCOVA model for the posttest perceived instructor autonomy support using the transformation ELCQ squared met the assumption for normality.

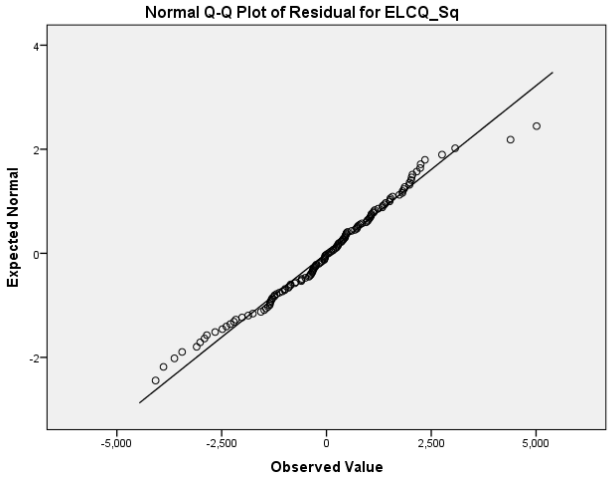
Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Predicted Value for ELCQ_Sq	.070	137	.098	.981	137	.052
Residual for ELCQ_Sq	.072	137	.079	.985	137	.151

a. Lilliefors Significance Correction

Residual for ELCQ_Sq





SPSS results for LCQ ANCOVA using ELCQ and ELCQ Squared

The results for the two ANCOVA models were very similar.

Tests of Between-Subjects Effects

Dependent Variable: ELCQ

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[b]
Corrected Model	9809.354[a]	13	754.566	7.518	.000	.443	97.729	1.000
Intercept	3711.739	1	3711.739	36.980	.000	.231	36.980	1.000
Group	364.066	2	182.033	1.814	.167	.029	3.627	.373
Instructor	293.074	2	146.537	1.460	.236	.023	2.920	.307
SchoolYear	140.371	3	46.790	.466	.706	.011	1.399	.142
Gend	23.601	1	23.601	.235	.629	.002	.235	.077
Online	101.290	2	50.645	.505	.605	.008	1.009	.131
Required	93.769	1	93.769	.934	.336	.008	.934	.160
BLCQ	6720.779	1	6720.779	66.958	.000	.352	66.958	1.000
RAI	14.443	1	14.443	.144	.705	.001	.144	.066
Error	12345.829	123	100.373					
Total	1043680.000	137						
Corrected Total	22155.182	136						

a. R Squared = .443 (Adjusted R Squared = .384)

b. Computed using alpha = .05

Tests of Between-Subjects Effects

Dependent Variable: ELCQ_Sq

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[b]
Corrected Model	285184814[a]	13	21937293.39	8.239	.000	.465	107.106	1.000
Intercept	3737769.489	1	3737769.489	1.404	.238	.011	1.404	.217
Group	10319924.54	2	5159962.270	1.938	.148	.031	3.876	.395
Instructor	7359968.393	2	3679984.196	1.382	.255	.022	2.764	.293
SchoolYear	4389445.935	3	1463148.645	.550	.649	.013	1.649	.160
Gend	489222.810	1	489222.810	.184	.669	.001	.184	.071
Online	2422288.840	2	1211144.420	.455	.636	.007	.910	.123
Required	3179463.728	1	3179463.728	1.194	.277	.010	1.194	.192
BLCQ	196096085.5	1	196096085.5	73.647	.000	.375	73.647	1.000
RAI	540756.799	1	540756.799	.203	.653	.002	.203	.073
Error	327503868.5	123	2662633.077					
Total	8563549576	137						
Corrected Total	612688682.6	136						

a. R Squared = .465 (Adjusted R Squared = .409)

b. Computed using alpha = .05