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Santa Barbara

Student Satisfaction with Online Learning

A dissertation submitted in partial satisfaction
of the requirements for the degree of
Doctor of Philosophy in Education

by
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June 2015

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DEDICATION

This research project is dedicated to my children, Patrick and Sophie, and students everywhere who remind me to constantly strive for improving student learning experiences.

My journey as an educator would not have begun without the guidance and support of Dr. Darin Gerard, Professor Cameron Sublet, and Dr. Don Lubach. Special thanks to Dr. Jason Duque who inspired me to understand "Learning is wild;" to ask, "What does learning like?" and the importance of considering, "Why this and not something else?" Dr. Duque's advice to ask questions about problems before jumping to solutions, then challenge common sense assumptions about problems was invaluable to the design and execution of this study.

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Gerber, M., Morgan, M.V., Sterling, K., Fematt, V., Joo, J., & Sublett, C. (2014). Improving the STEM engagement of student in the 2-year to 4-year higher education pipeline. *Graduate School of Education Higher Research Group*, Volume 1.

Sterling, K. (2014). Exploration of university students' satisfaction as it relates to perceived human interaction with online classes: University of California at Santa Barbara. Gevirtz Graduate School of Education. Dissertation project. *Published in journal for Annual Hawaii International Conference on Education, 2015.*

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Sterling, K. (2013). Student experiences in university hybrid online courses. Study of student participation, perceptions, and engagement with online learning tools. University of California at Santa Barbara. *Published in journal for Annual Hawaii International Conference on Education, 2015.*

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ABSTRACT

Title: Student Satisfaction with Online Learning, Kenneth W. Sterling, Ph.D., M.B.A., M.A.

This study sought to provide an analysis of online education in higher education with a focus on how the condition of human interaction will affect students' satisfaction relating to their online class experiences. The central question the study sought to answer is: What aspects of human interaction (instructor, teaching assistant [TA], student peer) have led to students' satisfaction with online courses in the UC online setting? This study used mixed methods of quantitative survey items, qualitative survey items, and qualitative interviewing to explore student perceptions of human interaction. Students in 21 undergraduate, online courses (n = 253) at three UC campuses completed an online survey. Then eight students were interviewed, as their open-ended responses could provide more insight into their experiences with online learning. Descriptive statistics, correlation, and regression analysis were reported for the quantitative portion of the study. Regarding means, analyses revealed that students reported moderate opportunities available to them for human interaction in their online classes. For perceived opportunities for human interaction with TAs, the mean score was 3.45 (between 3 "a few opportunities" and 4 "not much opportunity") on a Likert Scale. In addition, perceptions of participation with human interaction by students appeared lower, on average, than perceived opportunities.

Further, a relationship between students' perception of TA availability and their overall satisfaction with the online course was among the relationships found. In addition, opportunities for human interaction emerged as a significant predictor of satisfaction in a regression. For the qualitative portion of this study, open-ended questions and interview results revealed that students' perceived opportunities for human interaction and participation with TAs enhanced their experiences with online courses. Implications for research and practice were identified. For example, design of online courses should consider the use of TAs to enhance student satisfaction.

Keywords Online Education – Online Learning – Student Satisfaction – Instructor Interaction – Instructional Design – Course Design - Human Interaction - Education Technology – Improving Online Learning – Online Teaching Methods

TABLE OF CONTENTS

CHAPTER ONE

INTRODUCTION

Online education is rapidly evolving in the realm of higher education and gaining traction on a global level. The use of online learning technology is permeating higher education at a rapid rate, with over 80% of colleges using online technology in some form (Allen & Seamen, 2013). According to online education researchers Allen and Seamen (2009), five years ago over 18 million students were enrolled in postsecondary, degree-granting institutions in the fall of 2007. Of these 18 million students, approximately 3.9 million (21.9%) were enrolled in at least one online course. During the period 2002 through 2007, annual enrollment rates for online courses in higher education increased nearly 20% each year (Allen & Seamen, 2009). Online course enrollment is growing and many researchers agree the future of higher education is "tied to some form of online course delivery" (Berger & Lyon, 2005, p. 14; Harasim, 2000; Palloff & Pratt, 2003). More recently, according to Allen and Seamen (2013), over 6,700,000 individual students took at least one online course at a degree-granting, postsecondary institution. Naturally, questions have arisen about learning effects of online courses, including the degree to which students are satisfied by these kinds of learning experiences.

Lately, a debate has surfaced as to the level of instructor or "human" interaction that is needed to support students with their learning experiences. For example, according to Koseff (2014) in January of 2014, California State Governor Jerry Brown, "challenged regents to develop classes that require no 'human intervention' and might expand the system's reach beyond its student body" (p. 1).

At the same meeting, according to Koseff, UC Provost, Aimée Dorr reported that students might be "less happy and less engaged" with online classes that had limited human interaction. Two months later, UC President, Janet Napolitano contradicted Governor Brown's notion of "pure online course[s], that once in the can, [are] almost perpetual motion" (Hiltzik, 2014, p. 1). In other words, Governor Brown's concept was to create an online class and simply repeat the course over and over again with very few changes or updates. However, President Napolitano took a differing position that online classes were one of many required tools in the higher education process. She argued that certain populations of students definitely require instructor interaction and that all UC online classes "still have got to have human interaction."

Statement of the Problem

Atchley, Wingenbach, and Akers (2013) stated that enrollments in university online courses have "outpaced overall university enrollment for the past several years [and] growth of online courses does not appear to be slowing" (p. 2). Further, given that many college students are participating in online education and that enrollment in online classes is increasing at a substantial rate, researchers believe more questions should be asked about such outcomes as course completion and student performance in online courses compared to face-to-face courses (Atchley et al., 2013).

In the context of public universities, the University of California (UC) is one the largest public university systems in the world. However, the system appears to be adopting online education at a slower rate than some other large university organizations. Beginning in approximately 2009, the UC system addressed the integration of online learning with just over 500,000 UC undergraduate students participating in over 2,500 online courses

(University of California, 2013). In January of 2013, the UC Regents and Governor Brown allocated $10 million towards further developing online education, believing it to be a solution for reaching more students on reduced budgets (University of California, 2013). Based on conflicting opinions of Governor Brown and UC Leadership and review of the literature, the question of the importance of instructor "human" interaction and student satisfaction with UC online classes must be answered.

The focus of this study was to assess the relationship of student perceptions of human interactions on student satisfaction with online courses at a selection of UC campuses. From the literature reviewed, a prior pilot study, and based on the questions from Governor Brown and the UC Regents, there appears to be a problem, in some settings, with students' satisfaction with online learning (e.g., Jaggars & Xu, 2012; Xu & Jaggars, 2013). Based on previous literature, I hypothesized that there was a relationship between students' satisfaction with their online classes and the levels of human interaction they experienced in those classes. This relationship could be represented abstractly in this way: *Student Satisfaction with Online Classes* is a function of *Human Interaction* in these classes or,

$$SS = f\ (Human\ Interaction).$$

As later discussed in this study, there are two potential categories of human interaction measured in this study to explore their relationship with Satisfaction: opportunities for human interaction (*Opportunities*) and actual participation with human interaction (*Participation*), or

$$SS = f\ (Opportunities,\ Participation).$$

Background of the Problem

The question of students' satisfaction relating to their online learning experiences has surfaced as a legitimate concern. On one hand, some observers believe online courses are appropriate and can be delivered with limited instructor or human interaction. This means, for example, that content might be delivered purely over the Internet with limited-to-no human interaction, with no instructional or student peer involvement. On the other hand, two top ranking officials in the UC system, along with many faculty, suggested that purely online courses, with limited human interaction between instructor and student, led to poor student experiences. One question arises on this issue though: what is more important to researchers and practitioners—student performance or student satisfaction with their online courses? Do student perceptions matter if they are achieving the same or better performance in an online class? For example, does a student's performance in a class lead to increased or decreased satisfaction with the course or vice versa? Although these questions are not the focus of this study, they should be considered when conceptualizing student outcomes and also be considered as the basis for future research projects.

This study focuses on students' perceptions of their own experiences with online classes by exploring how the learning experiences and perception of human interaction affects students' perceptions of their own experiences (including their satisfaction) in the online class environment. Understanding students' perceptions of human interaction in online classes will contribute to our understanding of how to improve online classes for better overall student experiences.

Varying Conceptions of Online Learning

The majority of research regarding online learning to date suffers from a paucity of a strict or agreed upon meaning of what “online" means. The definition of online learning is fraught with questions and debates, particularly when discussing its use in higher education. The term “online education” is common, but means several different things. While some online courses offer *purely online (100%)* instruction, others offer "*blended*" or (*hybrid instruction),* featuring a mix of classroom and online learning (Garrison & Vaughan, 2008; Stewart, Harlow, & DeBacco, 2011).

However, even within the broad definition of purely online classes, questions remain, even in this study, as to what exactly constitutes purely online courses. For example, what about office hours with the instructor or TA? If a student can go to a physical office and have face-to-face contact during office hours, does the class still qualify as purely online? In a recent discussion, Dr. Drew Carter, a professor of Statistics at the University of California explained, “I created an online version of my course so I could have more time with my students” (personal communication, April 30, 2014). A professor such as Carter would typically spend 40 hours of live-lecture time with instruction and that was now replaced with his online course. An instructor’s reallocation of time for face-to-face meetings with students introduces the possibility that student experiences with online classes could be different, based on the instructor’s level of availability. This variability was considered in this study survey and interview questions that sought to discover the amount of human interaction (instructor, teaching assistant [TA], and student) that occurred for each class.

Is human interaction exclusively related to instructor-to-student contact or are other dimensions of interaction important as well? For example, how do interactions with TAs

shape students' perceptions of their online experience or, adding one more layer, how do interactions with other students in the online class impact the students' perceptions of their online experience? Taking this question a step further, do discussion forums or other *computer-mediated communications* (CMC) provide a sense of human interaction for students in their online courses?

One example of a purely online learning experience is a course that has no classroom (face-to-face) meeting and no in-person meetings with instructors in a synchronous setting. Furthermore, the online classes contemplated in this study occur in what is often referred to as "*asynchronous*" learning. These types of classes are generally scalable to larger class sizes (Das & Chatterjee, 2015). The major technology providers of pure online learning platforms are *BlackBoard*, *Coursera*, *Udacity*, and *EdX* (Taneja & Goel, 2014). A question emerging about these courses, however, is whether they retain the rigor of courses with classroom learning and face-to-face interactions (Duncan, Range, & Hvidston, 2014).

A slight variation of purely online classes is a course with online delivery supplemented by proctored exams: typically one midterm and one final exam. Otherwise, this type of course is completely taught and managed through online methods and technology.

An example of blended online learning (also known as "hybrid") is a class that typically is balanced in terms of the percentage of time in the classroom and the time spent online. MOODLE (Modular Object Oriented Dynamic Learning Environment) platforms and other classroom management tools are typically used to facilitate blended or hybrid learning. This type of learning could also be referred to as "flipped" (Bishop & Verleger, 2013). However, "flipped" learning can also mean students doing readings outside of class and then class time is used for discussion and other activities (not reading). Generally, flipped learning

relates to a delineation of the activities students perform outside of class prior to live lectures, so they may learn concepts in advance of meeting with the lecturer. Some researchers suggest that if a student can receive a passing grade in a class without using any online technology, it is not truly a blended or hybrid class (DeBacco, personal communication, April 25, 2014) but it could still be considered a "flipped" classroom without using technology as described above.

Another extension of hybrid courses are online content delivery systems for traditional classes. This type of class is typically a face-to-face learning experience supplemented with an online course management system. This category of online education is mostly comprised of on-campus, in-class instruction with a small amount of participation on a Google Site, DropBox Folder, or MOODLE learning management system platform. Classes within this category will usually have videos and documents available for viewing on the MOODLE and some classes will require participation in discussion boards with posts and responses. MOODLE platforms can also be used for quizzes, submission of assignments, and generating mass emails to entire class sections.

While the term "MOOC" (Massively Open Online Courses) is commonly mistaken for online classes at universities, these classes are very different in that they are typically non-accredited, highly enrolled classes with limited instructor-student interaction. MOOC classes are unilateral (one-way learning experiences from instructor to students) with little to no feedback (De Waard et al., 2011) from the instructor to the students. As contrasted to classes that can be offered as "blended" (hybrid) or on a face-to-face supplementation basis, these classes are purely (100%) online. MOOC classes may have tens of thousands of people participating. These classes are usually free, allow no contact with the lecturer, and are not

recognized by most universities as credit granting classes. According to George Siemen, one of the pioneers of MOOC education, the completion rate of MOOC classes is in the range of 4 to 6 percent (personal communication, February 14, 2014; Lewin, 2014, p. 1).

For the purposes of this study, "online" means a class that is listed on one of the UC campus websites as an "online" course. It could designate one or more of the types of "online" courses described above. The classes may be taught purely online, taught without any face-to-face interaction, or taught asynchronously; they also could be partially taught in person, with some face-to-face interaction and with some synchronous learning experiences.

Please refer to Appendix E, Common Terms with Online Education for a more comprehensive guide to online terms and their definitions.

Personal Interest

Personal reasons for conducting this study surfaced in 2010, when I enrolled in online classes at two different schools. One school was a prestigious business school, offering a blend of traditional and online courses. The other school was a community college, offering some online courses. What struck me was how well the community college courses were organized and the apparent high level of student engagement from the majority of students enrolled. On the other hand, fellow students at the prestigious business school were often expressing dissatisfaction with the online portions of the classes they took, especially with the lack on instructor interaction. As I advanced my educational pursuits and applied to this current Ph.D. program, I developed an interest in becoming involved in policy and leadership in the academic setting, perhaps helping to shape the future of online learning towards providing positive student experiences.

Purpose and Significance of the Study

Some research has attended to questions regarding the quality of online instruction as measured by student performance and completion rates in online courses (e.g., Atchley et al., 2013; Meyer, 2003; Xu & Jaggars, 2013). Some policymakers also have urged further and faster development of courses that might afford very limited human interaction in exchange for serving larger numbers of students. The purpose of this study was to examine the relationship between students' satisfaction with their online class experiences and their perceptions of human interaction opportunities and participation. The UC setting was chosen because the UC system is one the largest public university systems in the world and because the UC Regents have authorized an increase in online classes to be offered. This study is potentially significant because student satisfaction may be related to efforts of instructors, student engagement, and other factors that contribute to learning. Despite the recent body of research comparing online learning to traditional classes with student performance or completion rates (e.g., Atchley et al., 2013; Meyer, 2003; Xu & Jaggars, 2013), there was little consensus about how to improve students' satisfaction with their online learning experiences through various learning conditions, such as human interaction.

Research on experiences of online students and their satisfaction with human interaction is at a beginning stage. This exploratory study will also enhance our field of study and literature on topic by providing descriptions of the various student and instructor experiences with online learning on UC campuses (e.g., live interaction with instructors, TAs, and other students). In addition, this study may have implications for the future design of online courses in terms of human interaction.

Summary of Propositions

The study sought to address the relationships among students' perceived satisfaction with online courses and their perceptions of opportunities for human interaction as well as their actual interaction experiences. Based on previous research, this study is constructed to test three propositions:

1. Students who choose to take online courses are more likely to be moderately satisfied with their experience.

2. Students who take online courses are more likely to perceive few opportunities for human interaction. Also, these students are likely to have lower participation in whatever opportunities they perceive as existing with their online course.

3. Students who take online courses are more likely to be satisfied if they perceive that they have had more opportunities for human interaction and have actually participated in more of these opportunities.

The relationship between course satisfaction and human interaction suggests several specific research questions. These are presented in Chapter Three (Methodology).

Chapter One Summary

The central question the study sought to answer was, What aspects of human interaction have led to students' satisfaction with online courses in the UC online setting? As discussed in remaining chapters, this study used mixed methods of a quantitative survey and qualitative interviewing methods to explore student perceptions of human interaction. Students in 21 undergraduate, online courses (distributed to estimated $N = 886$ based on information available regarding class capacity or enrollments listed on websites) on five campuses were asked to complete an online survey (with three campuses participating).

Then, eight students from the sample were interviewed, as their open-ended responses could produce more suggestions on how to improve online learning experiences through human interaction. The informal hypothesis of this project was that Student Satisfaction with Online Classes is a function of the human interaction they experience with the class. Expressed as a formula, the informal hypothesis was: SS = *f* (Human Interaction). This aim of this study was to primarily gain a better understanding of students' satisfaction with the level of human interaction in their own experiences with the online classes in a large public university setting, with a view towards learning about ways to enhance student satisfaction.

CHAPTER TWO

REVIEW OF SELECT LITERATURE

Human interaction is important to human learning, in higher education, and in online courses. In this context, it appears important to build *opportunities* of human interaction into course design elements for such courses. Related studies in the field of human-computer interaction research have examined what computer technology must offer as a benefit so that people can interact with the technology (e.g., Liu, Gomez, Khan, & Yen, 2007). The issue addressed in this study is that and more: How can one be in an online class and interact with humans (instructor, teaching associate [TA], or student peers), via online—but also what is it about online courses that provides opportunities for interaction with instructors, TAs, and peers?

Existing human-computer interaction research (e.g., Helander, 2014) as applied to online environments might address the organization of information and how it is conveyed. This study additionally assumes that there is inherent educational value of interactions with people—instructors, TAs and other students—in providing occasions for deep learning to occur.

The literature reviewed for this study explores student performance, student satisfaction, student engagement, student completion, human interaction, and cultural considerations with online learning. Some previous studies have indicated that researchers did not find significant differences in performance or student satisfaction between face-to-face classes and well-designed, well-delivered online classes (e.g., Allen & Seaman, 2013; Atchley et al., 2013; Cho & Jonassen, 2009; Picciano, 2002; Schubert-Irastorza & Fabry, 2011). However, a growing body of new literature (e.g., Swan, 2006; Xu & Jaggars, 2013)

suggests more research into student perceptions regarding their online experiences would be important towards shaping future online courses.

This chapter reviews literature in the following four categories relating to online learning: (1) Background of Online Learning in Higher Education; (2) Student Satisfaction with Online Learning; (3) Considerations of Human Interaction with Online Learning in Higher Education; and (4) Related Areas of Online Learning in Higher Education. The literature presented supports the concept that human interaction is important with online college courses and that further research should be undertaken to explore the relationship of human interaction to students' satisfaction with their online courses.

Background of Online Learning in Higher Education

Online learning as it is known today in the public university setting was introduced approximately in 2008 (Allen & Seamen, 2013). Precursors to online learning in public universities could be traced back to the 1960s, when lectures were being broadcast live or via tape from one campus to another. In the 1980s, technology allowed remote locations to experience two-way distance learning, with multiple locations collaborating for lectures and discussions. After the advent of the public Internet in the 1990s, a push was made to harness it for education. In 2002, the first MOODLE (Modular Object Oriented Dynamic Learning Environment) learning platform was released, giving instructors the ability to design and deliver their first "online" courses.

Over the past few years, universities across the United States have raced to embrace online learning. However, in California, it appears that "MOOC-mania" (Massive Open Online Course, not to be confused with MOODLE above) may have already lost traction, after experiencing several failed initiatives already within the UC and Cal-State systems

(Kolowich, 2013). UC Irvine launched six online MOOC courses in January of 2013 with over 255,000 students initially enrolling for no charge (free) and no attempt for official school unit credits. In these UC Irvine courses, only 9 full-time students paid for their courses and received credit (M. Loble, personal communication, June 12, 2013). Another educational expert claimed online education may be causing "higher education to [lose] control over quality" (Hazelkorn, 2013).

As explained in Chapter One, "online" learning means many things. In the early days, it was more of a course management system than an interactive platform that may have had no face-to-face interaction at all. Since the recent introduction of online learning in 2008, various learning platforms (MOODLE, BlackBoard, eCollege, etc.) were developed and then adopted by most public universities in one form or another. From 2008 to present, online learning at public universities has matured considerably, with an increasing number of courses being designed exclusively for 100% online delivery. This means that students may complete the course without ever having a face-to-face interaction with an instructor, TA, or other student. Several challenges have been reported with 100% online delivery, with one major issue that remains to be solved: how to enhance student-learning experiences with online education.

As noted above, although evidently online learning has experienced enormous growth in the higher education setting over recent years, several challenges have also surfaced. Some questions have emerged; for example, as to whether students are as satisfied with their learning in online course as compared to traditional courses (Meyer, 2003; Shu, Zhao, & Wan, 2012; Sterling, 2013). Another concern has emerged as to whether fewer numbers of students complete such courses (Atchley et al., 2013; Xu & Jaggars, 2013). A final issue has

been whether perceptions of quality for online learning programs might differ from various points of view, including students, educators, and the public. The next section examines perceived issues with the quality of online education from the perspective of student outcomes and engagement.

Student Satisfaction with Online Learning

Student and Educator Views on Student Satisfaction and Performance

The quality of online classes has become a major concern in the university setting. Despite the race to embrace online learning by educational leaders, several educators believe that online learning has had a negative impact on student performance, especially as it is measured by grades on assignments, exams, and the final grade students earn in their classes (Allen & Seamen, 2013). Other educators believe that student engagement and satisfaction may suffer in online courses as compared to traditional classes (Allen & Seamen, 2013).

One example of a study that has explored issues of student satisfaction with discussion forum posts in their online classes was conducted at the National Changhua University in Taiwan. Lee (2013) investigated students' learning approaches, their own perceptions of discussion posts in online learning, academic performance, and students' satisfaction with online courses. This study explored relationships between aspects of human interaction (students' perceptions of their own engagement) as it related to satisfaction, participation, and overall academic performance (grades) in the online classes. Specifically, Lee examined online participation with discussion posts, student perceptions of instructor involvement, and looked at how these variables may impact online learning, student performance, and student satisfaction.

Lee (2013) approached online discussions with a view towards student satisfaction

with learning and how that may have affected their academic grade, finding a relationship between certain kinds of posts and students' satisfaction with the course. Student satisfaction was compared to analysis of the students' online posts for a seven-week period. Posts were analyzed by coding them into three specific classifications: Initiating Posts, Elaborated Response Posts, and Response with Resources Posts. *Initiating Posts* included students who initiated discussion posts that were contributed to by other students. *Elaborated Response Posts* were those students with responses that included comparisons, predictions, examples, and definitions. The *Response with Resources Posts* category included those student posts that qualified as Elaborated Response (ER), but that had additional information, such as related links to websites or referrals to books and news. Results demonstrated that "some aspects [e.g.,] of students' perceptions influenced Elaborated Response and Response with Resources" and further that students' contributions towards Initiation Posts significantly correlated to a 'deep motivation' in the class" (Lee, 2013, p. 347). Said another way, students who were the most interested posted more responses and posted the most elaborate responses. Researchers also performed a cluster analysis on the student data and categorized three separate groups of students regarding their performance.

Overall, according to Allen & Seaman (2013), Atchley et al. (2013), Picciano (2002), and Schubert-Irastorza & Fabry (2011) students are more accepting of online learning opportunities now than they have been in previous years. Furthermore, based on the sample of literature reviews in this chapter (above), it stands to reason that students would have higher levels of satisfaction with online classes they perform well in (as compared to classes they do not perform well in).

Online Course Completion: Student Satisfaction and Ability to Persist

Some researchers have directed attention, not to learning experiences (such as satisfaction), but rather to the students' ability to persist and complete online courses. Several faculty and educational administrators have expressed concerns about how online learning could negatively impact student performance and course completion (retention rates) in classes that were not offered in a traditional setting. Atchley et al. (2013) examined this issue at Texas Tech University, finding that students in face-to-face courses experienced higher completion rates (95.6%) than those who took online courses (93.3%). Atchley et al. (2013) were also able to determine a difference in enrollment retention based on the subjects studied (course discipline). This analysis included 14 categories of classes: accounting, agriculture, business, computer science, English, finance, health, HR (human resources) management, marketing, physical education, psychology, reading, and special education. Their findings revealed that course completion (enrollment retention) rates in finance classes were the lowest (82.2%) versus reading classes, which demonstrated the highest enrollment retention percentage (98.2%). Inferences may be drawn from completion rates towards exploring student satisfaction with online particular courses and content, as it stands to reason their level of satisfaction is related to their ability to persist.

In a related study that explored student performance and satisfaction, researchers also discovered the potential impact of student engagement on performance in online classes. Shu et al. (2012) used modern educational technology theory to design and offer online discussion teaching methods. They then applied their framework in the field, allowing them to analyze the learning effects of the online discussion experiences—all towards explaining how online discussion can enhance student engagement. Their findings demonstrated that

students who participated in online discussions felt more engaged than those students who did not participate in online discussions, and that those students tended to perform better in their classes. Relating these findings to the study, it may be possible to relate student engagement to student perceptions of satisfaction with online classes, thus leading to potential relationships between student perceptions and student performance (one of the ancillary questions of this study).

On the other hand, amidst other reports of decreased student performance in online classes, Atchley et al. (2013) found that some students studying the same subject with the same instructor and assignments actually performed slightly better in the online learning environment. A possible alternative explanation of these results could be that grading was relatively easier in the online classes than it was in the traditional, face-to-face classes. However, according to the researchers, the same assessment criteria and methods were used to measure each class type (online vs. face-to-face). Their data show, on the one hand, that a higher percentage of students received a grade of A with online courses. On the other hand, a slightly higher percentage of online students also received a letter grade of D or F. These differences in performance were statistically significant.

Finally, yet another focus in comparing online and traditional classes was how online learning environments may contribute to improved student experiences and student satisfaction with online learning. According to Allen and Seamen (2013) of the Babson Research Group, over 6.7 million students in the United States enrolled in at least one online course in their Fall 2011 term (an 8% increase from the 6.1 million students in Fall 2010). Their research also reported that 77% of academic leaders indicated student experiences (satisfaction) and learning outcomes in online classes were the same as or higher than face-

to-face classes. Notably, the researchers discovered that although traditional class enrollments have declined at universities over the past decade, online class enrollments at universities have been increasing. These findings suggest that more students may perceive better experiences (satisfaction) and learning outcomes with online classes over traditional, face-to-face classes. Another possibility is that students find online classes to be more convenient or less costly (financially or with their time).

Based on this selection of studies, it appeared that there were advantages and disadvantages for both online forums and face-to-face interactions, based on students' experiences and reactions to the courses studied.

Considerations of Human Interaction in Higher Education Online Learning

Student Satisfaction with Engagement and Online Discussion Forums

Other studies have specifically compared different forms of online learning to classroom (face-to-face) learning. The majority of the studies included in this review revealed that many online class offerings included a requirement for students to participate in online discussion forums. These forums were typically hosted on the schools' learning management systems and included a discussion forum functionality. Generally, these discussion forums offered *asynchronous interactions* (communication which does not occur simultaneously or at the same time) between those contributing the posts (students or instructors). Typically, the instructor or a class member would begin a new discussion thread based on a topic that was being reviewed in the class. Other students then later responded to the original post and/or subsequent posts with their own comments.

Development of Human Interaction Dimension in Online Learning Environments

Two recent studies conducted by Cho and Jonassen (2009) focused on human

interaction dimensions that occur in online classes. They found that different aspects of human interaction do have a direct impact on students' satisfaction with their online classes. As part of this research project, Cho and Jonassen (2009) also developed a survey instrument and scale based on prior work (DeVellis, 2003; Netemeyer, Bearden, & Sharma, 2003; Worthington & Whittaker, 2006) that utilized Likert 7-point survey items to relate levels of human interaction with student satisfaction. In their study, Cho and Jonassen learned online discussion forums led to the creation of social relationships with instructors and other students that resulted in higher student satisfaction. This was validated by earlier research in other studies that explored online learning and human interaction (Hill, Wiley, Nelson, & Han, 2004; Romiszowski & Mason, 2004), which found that students asking questions, posting messages, and providing assistance to other students increased their levels of perception on human interaction, as well as student satisfaction with the course.

Further, Cho and Jonassen validated the prior work of Hill et al., who initially found that online learning emphasized human interactions in learning and teaching processes (Hill et al., 2004). Cho and Jonassen also discovered that, "positive emotions such as pleasure, happiness, and satisfaction can be experienced by students engaged in online human interactions and that enjoyment of human interactions is positively related to students' satisfaction with online learning experiences" (2009, p. 14). For example, in a prior study by Wu and Hiltz (2004), they found that students who enjoyed online discussions reported higher perceived learning than students who enjoyed them less. In a related study by Muilenburg and Berge (2005), students reported social interactions as the most important barriers they perceived towards satisfaction with online classes.

Another point raised by Cho and Jonassen (2009) was why more human interaction

was needed in online classes and they partly based this on the work of Murphy and Coleman (2004). In their study, Murphy and Coleman found that online students who communicated using only text were concerned about misinterpretation by other students (versus the ability to have human interaction in other ways) and, therefore, more prone to be less satisfied with their online course.

Cho and Jonassen (2009) concluded their study by stating "human interaction is one of the important external factors to be considered in online learning environments" (p. 135).

Concerns over Less Interaction with Instructor in Online Classes

Some studies have suggested students' concerns related to less perceived interaction with instructors in online classes. In a pilot study at a California public university, 53 students responded to a survey regarding anxiety with online courses (Sterling, 2013). On the pre-survey, over 83% of the students indicated some level of concern they had for less interaction with the instructor. Relating these findings to a study by Zhu (2012) as discussed below, the majority of students were from Western, individualistic cultures, yet they still perceived that lack of instructor interaction with online learning would be a challenge for them. Based on Sterling (2013) and Zhu (2012), it may be that the issue of instructor interaction with online courses is an element that should be further examined in studies comparing student satisfaction with online learning as it relates to different ethnic groups and perhaps cultures.

Although student satisfaction with online classes is not a measure of performance, some of the studies reviewed have focused on student' satisfaction of instructor interaction as a dependent variable (rather than student engagement or student performance, such as grades). For example, instructor interaction was highlighted in the Schubert-Irastorza and

Fabry (2011) study, with emphasis on the variability of student satisfaction as it related to instructor involvement. Specifically, Schubert-Irastorza and Fabry (2011) suggested a framework that student satisfaction with online learning was influenced by three related, major constructs: instructor variables (e.g., instructor engagement), technical issues, and interactivity (e.g., human interaction). Findings revealed that student satisfaction with instructor engagement in the online classes was mostly influenced by their perceptions of the instructors' organization of the material, instructor clarity, and feedback received from the instructor (e.g., human interaction).

Forms of Human Interaction Matter in Online Learning

In a study by Richardson and Swan (2003), they found that both the quantity and quality of perceived instructor-student interactions was linked to student satisfaction. Richardson and Swan (2003) defined human interaction as "reciprocal events involving at least two actors and/or objects and at least two actions in which the actors, objects, and events mutually influence each other" (p. 13). More specific to my study, Richardson and Swan proposed three kinds of interaction that affected students' learning: interaction with content, interaction with instructors, and interaction with peers. Richardson and Swan (2003) acknowledged the "relationship between instructor/student interactions and learning outcomes has been well documented in traditional classrooms [therefore] it stands to reason that interactions with instructors would be equally important [to student satisfaction]" (p. 23).

On the topic of student (peer) interaction, Richardson and Swan cited Ruberg, Moore and Taylor (1996), explaining that *computer-mediated communication* (CMC) that was well facilitated by instructors could foster students' desire to collaborate, encourage experimentation, enhance the sharing of ideas, and lead to higher levels of student

satisfaction. A related study by Shea, Swan, Fredericksen, and Pickett (2001) examined 268 online classes at New York State University and they found significant differences ($p < .01$ and $r = .784$) with student satisfaction based on their perceptions of interactions with peers (i.e., other students participating in the online class). Students who reported higher levels of interaction with peers also expressed higher levels of satisfaction with the online class.

Interaction Affects Student Satisfaction and Perceived Learning in Online Courses

More recent research by Swan (2006) found that instructor interaction and active discussions with peers in the course were highly correlated with students' self reported satisfaction with the online course ($r = .761$, $p < .01$). Swan reaffirmed her earlier work by stating, "Interactions among students through course discussions seem to be one of the most influential features of online courses" (Swan, 2006). Swan (2006) also developed a survey that measured student satisfaction as it related to human interaction experiences in online classes. A sample of these survey items included, "How satisfied were you with the course?" with a 4-point Likert scale that had the following responses: Very Satisfied, Satisfied, Not Very Satisfied, and Not Satisfied. Another survey item was, "How would you describe your interaction with the instructor in this online course?" Answer choices: A Great Deal, Sufficient, Insufficient, and None. A similar survey item asked about students' interaction with classmates. Swan (2006) also reviewed syllabi from the online classes, seeking variables such as percentage of grade based on online discussion forum posts and percentage of grade based on group work with student peers.

Swan (2006) found that students who reported higher perceived levels of human interaction with their instructor also reported higher levels of satisfaction with their online course, with 84% reporting that they interacted with their instructor either, "a great deal" or

"sufficiently." In further support of her findings, Swan (2006) also cited Jiang & Ting (2000) and Picciano (2002), stating, "Student-teacher interaction has been shown to significantly affect learning in both regular classrooms" (p. 316).

Student satisfaction with their interactions in online classes was generally positive in Lee's (2013) study if they adopted "deep approaches" for online discussion. It was also confirmed that students who scored highest on the self-report perception scales (including such aspects as perceptions of instructor involvement) tended to outperform other students in the class (academically), who either did not adopt "deep approaches" or those who scored lower on the perception scale. Additionally, students' level of satisfaction with online discussions seemed to be a good predictor of their number of Elaborated Response messages posted (Lee, 2013). This study also suggested that another technique instructors could use to encourage engagement was to inform students of what others had contributed in their posts.

This study suggested that instructors could foster more student satisfaction as a result of their human interaction with students, using online discussions. The research suggests that through development of deeper learning approaches and positive student perceptions, this can lead to better academic performance and favorable student satisfaction with not only online discussions but with the class overall.

A second study that dealt with student views regarding interaction and satisfaction was conducted by Picciano (2002). Picciano (2002) suggested student interaction was important for successful experiences that led to student satisfaction. Picciano examined student performance in an online U.S. university course, relating students' interactions to their perception of instructor "presence." In this study, "presence" was a term used to describe the student's sense of belonging and contribution to the online class experience as it

related with other students and the instructor.

Results of the Picciano (2012) study supported a strong relationship between a student's beliefs about interaction and their own perception of how satisfied they were with learning in the online class. However, Picciano found inconsistent results regarding actual performance and observed interactions. Questions remain as to the nature and extent of student interactions with online learning and how those interactions impacted (or improved) student satisfaction and performance.

The impact of student perceptions regarding instructor involvement appeared to be an important factor in delivering online learning experiences and was one that should continue to be a focus of research. To date, this selection of studies suggests that when students believe their instructors are more "engaged" in teaching online classes, the students have a higher level of engagement (satisfaction) and performance (Schubert-Irastorza & Fabry, 2011).

In two different studies (Meyer, 2003; Sterling, 2013), research suggested shy students might benefit and have higher satisfaction with online discussions than those discussions that occurred in a class. Said another way, online discussion forums may promote more participation from "shy" students who would otherwise not speak in a traditional classroom setting. A relatively older study by Meyer (2003) compared students' satisfaction of face-to-face (in class) discussions to threaded discussions (online forum posts with associated responses) and then evaluated the use of threaded discussions for evidence of higher-order thinking. Meyer (2003) found that although advantages existed for both online forums and face-to-face interactions, students tended to spend more time participating in online discussion forums than in face-to-face discussions. On the other hand, students

reported getting higher "energy" and stimulation from face-to-face classroom interactions than online forums, with some indicating face-to-face as their "preferred learning mode" (Meyer, 2003).

In a more recent pilot study, I also compared students' perceptions of face-to-face vs. online learning (Sterling, 2013). Among students enrolled in two education courses at a UC campus, I learned that shy students might be less inhibited when participating in online discussions versus face-to-face discussions. In this study, 57 university students completed pre- and post-surveys regarding their participation in online discussions. Several students indicated a lower level of communication apprehension when they participated online vs. face-to-face. Comments from three students illustrated this.

P31: "Online is good for shy people so they can talk."

P26: "Even though I prefer 'in-person' lectures, I would rather participate in an online discussion than an in-class or section discussion."

P4: "I really enjoyed this class. The online forums were easier for me to express myself in. I'm not a shy person but somehow it's easier for me to say what I want when I am online. I also can control what I say and not mess up in class."

An interesting sub-finding of the pilot study was that students who had transferred from a community college appeared to have lower levels of satisfaction as it related to interaction with their instructor in the blended class. Interestingly, on their pre-surveys, the community college transfer students indicated a higher preference not to participate in online learning or discussions (mean of 3.72 on Likert scale of 1 to 5, with 1 being "strongly prefer online learning" and 5 being "strongly not prefer online learning"). However, after taking the class and participating in the online discussions, their post-survey data indicated a lower level

of anxiety and a reduction of the anxiety mean to 2.70 (nearly a 28% reduction from the mean of 3.72 reported above). Thus, although transfer students may initially have had apprehension about online learning in the university setting, they may change those perceptions after being exposed to their first blended or hybrid online class in the university setting (though they may still not be fully satisfied with their online learning experience).

Related Areas of Online Learning in Higher Education

Technical Issues with Online Classes May Lead to Negative or Positive Outcomes

In a study of 51,017 college students at Washington State's 34 community and technical colleges, Jaggars and Xu (2012) found that students who enrolled in online courses, and who frequently encountered technical issues, were more prone to feeling a sense of isolation. They also found that this group of students reported the perception that structure and support were lacking in the class. These same students also achieved lower completion rates of their online courses, which were partly attributed to negative experiences with technology. Based on these findings, it appeared that technical issues were also correlated to students' ability to persist and complete online courses (as discussed previously). It is perhaps likely that students who feel isolated (with little or no human interaction) in an online class would also be less satisfied with the class.

In a related study, Liu et al. (2007) found that university students who had a prior working knowledge of computers and who were comfortable using the Internet, were more likely to perform better and have higher levels of satisfaction in their online classes than those students who were not as computer literate. This study also suggested that other students who did not have the same prior access to technology would be disadvantaged in online courses, (which was mostly attributable to their lower levels of computer literacy).

Performance was measured by engagement (participation) and grades received in the courses that were included in the study. Other data and findings from Liu et al.'s study provided additional support on the topic of course completion and ability to persist (as discussed above). Liu et al. (2007) concluded that for students to be successful in an online course, they must not only possess a high degree of computer literacy, but also have motivation, a sense of self-efficacy, and the will to persist and complete the class.

I conducted further research in a pilot study at the University of California, as previously described (Sterling, 2013). This research indicated that those students who were familiar with technology and online learning tools (i.e., computer literate) had a lower level of self-reported anxiety about participating in online learning. For example, of 47 student responses to a survey item that asked about anxiety regarding online participation, the mean anxiety level for students who had taken a prior online course was lower at 3.36, compared to 4.64 for students who had never taken an online course: a 28% difference (on a Likert scale of 1 to 6, with 1 being low anxiety and 6 being high anxiety). It appears possible and meaningful to connect levels of anxiety experienced by students in online classes with their perception of human interaction and satisfaction with this class. This would be an appropriate topic for future research on students' anxiety and concerns about human interaction with how online classes impact student satisfaction with the course.

Students' Ability to Persist and Varying Outcomes Possibly Influenced by Cultural Background

In a study undertaken at the University of Washington, researchers Xu and Jaggars (2013) examined data from approximately 40,000 students who participated in online classes. This study explored different types of students (e.g., younger and older students, or students

from different ethnicities) and how they "adapt[ed] to the online environment in terms of their ability to persist and earn strong grades in online courses relative to their ability in face-to-face courses" (p. 23). Overall, they found students who took online classes experienced lower performance issues, apparently due to "negative peer effects [of] online courses" (Xu & Jaggars, 2013). Specifically, they discovered certain types of students struggled to persist in (and complete) online English or Social Science classes, namely students who were younger, male, or of African-American descent.

Generally, students have expressed concern that online classes may provide less teacher-student interaction than traditional, face-to-face environments. Data from the Zhu (2012) study affirmed these prior concerns and introduced potential differences between Asian and Western cultures could exist on this topic. Findings in this particular study indicated that Chinese students reported lower levels of satisfaction and lower perceptions of instructor interaction and availability in their online class, versus what students experienced with face-to-face classes. Although this study was conducted with Flemish and Chinese cultures, it would be interesting to further study this concept in Asian and Western cultures, examining differences between collectivist and individualistic cultures as discussed below.

Impact of Cultural Norms in Student Satisfaction with Online Learning

Zhu's (2012) study appeared to raise the possibility of further research to explore cultural bias with regard to online learning. The study presented value as a cross-cultural examination of student perceptions and performance with online. Additionally, it provided data that could be examined for online research that seeks to answer questions regarding student perceptions of online learning, group work, and student's concerns relating to instructor interaction.

The study by Zhu (2012) can help researchers to better understand potential differences of perceptions between Asian (collectivist culture) and Western (individualistic culture) students with regard to online learning. Zhu's data showed that Chinese students had a statistically significantly higher level of satisfaction with collaboration in their e-learning environment than did Flemish students. However, it is notable that the Chinese students reported lower levels of satisfaction with group assignments and lower levels of interaction with the instructor and these results were statistically significant as well.

Related research by Rosenberg, Westling, and McLeskey (2010) investigated cultural background and how "tendencies impact the way students participate in education" (2010, p. 72). The authors offered comparisons between what they termed "collectivist" and "individualist" cultures as a framework for understanding potential differences in students' perceptions of education. *Collectivist cultures* are those in which more emphasis and importance is placed on group interactions (e.g., family, work-group, or community); whereas *individualistic cultures* place more focus on individual-centered interactions and accomplishments. Table 1 summarizes the differences that Rosenberg et al. discussed.

Table 1

Comparison of Individualistic Culture and Collectivist Culture Student Behaviors

Individualistic Culture Student Behaviors	Collectivist Culture Student Behaviors
Students engage in discussion and argument to learn to think critically.	Students are quiet and respectful in class in order to learn more efficiently.
Property belongs to individuals, and others must ask to borrow it.	Property is communal.
Instructor manages the school environment indirectly and encourages student self-control.	Instructor is the primary authority, but peers guide each other's behavior.

Rosenberg et al. (2010) further explained, “The influence of culture on beliefs about education and participation styles cannot be overestimated” (p. 81). They then noted that Asian students, for example, tended to behave differently in classes than European or North American students and that both sets of students had different views on participation and engagement in classes. Next, Rosenberg et al. (2010) contrasted the role of Hispanic background and culture to European and North Americans with regard to engagement in the classroom. Lastly, Rosenberg et al. emphasized that people in different ethnic cultural groups tend to follow particular interaction studies, with “tremendous variability within cultural groups” (2010, p. 76).

Related literature was consulted to explore how researchers from other disciplines may add understanding to the examination online learning in a cultural context, as few studies had been conducted to compare how students from collectivist and individualistic cultures rated their satisfaction with online classes. According to the literature reviewed, there might be differences with online learning experiences relating to students’ cultural norms. Two renowned Communication Studies researchers, Giles and Toohey, have formulated well-respected theories that addressed the differences in cultural norms and expectations between collectivist and individualistic cultures. Giles’s Communication Accommodation Theory (1977) and Tooey's Face Negotiation Theory (1985) are widely used theories that posit Asian cultures are thought to support “collectivist” experiences and values, whereas Western cultures are typically more aligned with “individualistic” values. Taken in the context of online learning and student perceptions of interaction, people from individualistic cultures might prefer working alone and not place as much emphasis on accomplishing tasks with group interaction.

One such example would be how Asian (Chinese) students would differ from Western (Flemish) students in their satisfaction with online classes, due to less human interaction. The study conducted by Zhu (2012) at the Universiteit Brussel contrasted Western and Asian student satisfaction with human interaction and performance to explore how cultural perspectives may alter student performance in online classes (previously discussed). Zhu measured student participation as it related to online discussions and group work submissions, correlating these measures to student perceptions of interaction, satisfaction with online learning and overall academic performance. Zhu found significant differences "between Chinese and Flemish students regarding their satisfaction and dissatisfaction with online collaborative learning" (p. 130). For example, Flemish students spent over twice as much time logged into the online class as the Chinese students (e.g., an average of 4.85 hours per week for Flemish students compared to 2.26 hours per week for Chinese students). However, Chinese students reported that their classmates contributed more as a group than the Flemish students reported about their group work.

In Zhu's (2012) study, the Chinese students responded with higher levels of satisfaction when it came to their online-learning experiences regarding peer contributions and levels of collaboration among students. Chinese students also reported a higher preference for online learning. These particular findings appeared to be somewhat counter-intuitive, as the Flemish students persisted and spent more time using the online learning platform, yet they reported a lower preference for online learning. Perhaps more research on this topic would yield different results or explain this research phenomenon. For example, did the Flemish students experience more difficulty with the online technology, requiring them to be online longer?

Additionally, from the findings in this particular study (Zhu, 2012), it would be interesting to know whether students from Western cultures perceive different outcomes with satisfaction for online learning for project-based assignments (as compared to students from non-Western cultures). For example, with regard to students' reported satisfaction of online group work, Zhu found the Flemish students reported higher levels of satisfaction with their final results (grades) for online group work than the Chinese students. This finding may indicate that students from Asian or other collectivist cultures could be more likely to report lower levels of satisfaction if they believe they are negatively impacted with online learning. These findings could also be a result of students' perceptions of course satisfaction as being a potential outcome of grade received (performance) in the online class. As defined in the Zhu study, instructor interaction, or the amount of time involved between instructor and student, was a topic mentioned in much of the literature reviewed.

Technical Issues that May Hamper Student Satisfaction with Online Learning

Although the researchers above (e.g., Schubert-Irastorza & Fabry, 2011; Sterling, 2013), in the discussion of student satisfaction, espoused the benefits of online learning, especially with online discussion participation, there were still technical several issues that negatively (or positively) impacted students' perceptions and performance when using online learning platforms, such as problems with computers, problems with connecting to the Internet, slowness, losing work and general lack of technology skills.

Conclusion and the Current Study

The study explored student perceptions of their experiences with online classes as they related to levels of human interaction involved in the online classes they participated in. This literature reviewed included discussions of four key areas, including discussion of

student satisfaction with online classes, human interaction with online classes, and then how human interaction in online courses may impact student satisfaction with those courses.

Relationship Between the Literature Review and the Study

A review of contemporary literature available regarding online education revealed that issues exist with student perceptions of their experiences with classes as related to human interaction and their satisfaction with the online class.

There are three primary ways the literature review has shaped the present study. First, the literature strongly suggests relationships between instructor interaction (Swan, 2006), student peer interactions (Picciano, 2002; Richardson & Swan, 2003), and student satisfaction with online courses (Swan, 2006). However, fewer studies have looked at questions of human interaction with TAs. Therefore, the current study examines all three types of human interaction (instructor, TA, and student peer). For example, several studies (e.g., Cho & Jonassen, 2009; Richardson & Swan, 2003; Swan, 2006) found that the greater the instructor interaction with students in online classes, the greater the student satisfaction (Hill et al., 2004; Romiszowski & Mason, 2004; Swan, 2006). Based on this, I assume that perceptions of human interaction would impact students' level of satisfaction with their own online learning experiences.

Stated another way, students' individual interactions with online classes (engagement and human interaction) appeared to impact their overall satisfaction and performance with online classes. In a previous study, positive impact was demonstrated by students who were more engaged and with those who participated more in their online classes. Higher online class engagement (e.g., with online discussion boards) generally resulted in better performance, also leading to students earning higher grades (Picciano, 2002). This concept

was further explored in the study by items on the survey, which sought to discover student perceptions of their interactions with instructors, teaching assistants, and students (peers).

Second, Richardson and Swan's study (2003) found that the quantity and quality of perceived instructor-student interactions was linked to student satisfaction and further that elements of human interaction included connections with instructors and student peers. Swan's later research (2006) found that instructor interaction and active discussions with peers in the course were highly correlated with student satisfaction; furthermore, the survey items developed in her study helped guide the survey items in this study. For example, a set of 6 survey items under the section, "Opportunities to collaborate with student peers," captured students' perceptions of active discussions with peers. These items were also informed by Cho and Jonassen (2009) and then modified by me for this specific study.

Third, a variety of measures with student satisfaction in their online courses were found in the literature reviewed. This study used 7 survey items from the UCLA study (described under the heading Survey Design in Chapter Three below), 2 items from the pilot study I conducted in 2013; 6 items based on Cho and Jonnasen (2009), and 6 items informed from Swan (2006).

Fourth, students' ability to persist, or completion rates was another issue of concern to researchers and the university community.

Chapter Summary

Research on student perceptions of human interaction in face-to-face classes vs. online classes appears to be fairly nascent, although literature reviewed for this project did indicate certain students prefer one or the other for various reasons (e.g., some benefit with online due to communication apprehension or shyness in traditional classes). There also

appeared to be a growing preference among college students to participate in online discussion or online project-based learning. However, this finding could also partially be attributed to the Generation-Y phenomena (students born between the 1980s and 2000s) and their apparent preferences for computer-mediated communication (Meyers & Sadaghiani, 2010).

Lee's (2013) study of student learning approaches, students' perceptions of online discussions, student satisfaction, and overall academic performance found that students who were more engaged in online learning, initiated more posts and contributed higher levels of information to those discussion posts. Lee also demonstrated a correlation between highly engaged online students and their academic performance, suggesting that students who experienced more human interaction were more likely to be satisfied with their online class experience.

While there were some successes with online classes discovered in the literature reviewed, there were still several challenges with online learning. These challenges included technical issues (Jaggars & Xu, 2012), lack of computer literacy (Liu et al., 2007), and other disadvantages with certain groups of students. Other differences that impacted online learning were discovered, including subject disciplines, gender, age, culture, and ethnicity. Student persistence with online classes was also of concern and was well articulated in Xu and Jaggars (2013).

Finally, specific studies on the question of human interaction and student satisfaction were reviewed to learn more about issues and to craft better survey items for the questionnaire that was administered in this study. Cho and Jonassen (2009) found that different aspects of human interaction do have a direct impact on students' satisfaction with

their online classes and their survey items helped guide this project.

Given the importance of the problems discussed above and especially that students' satisfaction and learning may be negatively impacted by the lack of human interaction in online classes, it was justified that this study explored how perceptions of human interaction may have impacted students' satisfaction with their online classes. One way of exploring this impact was to interact with students in a research setting to understand perceptions of their online experiences, what may have contributed to those perceptions, and how the online class experience may be improved upon in the future.

The literature suggested it might be possible, through this study, to explore if student perceptions of human interactions in their online classes have an impact on higher levels of satisfaction with the course.

This present study appears relevant to the question of the importance of human interaction with online classes and especially pertinent towards exploring the debate between Governor Brown and the UC leadership community. Perhaps further exploration of this question in this study may spark discussion about benefits of online learning at a time when higher education institutions are seeking to decrease costs and serve additional students.

CHAPTER THREE

METHODOLOGY

This study aimed to explore how the instructional design of online courses led to the influence of student satisfaction (Satisfaction) based on levels of human interaction (Opportunities and Participation) with instructors, teaching assistants, and students (peers). This chapter first provides an overview of the study methods and then reviews the perspective taken for the design of this study (i.e., survey and interview design). For the survey, participant selection, participant description, research site, instrumentation and procedures are described. The interview design is described in turn. Lastly, the methods for conducting analysis on the data gathered in this section are discussed, including analytic methods for addressing the study's research questions, the qualitative analysis (coding), as well as ancillary exploration.

Overview of the Methods

This study used a mixed methods approach that involved a quantitative survey, qualitative open-ended survey questions, and qualitative interviews to explore students' perceptions of human interaction (independent variables) and their satisfaction (dependent variable) with their online classes. Quantitative survey methods are appropriate for this study to allow exploration of relationships between the study's independent variables (i.e., perceived interactions) and the dependent variable (satisfaction). 283 students (completed responses of $n = 253$) responded to a survey measuring these variables.

The propositions being tested in this study lead to three explicit research questions:

1. What are UC students' perceptions of satisfaction (*Satisfaction*) with online courses?
2. What opportunities for human interaction do UC students perceive as available

(*Opportunities*) and how often did they take advantage of these opportunities (*Participation*) during their online course?

3. How well do students' Opportunities and Participation regarding online course predict their Satisfaction?

Several ancillary research questions related to student transfer status, class year, gender, and other student characteristics were explored and are further discussed in Chapters Four and Five.

The UC system was the single research site from which I gathered data. The school system has ten campuses with approximately 220,000 students, comprised of approximately 190,000 undergraduates, 30,000 graduate students, and 15,000 faculty. Over the summer of 2014, it is estimated that over 2,000 undergraduate students enrolled in online courses offered from various campuses throughout the UC system (some were not included in this study for various reasons, including IRB approval barriers). The online courses offered at UC campuses offered the same unit credit as other (traditional, face-to-face) classes. The selection of online courses varied by campus and department (descriptions of the types of courses, campuses and total enrolled students may be viewed in Chapter Four, Table 4).

The approval of an online course happens in the following manner. If a class has already been approved as a traditional, face-to-face course, the approvals for offering it online are somewhat easier than a newly created class. Depending on whether or not the course is a GE (general education) course, campus approval will be needed from various departments (GE committee, Registrar, Academic Senate), in addition to support from the home department of the course offered.

Design of the Study

Survey Design

The design of the survey was informed by the Cho and Jonassen study (2009), the Swan study (2006), the Sterling pilot study (2013), and the UCLA Study on Student Online Satisfaction survey (2013). The Sterling pilot study included two surveys (pre and post) to explore student experiences with classes offered in a hybrid or blended design (combination of online and face-to-face).

Participant Selection & Procedure

I purposely selected students who had participated in learning with online courses (Creswell, 2009). To make potential generalizations regarding my population of interest, each participant in the study met specific criteria in order to assure the quality of the data (Patton, 2002). In order to be included in the study, all participants had participated as an undergraduate student in an online class (21 total classes) through the UC (at 3 campuses) over the Summer of 2014.

I approached students by obtaining a list of online classes from UC campus websites, then emailing instructors a request to forward the link for the online survey to their online students. Bearing in mind that this outreach was the first impression students had of the research project and purposes, the email was crafted to be precise and professional (please refer to Appendix A). The hope was that, as readers, students would understand attention to detail as an implicit way of showing respect for their time and consideration. In essence, this was the initial moment of establishing rapport with participants. Of 886 students, 283 students responded (32%); and of that number, 253 (29%) yielded complete responses.

Participant Description

Of 253 participants, 71.9% were female and 92.5% were enrolled fulltime. The sample of student participants ranged in age from 19–23 years. More descriptive data about participants are provided in Chapter Four.

Research Site

The UC setting was chosen because it was one of the largest public university systems and because there were several online courses offered during Summer Session 2014. It was deemed that there would be sufficient access to undergraduate students enrolled in online courses at these sites for the purposes of reaching the desired number of participants.

Instrumentation

The 63-item survey (Appendix C) was comprised of 8 different sections to inform the respondent and organize responses: *Section 1 – Background Information*; *Section 2 – Satisfaction with Course*; *Section 3 – Opportunities and Participation for Human Interaction with the Instructor*; *Section 4 – Opportunities and Participation for Human Interaction with Teaching Assistant*; *Section 5 – Opportunities and Participation for Human Interaction with Classmates*; *Section 6 – Suggestions for Improving Human Interaction in the Online Class; Section 7 – Request for Interview*; and *Section 8 – Demographic Information*.

For the purposes of this study, "human interaction" refers to opportunities and actual encounters (participation) with instructors, TAs, or classmates enrolled in the same online course. Each of these sections is detailed below, including sample survey items.

Section 1 – Background Information was comprised of 2 items related to creating a confidential code to compare data and the course number/description of the online course.

Section 2 – Satisfaction with Course contained 5 Likert-scale (1–7) items designed to

measure the dependent variable: students' satisfaction with the course (Vagias, 2006, p. 1). Five items were closed-ended, Likert-scale questions based on the seven-point (1–7) Likert-Type Scale Response Anchors (Vagias, 2006), for the purpose of reducing neutral responses. The anchors explained by Vagias in 2006 for Level of Agreement are: 1 – Strongly disagree; 2 – Disagree; 3 – Somewhat disagree; 4 – Neither agree or disagree; 5 – Somewhat agree; 6 – Agree; and 7 – Strongly agree (Vagias, 2006, p. 1). These items focused solely on the students' self-reported satisfaction with the online class. Note that for questions that had the option ("have not taken online class before"), those responses were not included as a number value in the data analysis. Sample survey items included, "Based on my experience with this online class, I would recommend that others take UC online classes," and "This online class provided me with an academic experience consistent with my expectations of UC."

I intentionally asked the questions about satisfaction before inquiring about Opportunities and Participation with human interaction, so as not to "prime" or bias the participants with their survey item answers relating to Opportunity or Participation.

Sections 3, 4 and 5 – Opinions About Opportunities and Participation for Human Interactions with Instructor, Teaching Assistant (TA) and Students (peers) contained 6 composite grouping measures that were designed to measure the study's six independent variables: (1) aspects of the perceived human interaction opportunities with instructor (2) aspects of the perceived human interaction opportunities with TA; (3) aspects of the perceived human interaction opportunities with peers; (4) aspects of actual human interaction with instructors; (5) aspects of actual human interaction with TAs, and (6) aspects of actual human interaction with peers. All 6 of the items were measured on a Likert-scale (1–6) questions, with the same instrumentation and rationale as described in Section 2. These items

were designed to learn more about how students perceived their levels of interaction with the instructor, teaching assistants, and other students.

As noted later in this chapter, the independent variables in this study were operationalized with questions about Opportunities for human interaction and actual Participation with instructors, teaching assistants, and other students in online classes. These survey items explored students' perceptions about the (1) Opportunities and (2) Participation of human interaction available in the online course.

For example, one of the Likert-scale items asked, "Please describe the *opportunities* available for you to interact with your instructor." The next item asked, "Over the course of the class, how often to you *participate* in these interactions with your instructor?" These items were designed to explore interaction effects with the variables. Similar survey items asked about interactions with TAs and other students in the class.

Section 6 – Open Ended Feedback Questions consisted of 5 open-ended question items designed to solicit descriptive and rich responses from participants, with a goal towards learning more about perceptions that were not contemplated during the design of the survey or research study. These items included, "What suggestions do you have about improving human interaction in this online class?" and "Please describe your thoughts about your interactions with the instructor and teaching associate in this course."

Section 7 – Invitation for Interview began with a "thank you" to the respondent and then asked if they would be interested in being interviewed for 30 minutes.

Section 8 – Demographic Information was intentionally placed at the end of the survey to not bias responses (Miller, 2013); these data were used to describe subsets of the sample. This section consisted of 7 items, such as class year, transfer student status,

ethnicity, gender, major why the student enrolled in the online class, and if the student was enrolled full or part-time. This information was used for describing the sample and to explore relationships with the variables that were ancillary to the stated research questions above.

Survey Procedures and Data Collection

As described under survey design, I emailed instructors of the online courses, who sent the link to their students; 25 classes were approached and 21 instructors agreed. Once students clicked on the survey link from the email invitation, they were directed to a Qualtrics survey page that took between 8 and 10 minutes to complete. In the one instance that there was a proctored exam, paper surveys were delivered to the class meeting and surveys administered there. This additional protocol was based on prior research on paper versus web-based surveys, where the data demonstrated that response rates were substantially higher with paper-based surveys (Greenlaw & Brown-Welty, 2009; Nulty, 2008). Paper surveys were coded identically to the web surveys and entered into an Excel data table that contained all data from the survey responses (web and paper). This course may be over-represented as the response rate was higher than most of the other courses surveyed. Specific subject areas and campuses for each of these 21 instructors are presented in Appendix F, who were teaching UC online classes over the Summer of 2014, with a request to forward the link to their students (total of 886 students).

Qualtrics online survey software rendered online forms for input and capturing data onto secure and encrypted servers. I was the only person with the password or access to the data. Open-ended responses were entered into Dedoose for qualitative analysis. Certain numeric data was input into IBM SPSS (Statistical Package for Social Sciences) Version 22.0.0 to generate descriptive statistics (means, ranges, standard deviations) and correlations

and regressions that aided in understanding the research questions.

Survey items examined with additional, ancillary statistical analysis included responses to transfer student status, experience, ethnicity, and whether the student was a full-time UC enrolled student. ANOVA was used to examine these ancillary questions.

Finally, the surveys utilized open-ended items (qualitative survey items) to elicit additional views on online learning. For example, one question was: What suggestions do you have about improving human interaction in this online class?

Quantitative Analytic Methods and Construction of Dependent and Independent Measures

To address *Research Question 1* (Satisfaction), descriptive statistical analysis was conducted on three separate measures of satisfaction. The first measure (labeled Satisfaction 3), termed Satisfaction-Overall, was assessed by Survey item A5: *On a scale of 1–7 (1 being best) my overall satisfaction with this online course is*: (see Appendix C).

The second measure (labeled Satisfaction 1), termed Satisfaction-Composite, was assessed by a composite of Survey items A2, A3 and A4 as follows:

A2. *Based on my experience with this online class, I would recommend that others take UC online classes: (Strongly agree, Agree, Somewhat agree, Somewhat disagree, Disagree, Strongly disagree)*.

A3. *This online class provided me with an academic experience consistent with my expectations of UC: (Strongly agree, Agree, Somewhat agree, Somewhat disagree, Disagree, Strongly disagree)*.

A4. *In comparison to other face-to-face UC classes I have taken on campus, this online course was*: (*Much better, Better, Slightly better, Slightly worse, Worse, Much worse*).

A third measure (labeled Satisfaction 2) also termed Satisfaction-Composite was

assessed by a composite of Survey items A2, A3, and A4 (the above items) along with item A5: *On a scale of 1-7 (1 being best) my overall satisfaction with this online course is*. This analysis specifically examined the means, range, and standard deviations of the survey items relating to satisfaction (dependent variables).

Cronbach's Alpha of Satisfaction survey items calculated to explore the internal consistency of items to estimate reliability. Cronbach's Alpha was .781 across A2–A4 items and .752 across A2–A5 items. In both cases, the Cronbach's Alpha indicated high reliability of above .7 for all Satisfaction survey items (Nunnally, 1978).

For the purposes of regression analysis in this this study, based on Cronbach's Alpha reliability computations, the measure of Satisfaction in this study was a composite of A2–A5.

To address *Research Question 2* (Opportunities and Participation with human interaction), means, standard deviations, and ranges were calculated for the opportunities and participation variables (presented in Chapter Four). Six variables were utilized and are listed below in Table 2, along with sample items, number of items in the composite scale, and the Cronbach's Alpha coefficients for the composites of these variables.

To address *Research Question 3*, correlation and regression analysis were conducted to explore relationships between aspects of the human interaction variables (i.e., Opportunities and Participation, the independent variables listed above) and student Satisfaction (dependent variable) with their online course. Correlation analysis was used to examine the relationships among the variables. Linear regression analysis was used to calculate the predictive effect of Opportunities and Participation considered separately and together, on the Satisfaction. Table 3 below summarizes the independent variables, various examples of human interaction opportunities, and the dependent variables of this study.

Table 2

Study Variables – Human Interaction Composite Survey Items (Dependent Variables)

Study Variables – Human Interaction (Dependent Variables)	Survey Items	Cronbach's Alpha	Cronbach's Alpha (Standardized)
Instructor-Opportunity (Survey items 9–17) (sample item: Please describe the opportunities available to you for instructor interaction: virtual office hours)	9	.771	.769
Instructor-Participation (Survey items 18–26) sample item: Over the course of the class how often did you participate in these interactions with your instructor: virtual office hours)	9	.829	.834
Teacher Assistant-Opportunity (Survey items 27–32) sample item: Please describe the opportunities available to you for teacher assistant interaction: virtual discussion)	6	.735	.742
Teacher Assistant-Participation (Survey items 33–39) sample item: Please describe the opportunities available to you for teacher assistant interaction: virtual discussions)	6	.726	.740
Peer-Opportunity (Survey items 40–46) sample item: Please describe the opportunities available to you for peer interaction: online discussion forums)	7	.811	.855
Peer-Participation (Survey items 47–53) sample item: Please describe the opportunities available to you for peer interaction: online discussion forums)	7	.823	.834

Table 3

Chart of Independent Variables, Human Interaction and Dependent Variables

Independent Variables (Aspects of Human Interaction)	Examples of Human Interaction (Opportunities)	Dependent Variables (Student Satisfaction)
(1) Opportunities and Participation - interaction with instructor (Opportunities-Instructor) (2) Opportunities and Participation - interaction with teaching associates (3) Opportunities and Participation - interaction with other students	(1) Face-to-face office hours (2) Virtual office hours (3) Email (4) Online discussion forums (5) Lectures (6) Discussion sections (7) Group projects	(1) Students' Perceptions of Human Interaction (Overall) (2) Students' Perceptions of Human Interaction (Composite)

As this research instrument was adapted from other surveys[1], data were initially analyzed to understand responses using descriptive statistics. Two composite measures (Opportunities-Instructor and Participation-Instructor) are shown in Figures 1A and 1B below, taken directly from the survey (Appendix C):

[1] Cho and Jonassen (2009); Sterling (2013); Swan (2006); UCLA Study on Student Online Satisfaction (2013).

Please describe the opportunities available to you for instructor interaction in this class.

	Lots of opportunities for interaction with instructor	Some opportunities for interaction with instructor	Few opportunities for interaction with instructor	Not much opportunity for interaction with instructor	Very few opportunities for interaction with instructor	No opportunity at all for interaction with instructor
In-person face-to-face lecture	○	○	○	○	○	○
In-person face-to-face discussion section	○	○	○	○	○	○
In-person office hours	○	○	○	○	○	○
Virtual (video, pre-recorded) lecture	○	○	○	○	○	○
Virtual (video, live stream) lecture	○	○	○	○	○	○
Virtual discussion	○	○	○	○	○	○
Virtual office hours	○	○	○	○	○	○
eMail with instructor	○	○	○	○	○	○
Online discussion forums	○	○	○	○	○	○

Figure 1A. Composite measure: students' perceived opportunities for instructor interaction.

Over the course of the class, how often did you participate in these interactions with your instructor:

	Always	Most of the time	Frequently	Occasionally	Seldom	Never
In-person face-to-face lecture	○	○	○	○	○	○
In-person face-to-face discussion section	○	○	○	○	○	○
In-person office hours	○	○	○	○	○	○
Virtual (video, pre-recorded) lecture	○	○	○	○	○	○
Virtual (video, live stream) lecture	○	○	○	○	○	○
Virtual discussion	○	○	○	○	○	○
Virtual office hours	○	○	○	○	○	○
eMail with instructor	○	○	○	○	○	○
Online discussion forums	○	○	○	○	○	○

Figure 1B. Composite measure: students' actual participation of instructor interaction.

Qualitative Analysis: Coding

Qualitative responses from open-ended questions survey items and interviews were entered into Dedoose, qualitative analytical software used to identify common and recurring themes as well as to provide numbers of times words and phrases were used (not reported in this study). This procedure allowed organization and grouping of the qualitative responses to discover participants' responses as to how human interaction may occur with online classes.

A research assistant assisted with this portion of the study, with coding responses, coding interview transcripts, and running additional data analysis.

Themes were discovered during the coding and analysis of these qualitative interviews. In coding interviews, I looked to Mostyn (1985) to develop customized, "dynamic" approaches to organizing and analyzing interview results. As a method of reviewing and coding data, I was also mindful of Gorden's (1975) views, who asserted "in order to gain any real insights into the meaning we must analyze the communication presented to us" (p. 116). I adopted his four-step procedure in order to review data and code it by the following means:

(1) Listen and read critically.

(2) Ask probing questions of the data—what is the meaning?

(3) Look for meaningful relationships.

(4) Synthesize and arrive at some sort of solution about the data.

For a more contemporary view on how to more accurately code qualitative research, I reviewed Saldaña's (2009) elementary introduction to coding and applied the recommended method of "lumping," looking for any regularities in occurrence of words, themes, or concepts. According to Kvale and Brinkmann (2009), "lumping is a coding method that gets to the essence of categorizing in a phenomenon" (p. 159). I then coded for an understanding of perceptions by honing in on key points that revealed themselves when data was reviewed from the interviews. For example, after loading the interview transcripts into Dedoose, I was able to run a scan for recurring themes with the interviews using a combination of qualitative and quantitative tools. Dedoose then produced a report that detailed commonalities and differences between the eight interview subjects. For example, all eight of the subjects

shared common statements that there should be some type of human interaction with online classes. Most interview subjects seemed to agree that interactions with students TAs would provide them with higher levels of satisfaction. A little over half of the interview subjects expressed negative comments about instructor availability.

Interview Design

Data for this study were also gathered through qualitative interviews, which sought to gather "nuanced accounts of different aspects of the interviewee's experiences" (Kvale & Brinkman, 2009, p. 30). The major benefit of conducting interviews was to gain perspective and understanding of students' views and discover information not learnable with surveys. Interviews were then included in the study in order to obtain more in-depth perceptions that students have formed based on their experiences with online classes. Regarding the importance of interviews as an exploration of student perceptions, it has been said that qualitative data are "data in the form of words" (Miles, Huberman, & Saldaña, 2014, p. 10). In this study, interviews also allowed participants to provide richer information (Creswell, 2009), which was important for further understanding students' perceptions of their online class experiences.

To enhance inter-reliability of quantitative analyses on the majority of survey items, qualitative interviewing protocols were used as an exploratory method (Patton, 2002). Eight students were interviewed, with the primary goal of developing an understanding of factors which may influence students' Satisfaction; students' perceptions of human interaction Opportunities; and how much Participation with human interaction was involved.

Students selected for interviews were identified through the survey. The interview script (student interview form) is provided in Appendix D1. The interview protocol and

coding procedures are explained in Appendix H. Interviews were conducted on Skype or Google Hangouts and lasted between 20 to 30 minutes. Interviews were recorded and later transcribed by a third party for review, then imported into Dedoose software to identify both common and unique statements from students that were important for understanding the exploration of variables in this study. Analysis of these data were conducted to identify themes characterizing students' experiences in the courses.

Once the individual interviews were summarized and analyzed, I compared and contrasted individual responses. These results are presented in Chapter Four.

Ancillary Exploration

Finally, to explore if transfer students were less satisfied with online classes, a t-test was run on the independent variable of transfer status and the dependent variable of student satisfaction.

Means of items were also explored to discover if the type of online course (e.g., engineering, English, etc.) made a difference with overall satisfaction with the class.

Additional explorations were undertaken to examine whether students with different college majors or different college years differed in their satisfaction with online classes.

Finally, in an exploration of the impact that ethnicity and perhaps family background in culture (individualistic or collectivist) may have on student satisfaction with online learning (Zhu, 2012), preliminary examination and analyses were run based on the inferred concept that members of Western culture shared individualistic culture beliefs regarding education (as previously discussed in Chapter Two) and that they may have higher levels of satisfaction than members of collectivist cultures (such as Asian, Hispanic or Latino). To accomplish this preliminary analysis, I ran a frequencies test on the ethnicity groups to first

determine the number of ethnic groups; then I created subgroups and ran a t-test ANOVA against the Caucasian group; understanding results were dependent on the number of groups.

Additionally, to explore if students from a potentially a collectivist culture (e.g., Asian, Hispanic or Latino) perceived different levels of availability for human interaction opportunities, I created Asian and Hispanic/Latino subgroups to represent collectivistic cultures. I then performed a t-test to compare the potentially collectivist group to the potentially individualistic group on the question of human interaction aspects that may possibly impact student satisfaction with their online course.

Chapter Summary

This mixed-methods research project included a quantitative survey, qualitative open-ended survey items, and qualitative interviews. The number of participants for this study who substantially completed their survey questionnaires was 253 (n = 253) from three UC campuses. All 253 students were enrolled in a UC online course over the Summer of 2014. Survey item questions were informed from prior studies related to students' satisfaction with online learning as it related to their perceptions of human interaction. Relationships were explored between the independent variables (opportunities available for human interaction and participation in human interaction) and the dependent variable (student satisfaction with the online class). Analysis was also undertaken on the qualitative responses gathered from open-ended questions and interviews. These qualitative responses were analyzed using Dedoose software to discover and better understand recurring themes and possible alternative explanations that were not apparent in the quantitative data collected for this research.

CHAPTER FOUR

FINDINGS

This study explored perceptions of university students regarding human interaction opportunities and participation in online classes and the possible association of these with satisfaction with their online courses. Study participants were all undergraduate students enrolled in three campuses of the UC system who took an online class over the summer of 2014.

This chapter presents results from analyses designed to address three major research questions. The chapter initially reviews respondent demographic information, followed by presentation of results from specific analyses. Descriptive statistics are presented to address the first two research questions and results from a correlation and regression analyses are presented to address the third question pertaining to the association between opportunities to engage in human interaction and students' course satisfaction. Also, results from a small qualitative analysis of interview data is presented to more fully explore the results from the primary analyses.

Descriptive Statistics

Students were sampled within courses and within campuses. Table 4 (below) presents summary of characteristics for the overall sample.

Overall, 886 potential students were eligible for the survey and 283 students responded (32%). Usable responses were obtained from 253 respondents (88%). Demographic information presented in Table 4 summarize only those responses from complete surveys. Varying percentages of students enrolled in each online course responded.

Table 4 also shows the response rate by campus and course. Response rates per course ranged from 9% to 45% and by campus, from 22% to 33%.

Table 4

Descriptions of Campuses, Classes, Gender, Class Year, Enrollment, and Response Rates

	Fe-male	(%)	1st Year	Soph-omore	Junior	Senior	Other	Enrolled in Class	Total Resp-onses	Response Rate
Campus 1										
Math	13	54.2%	2	12	10			72	24	33%
Subtotal	13	54.2%	2	12	10			72	24	33%
Campus 2										
Engineering	1	16.7%		1	2		3	20	6	30%
English	4	80.0%			4		1	30	5	17%
Film	45	77.6%	1	5	8	38	6	210	58	28%
Geology	1	50.0%				2		23	2	9%
History	13	68.4%		3	8	7	1	62	19	31%
Linguistics	36	76.6%	2	15	17	13		104	47	45%
Music	5	71.4%			1	6		33	7	21%
Science	34	79.1%		10	24	8	1	137	43	31%
Theater	15	83.3%		3	1	9	5	84	18	21%
Subtotal	154	75.1%	3	37	65	83	17	703	205	29%
Campus 3										
Chemistry	1	33.3%			2	1		18	3	17%
Geography	2	66.7%			1	2		19	3	16%
Math	5	55.6%	1	1	4	2	1	39	9	23%
Writing	7	77.8%		1	2	5	1	35	9	26%
Subtotal	15	62.5%	1	1	9	10	2	111	24	22%
Totals	182	71.9%	6	50	84	93	19	886	253	29%

As can be seen in Table 4, higher response rates were obtained from students enrolled in Linguistics, History, Science, Math and Engineering courses. Lower response rates from students occurred with Chemistry, Geology, and Chemistry courses. It can be seen from the table that substantially more females (71.9%) responded than males.

Additional data analysis not depicted in the table above showed that 43 of the students (17%) had transferred from community colleges into their UC campus. Responses for types of college majors indicated that nearly half of participants were in a STEM (Science, Technology, Engineering, and Mathematics) major, with 33 of the participants "Undeclared," 67 Liberal Arts majors (26.5%); 121 STEM majors (47.8%); and 32 of the students were Business & Economics majors (12.6%).

Ethnicity groups of the participants: 112 Asian/Pacific Islanders (47.7%); 3 Black/African Americans (1.3%); 60 Caucasians (25.5%); 42 Hispanic/Latinos (16.6%); 1 Native American/American Indian (0.4%); and 17 Other (7.2%).

Treatment of Survey Data

Although seven questions on the survey related to satisfaction, only four (A2–A5) were used for one measure of Satisfaction. This was determined after conducting analyses on the reliability of each survey question relating to Satisfaction. An analysis was then conducted on the four survey items used for the Satisfaction composite to determine reliability (Cronbach's Alpha) of the items amongst themselves and against the single question regarding Satisfaction-Overall. The full survey is presented in Appendix C and the items used to compose the variables of Satisfaction (the composite measure in Chapter Three of four items, A2–A5), Opportunity (22 items), and Participation (22 items) are in bold font. Cronbach's Alphas were computed for the composite items actually used in these analyses. Per Nunnally (1978), Alpha reliabilities range from 0 to 1 and values greater than .7 are considered to be more reliable.

Survey items that remained and that were used for the computation of measure for Satisfaction include a direct request from students regarding Satisfaction (A5) and the

composite of three other questions (A2–A4) that highly correlate to the stand-alone question regarding Satisfaction. Statistics for Satisfaction were initially calculated three different ways each time analysis was performed: (1) Satisfaction Overall (assessed by Survey item A5); (2) Satisfaction 1 (assessed by a composite of Survey items A2, A3 and A4); and finally, (3) Satisfaction Combined (assessed by composite of Survey items A2, A3, A4 and A5). For purposes of correlation and regression analysis, discussed later in this chapter, Satisfaction refers to the single, condensed measure of Satisfaction Combined (composite of Survey items A2, A3, A4 and A5).

Student Satisfaction (Research Question 1)

Means and standard deviations were calculated for Satisfaction. These analyses revealed that students were moderately satisfied with their UC online class. Overall Students' Mean Satisfaction Score was 2.69 (between "2. Highly satisfied" and "3. Moderately satisfied") on a Likert Scale of 1–7,1 being best ($M = 2.69$, $SD = 1.75$).

As stated in Chapter Three, Cronbach's Alpha of Satisfaction survey items was .781 across 3 items and .752 across 4 items. In both cases, the Cronbach's Alpha indicated high reliability of above .7 for all Satisfaction survey items.

As reported in the table below, frequency analysis of the responses for Satisfaction (Item A5) indicated that 20.3% of the respondents reported a "Best" (very satisfied) with their online class, 23.1% were highly satisfied, and 18.7% of respondents were moderately satisfied (see Table 3). Only 9 students (3.6%) reported a "Worst" (very unsatisfied) rating.

Approximately two thirds of respondents (62.1%) in Table 5 reported levels of 1–3 ("very satisfied" to "moderately satisfied") with their course and 24.4 % reported some level, 5–7 of dissatisfaction with the course ("moderately unsatisfied," "highly unsatisfied," or

"very unsatisfied"). Furthermore, there was a greater frequency of students who reported they were highly or very satisfied (43.4% responded with a 1 or 2) as opposed to the 14.0% who reported highly or very unsatisfied (6 or 7).

Table 5

Frequency Table: Satisfaction with Online Course

Response *	Frequency	Valid
1 - very satisfied	51	20.3
2 - highly satisfied	59	23.1
3 - moderately satisfied	48	18.7
4 - neutral	34	13.5
5 - moderately unsatisfied	26	10.4
6 - highly unsatisfied	26	10.4
7 - very unsatisfied	9	3.6

* On a scale of 1–7, 1 being best. *N=253*

Students' Perceptions of Opportunity and Actual Participation (Research Question 2)

Means and standard deviations were calculated on both Opportunity and Participation (see Table 6). Of note, the reported mean on human interaction Opportunities indicated students perceived more availability for interaction than what students reported for actual Participation with human interaction encounters.

These analyses revealed that students reported moderate Opportunities available to them for human interaction in their online class. Overall, students reported perceived Opportunities for human interaction with TAs, resulting in a mean score of 3.45 (between 3 "a few opportunities" and 4 "not much opportunity") on a Likert Scale of 1–6, with 1 being "lots of opportunities (M = 3.45, SD = 1.75).

Participation with human interaction by students appeared lower than perceived Opportunities. The mean score for Participation was 4.34 (between "4. occasionally" and "5. seldom") on a scale of 1–6, 1 being, "always participated" (M = 4.34, SD = 1.68).

Finally, an analysis of both Opportunities and Participation was conducted, resulting in a mean of 3.9 on a scale of 1–6, with 1 being "lots/always" opportunities (M = 3.9, SD = 1.27). This analysis suggests a lower overall total mean of perceived aspects of human interaction for the majority of students.

Correlation coefficients were then calculated to assess the relationship between students' perceived Opportunity for interaction and their actual Participation, resulting in a very strong correlation among items of .942.

Prediction of Satisfaction from Opportunity and Participation (Research Question 3)

Results of the correlation analysis of all variables are in Table 6. Regarding correlations between the independent and dependent variables, for Satisfaction 1, correlations ranged from a low of. 138 (between satisfaction and participation-student peers) to a high of .260 (between satisfaction and opportunity-TA). For Satisfaction 2, correlations ranged from a low of .177 (between satisfaction and opportunity-student peers) to a high of .251 (between satisfaction and opportunity-TA). For Satisfaction 3 (overall), correlations ranged from a low of .105 (n.s.) to a high of .180 (between satisfaction and participation-student peers). Regarding the strong correlations of Satisfaction 1 and 2 with Opportunity-TA, for example, these results indicated that the higher the reported opportunity for interaction with the TA, the higher the reported satisfaction. Of 18 possible human interaction correlations examined with the three satisfaction variables, 5 were statistically significant at the .05 level and 11 were statistically significant at the .01 level.

Table 6

Intercorrelations Among Independent and Dependent Variables, Means and Standard Deviations for Independent and Dependent Variables

	Sat.1	Sat.2	Sat.3	Opp. Inst.	Part. Inst.	Opp.TA	Part. TA	Opp. Stdnts	Part. Stnts.	*M*	*S.D.*
Satisfaction 1(Items A2–A4)	-									2.79	2.31
Satisfaction 2: (All items)	.907**	-								3.72	2.94
Satisfaction 3: (Item A5)	.376**	.725**	-							3.16	1.75
Opportunity-Instructor	.257**	.242**	.105	-						4.02	1.85
Participation-Instructor	.202**	.211**	.128*	.648**	-					5.04	1.46
Opportunity-TA	.260**	.251**	.130*	.536**	.429**	-				3.45	1.75
Participation-TA	.197**	.205**	.124	.467**	.700**	.689**	-			4.34	1.68
Opportunity-Student Peers	.153*	.177**	.147*	.613**	.582**	.569**	.570**	-		3.95	1.39
Participation-Student Peers	.138*	.180**	.180**	.518**	.624**	.433**	.609**	.843**	-	4.61	1.47

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

To discover how well the independent variables of Opportunity and Participation, considered together, predicted Satisfaction, a regression analysis was performed. Although there were six independent variables in the correlation analysis, it was decided to form two composite variables for analysis in the regression. One was labeled Opportunities for Human Interaction, a composite of Opportunity-Instructor, TA, and Student Peers; and the other was labeled Participation in Human Interaction, a composite of Participation-Instructor, TA, and Student Peers. Because Opportunity temporally occurs prior to Participation (students first need to perceive there is Opportunity with human interaction prior to Participation in the human interaction), Opportunity and then Participation were entered into the regression analysis. For the dependent variable, Satisfaction, I used the composite measure for Satisfaction, Satisfaction 2 (Items A2–A5). The results of this analysis can be seen in Table 7 below.

Participation in human interaction did not emerge as a significant predictor of Satisfaction (β =.060, *p* =.534). However, Opportunities for human interaction did emerge as a significant predictor (*t*= 2.244, β = .218, *p* = 026). Thus, as students' perceptions of opportunities for human interaction increase, their levels of satisfaction also increase.

Table 7

Regression Coefficients of Human Interaction Opportunities to Student Satisfaction

	Unstandardized Coefficients		Standardized Coefficients	*t*	Sig. or *p*
	B	Std. Error	Beta		
(Constant)	6.950	.987		7.042	.000
Opportunities for Human Interaction	.036	.016	.218	2.244	.026
Participation in Human Interaction	.010	.016	.060	.622	.534

The results of the regression indicated that the variable that assessed the opportunities available for instructor, TA, and other student interaction emerged as a statistically significant predictor of student satisfaction with their online course, but not the reported frequency of actual participation. However, because of the high correlation between Opportunities and Participation, these results should be interpreted cautiously.

Ancillary Research Questions

With the initial data analysis relating to Research Questions 1, 2, and 3 completed, I then explored five ancillary research questions. Ancillary research questions were developed to possibly illuminate the potential relationships between: (1) transfer status to satisfaction with online class; (2) course type to satisfaction with online class; (3) college major to satisfaction with online class; (4) ethnicity to satisfaction with online class, and (5) collectivist culture background (possible subset of ethnicity) to satisfaction with online class (please see notes in the Limitations section in Chapter Five for further discussion of potentially linking ethnicity to cultural background and beliefs). It is commonly understood

that ethnicity itself does not determine culture or cultural beliefs but it is also understood that ethnicity and ethnic background could be a factor in shaping cultural beliefs.

A. Possible Relationship Between Transfer Status and Satisfaction with Online Class: A t-test was conducted to analyze this ancillary research question. This method was deemed appropriate as there are only 2 groups of data (Transfer-Yes or Transfer-No) being compared on the dependent variable, Satisfaction (composite of Items A2–A5). Specifically, an Independent Samples Test (t-test for Equality of Means) was conducted, resulting in a (2-tailed) *p*-value of .119. Given that this value was greater than .05, it was not statistically significant. Therefore, there was no difference in satisfaction between transfer and non-transfer students.

B. Possible Relationship Between Course Type and Satisfaction with Online Class: Means of item results were explored to discover if the type of online course the students enrolled in made a difference with their overall satisfaction with the class. A one-way ANOVA was deemed appropriate because there were 9 groups compared in this analysis. The 21 different online classes that were reported in the survey were grouped into 9 major course types: Engineering, English, Film, History, Mathematics, Music, Science, Social Science, Theater Arts. Table 8 reports means of Satisfaction composite (Items A2–A5) for students categorized by the type of class they were taking. The lowest mean, indicating higher satisfaction was 2.26 (Engineering) and the highest mean, indicating lower satisfaction was 3.20 (Engineering). Interestingly, there was a difference of .94 (13%) between the highest and lowest mean of overall satisfaction by course type.

Table 8

Course Types by Category

Students from 21 different classes were categorized then combined into (9) categories:	*N*	Mean of Overall Satisfaction with Online Class Scale 1–7 (1 Best)
Engineering (highest overall level of satisfaction)	6	2.26
English	14	2.78
Film	58	2.47
History	19	2.52
Mathematics	33	3.09
Music	7	2.71
Science	51	2.84
Social Science	47	2.76
Theater Arts (lowest overall level of satisfaction)	18	3.20

(*N*=253)

Tables 9 and 10 report a further analysis, which compared multiple "pairs" of courses. T-tests were run to compare means on satisfaction for these groupings, and *p*-values are reported in these Tables. As Tables 9 and 10 indicate, film courses had students reporting significantly lower means on satisfaction than did students in mathematics (Table 9) and science (Table 10) courses.

Table 9

Pairwise Comparisons of Course Type Mathematics to Other Course Types

Course Type 1	Course Type 2	Mean Difference	Std. Error	*p*
Mathematics	Engineering	-.115	.600	.848
	English	.302	.391	.441
	Film	.610	.310	**.050**
	History	.569	.356	.111
	Music	.371	.449	.410
	Science	.243	.308	.432
	Social Science	.330	.318	.300
	Theater Arts	.822*	.356	.022

Dependent variable measured from Satisfaction composite (A2, A3, A4, and A5.
95% Confidence Interval for Difference

Table 10

Pairwise Comparisons of Course Type Science to Other Course Types

Course Type 1	Course Type 2	Mean Difference	Std. Error	*p*
Science	Engineering	-.358	.538	.506
	English	.059	.285	.837
	Film	.368*	.158	**.021**
	History	.326	.236	.168
	Mathematics	-.243	.308	.432
	Music	.128	.362	.724
	Social Science	.087	.172	.614
	Theater Arts	.579*	.236	**.015**

Dependent variable measured from survey items A2, A3, A4, A5 and B1.
95% Confidence Interval for Difference

C. Possible Relationship Between College Major and Satisfaction with Online Class: To explore whether students with different college majors may have had different levels of satisfaction with their online classes, Table 11 reports satisfaction within four majors: liberal arts, STEM, business/econ, and undeclared. As can be seen in Table 11, the means were fairly close to each other; however, the lowest mean was for Undeclared (2.41) and the highest was for STEM (2.70).

Table 11

Grouping of Students' College Majors and Comparison to Satisfaction with Online Class

Major Type	*N*	Mean of Overall Satisfaction
Liberal Arts	67	2.69
STEM	121	2.70
Business/Econ	32	2.61
Undeclared	4	2.41

(n = 224 out of 253 total participants)
STEM majors include Science, Technology, Engineering, and Mathematics

A portion of the literature reviewed for this study had suggested that Western students and Asian students may have different perceptions of human interaction with education. Therefore, two groups were compared on their satisfaction: Caucasian and non-Caucasian (Asian/Latino). This was done by first computing means of the groups, which produced an overall satisfaction mean of 2.64 for the Asian/Latino group and an overall satisfaction mean of 2.75 for the Caucasian group. Then an Independent Samples t-test (Levene's Test for Equality of Variances) was conducted that produced *F* of .081, Significance of .776, and -.885 on the t-test for Equality of Means. Thus, the t-test on student satisfaction for these groups revealed no statistically significant difference.

D. Possible Relationship Between College Year and Satisfaction with Online Class:

I next conducted a univariate analysis of variance (ANOVA) analysis of class year/standing to look for differences among the means of students' Satisfaction with their classes as it may relate to years at the university. ANOVA was the appropriate statistical analysis to be utilized, as the Independent Variable had more than 2 groups (5 groups total: Freshman, Sophomore, Junior, Senior, and Other).

No significant differences were found by class year based on the data analysis. On a test of "between subjects" effects based on class year compared to Satisfaction resulted in the Type III Sum of Squares was 3.297 (M = .824; p =.430) and therefore not significant. However, as seen in Table 6 below, Freshmen appeared somewhat lower in their levels of satisfaction (13% less) than the other groups, with a mean of 3.0, on a scale of 1–7, 7 being best (M = 3.00. SD = 4.63).

Table 12

Comparison of Means: Satisfaction with Online Course by Class Year

Class Year	Mean Std.	Error	Lower Bound	Upper Bound
Freshman	3.000	.463	2.087	3.913
Sophomore	2.612	.143	2.330	2.894
Junior	2.693	.108	2.480	2.907
Senior	2.602	.095	2.414	2.789
Other	3.013	.213	2.594	3.432

* calculated with a 95% confidence interval

E. Possible Relationship Between Ethnicity, Collectivist Culture Background, and the Perceptions relating to Availability of Human Interaction and Satisfaction with Online Classes: In consideration of Zhu (2012) and Sterling (2013), an analysis was undertaken to explore the possible implications of students' cultural norms on their experiences, and therefore their satisfaction with online classes. As discussed further in Chapter Five, this exploration only suggested comparisons with ethnicity, since cultural background was not properly examined on the existing survey items. I conducted three t-tests for perceptions of: instructor availability, TAs, and other students.

With respect to perceptions of instructor availability, the t-test indicated a difference that approached statistical significance between students from varying ethnic backgrounds, with students in the Caucasian group appearing somewhat higher on perceived levels of instructor availability than non-Caucasian (Asian/Latino). After the means of each group were calculated, an Independent Samples t-test (Levene's Test for Equality of Variances) was completed. There were no significant differences (with a *p*-value of .217), which led to a third test being performed, the t-test for Equality of Means. The Mean Difference was -2.673 with a *p*-value of .080; though not less than .05, the value could be said to approach statistical significance.

By contrast, with respect to their perceptions of availability of human interactions with TAs or other students, there were significant differences based on ethnicity type. The analyses conducted on these two types of interaction were accomplished with t-tests that compared the same two groups described above (Caucasian-Individualistic Culture and Asian/Latino-Collectivist Culture). Results indicated that students from the Individualist Culture group (Caucasian) were more satisfied with online classes and they believed their TAs were more available to them. With regards to students' perceptions of the availability of human interaction with TAs based on ethnicity or culture type, results from Levene's test for Equality of Variances produced an *F* of .033 with significance of .856, then a t-test for Equality of the Means at 3.045 with a *p*-value of .011. These findings demonstrated there was a significant difference between the two groups.

With regards to students' perceptions of the availability of human interaction with other students based on ethnicity or culture type, the t-test supported the hypothesis that there was a difference between groups. Specifically, the Caucasian group perceived that other students were more available compared to the non-Caucasian group, *p*-value = .004. However, it must be acknowledged for the above test results that given current survey items and ethnic background data from this current study, these findings are limited regarding cultural differences and only pertain to Caucasian and non-Caucasian students.

Qualitative Data Analysis

Having reported the results from the quantitative analyses, the richness of responses to open-ended survey item questions provided additional insight into students' experiences with human interaction and satisfaction with their online classes. Initially, the open-ended survey responses are reported, followed by responses from the interviews.

Open Ended Survey Question Reponses

Five open-ended questions were asked in the survey, guided by other surveys, literature reviewed, and a pilot study that was undertaken before this project.

1. "How would you describe the options for human interaction in this online class?"
2. "Please discuss your thoughts about your interactions with the instructor and TA in this online class."
3. "Please discuss your thoughts about your interactions with other students in this class."
4. "What suggestions do you have about improving human interaction in this online class?"
5. "If you participated in any group projects, please explain how those worked and if you were satisfied with group project experiences."

Of the 253 survey respondents, 208 completed qualitative Question 1; 207 completed qualitative Question 2; 204 completed qualitative Question 3; 204 completed qualitative Question 4; and 183 completed Question 5. A review of the open-ended questions was conducted using Dedoose, an Excel spreadsheet and visual examination of each written response. The responses were analyzed by coding them with either a positive, neutral, or negative valence and then sorting them to discover common themes and potential similarities among respondents.

Responses that were generally supportive or expressed satisfaction with the course were coded as having a *positive valence* (1), for example: "I really liked this class"; "My TA was very responsive in both virtual discussion sections and through email. Ideas were conveyed clearly during these interactions and questions were answered"; or "My TA was

very helpful." Responses that did not express negative or positive sentiments or contained comments that did not relate to the question or human interaction were coded as having a *neutral valence* (0), for example, "I wish I had a Mac instead of Windows," or "I think my TA graded all my writing assignment. I never talked to her or officially knew she was my TA or not. I recognized her name when I had my reports graded because I had her as a TA before in a different music history class." Responses that were generally negative, unsupportive, or expressed some level of dissatisfaction were coded with a *negative valence* (-1), for example, "I would have preferred some more interaction with the professor. While the lectures were fantastic, being able to receive direct feedback from such a professional would have been great," or "I do not feel that the instructor cares at all about the class or my performance in the class." Finally, *N/A or not applicable* was reserved for those responses that did not seem to relate to the question at all.

A research assistant trained on the coding methods reviewed the coding, making changes to some codes, which I accepted. In total, there were 47 revisions (4.67% out of 1004 responses).

Of the 1004 open ended responses, 193 (19.2%) were coded with a negative valence; 338 (33.7%) were coded with a positive valence; 358 (35.7%) were coded with a neutral valence; and 97 (11.6%) of the responses were recorded as N/A or Not Applicable.

Table 13 provides a summary of the positive, neutral, negative, and N/A responses for each of the five open-ended questions. Interestingly, for Instructor/TA interaction over one-half of the responses (51.5%) were coded as positive.

Table 13

Analysis of Valence (Sentiment) Coding on Open-Ended Survey Question Responses

Open-Ended Question	Positive (1)	Neutral (0)	Negative -1	N/A (N/A)	Total Points	Total Responses	Mean	*SD*
1. Describe Interaction	86 (41.3%)	71 (34.1%)	51 (24.5%)	0	91.1	208	0.438	0.796
2. Instr/TA Interaction	106 (51.5%)	59 (28.6%)	41 (19.9%)	0	65	206	0.316	0.786
3. Student Interaction	72 (35.5%)	58 (28.5%)	73 (36.0%)	0	-1	203	-0.005	0.846
4. Suggested Improvement	28 (13.7%)	156 (76.5%)	20 (9.8%)	0	8	204	0.039	0.717
5. Group Satisfaction	46 (25.1%)	14 (7.7%)	8 (4.4%)	115 (62.8%)	38	183	0.208	0.492
TOTAL	338 (33.7%)	358 (35.7%)	193 (19.2%)	115 (11.5%)	201.1	1004	0.199	

(*n*=208 out of 253 total participants)

Recurring Themes with Open Ended Survey Responses

Available Options and Desired Interactions:

In an effort to identify recurring themes for *open-ended survey item question 1* (asking about options that were available for human interaction), many comments fell into a single category with some additional themes identified. Specifically, 123 comments indicated a desire for greater availability on the part of the instructor for questions, instruction, office hours, or live lecture.

P62: "It needs to make more opportunity to communicate with professor [*sic*]."

P74: "I think that the professor should be present."

P145: "Virtual office hours would be nice with the instructor."

P208: "Maybe at least meeting the professor at least once like the first lecture just so we feel like we actually know who is teaching the class."

Other comments described teaching assistants (TAs) as more accessible and helpful than instructors. Interestingly, students who reported the most Satisfaction (as reported in quantitative survey item and in their open-ended comments) also expressed they were able to interact with their instructor and/or TA to their satisfaction. This finding may also inform the predictive nature of the regression analysis findings, indicating that students reported higher satisfaction when they perceived higher Opportunities for human interaction with their TA.

> P61: "I do not feel that the instructor cares at all about the class or my performance in the class. However, I feel that my TA is very concerned with student learning and cares about my personal experience in the class."
>
> P82: "My TA was great. I thought the professor was okay."
>
> P49: "There was a lot of opportunity for interaction with the TA, but the professor not so much. We didn't even get his email."

For *open-ended survey item question 5*, relating to group work, 108 students expressed positive feedback about working with groups in their online class.

> P117: "Really good. Random group assignments and group activities do the trick."
>
> P150: "There were a lot of group interactions through group projects and labs throughout the class. I liked the interactions because it promoted teamwork and improved my communication skills with the people I was working with."
>
> P200: "Our instructor put us in groups at the very beginning and that made everything easier. It was like a forced friendship, but in a good way. My group and I had a group text and used it quite often to talk about class, remind each other about assignments and ask for help on our projects. I had friends outside my group though that said their

group barely talked and everything felt forced and weird. I may have just been lucky with my group."

P29: "Group projects would be the best suggestion for human interaction."

However, a few students indicated they preferred to work alone, not in groups.

P75: "We did not work in groups at any point throughout this class! This was good, as I don't think many of my classmates kept up with the workload at all."

P184: "I think a lot of the time, working in a group is difficult to coordinate and I'd rather work on them by myself instead of arranging a time when we can all meet, since we all have different schedules. Communication is difficult, especially when it's with people you don't know or don't know beyond just class."

For *open-ended survey item 3*, which solicited feedback from students on their interactions with peers (i.e., other students in the class), many responses were positive, especially regarding interaction with other students on discussion boards.

P133: "Other students answered some of my forum questions posted and the instructor looked over those answers to make sure they are right. Student collaboration was honest and done the way it is meant to work."

P144: "For the most part, it was pretty interactive. Once we got used to the flow of the class, there was a very high level of student interaction and participation."

Contrastingly, some responses to survey item 3 indicated that other students were generally satisfied with the *lack* of interaction in their open-ended responses, as they perhaps did not expect it or believe that online classes were taken for convenience (perhaps making up for the lack of human interaction).

P103: "Nonexistent but that's understandable as it's solely an online course."

P40: “A live chat would be helpful but I don't think it is absolutely necessary. People take online courses for convenience not necessarily human interaction.”

P122: “It's online...so the point is that there isn't human interaction. Students are busy that's why they take online classes.”

P205: “None. I think it's better to not have student interactions in an online class.”

Soliciting Suggestions from Participants

Several of the responses to the *survey question 4*, which solicited suggestions for how to improve human interaction with their online course, perhaps unsurprisingly included access to instructors (virtually or in person) for office hours.

P10: “Please set up some office hours either on campus or at least via Skype. I've had another professor do that and it was no problem.”

P116: “One suggestion is that the instructor could have online office hour through web cam.”

P170: “Maybe an Office Hour that was live once or twice a week?”

P186: “Re-architect this class and make online webinars the same substance, content, access and involvement driven as the in-class attendance class peers. This instructor also had us do the evaluation before we knew we got bad final grades so that needs to be changed too.”

P190: “Have online lectures that are more engaging! The current online lectures are incredibly dry, and the professor speaks in monotone.”

Another student, different from the above suggestions, thought there was plenty of human interaction.

P14: “Strangely enough, I felt that this class had a large amount of human interaction in this online class. I cannot think of another way to improve it.”

Correlating Valence (Sentiment) Sum of Open-Ended Responses to Student Satisfaction

To further explore themes that appeared related to enhancing Satisfaction with their online course, an additional analysis of Satisfaction was performed and is reported in Appendix J.

Interview Responses

Eight students were interviewed using Google Hangouts of Skype to further explore their perceptions of human interaction and Satisfaction with their online course. All interviews were recorded (audio) and transcribed; then reviewed for content for purposes of identifying both common and unique statements from students (previously described in Chapter Three).

Brief mini-portraits of each interviewee are presented in Appendix I, with descriptive information and common themes that were discovered when coding the content of their interviews. Each student was assigned a pseudonym to preserve anonymity. A summary of descriptive information indicates there were six females (75%) and this was generally representative of the sample of overall students who responded to the survey. In terms of class year, there were two sophomores (2nd year), three juniors (3rd year) and three seniors (4th year). Interviewees majored in Economics (one student), Film (two students), Math (one student), Psychology (one student) and Science (two students). Interviewees were from three campuses.

Of particular note, seven of the eight interviewees agreed that some form of human interaction would be desirable but that they would prefer it to be with a TA or with other

students (not necessarily with the instructor). Opinions on this topic were quite different among interviewees, however, and seemed to relate to some students' feeling that the instructor's virtual presence was adequate or unsatisfactory: if the instructor didn't care, the students understandably would not want more interaction.

One student, "Michelle," reported feelings of isolation from other students; she stated that she missed having interaction with her professor. Some others reported more negative comments about professor availability. For example, "Bobby" a Junior enrolled in a film studies class stated, "Honestly, the professor doesn't seem like [he/she] was that into this class. [He/she] was never available, the videos were kinda lame and it felt that [he/she] just did online to save time."

"Mike" a Senior, explained that he utilized the TA a lot for his online science class, saying, "The teacher was pretty much off the radar. I think [he/she] answered one of my emails and even in that referred me to the TA." Mike then explained, however, that he "really appreciate[d] my TA for all the help [he/she] gave me. I was able to meet with [him/her] several times per week in person or online with Google Hangouts. Reminds me of Khan Academy but I could ask questions and be interactive too."

Still others had positive comments about professor availability. "Sara" a Senior taking a math class said, "It was really cool; the videos for learning Statistics really helped. [He/she] made them especially for us and told us [he/she] were available for office ours anytime." Then "Sara" went on to say, "I didn't attend any of those but it was nice to know [he/she] was there."

Of the eight interview respondents, three indicated a strong preference for online learning, two indicated a strong preference for face-to-face learning, one expressed a mild

preference for online learning, and two appeared to be without a preference as to the method of delivery (face-to-face or online). One of the two students who reported neutral opinions about online vs. face-to-face did express that she had a "good experience" with her online class and would be receptive to trying more classes to see if she would develop a preference. Interestingly, three of the interview participants stated that they would prefer completely online classes because it was "less work" or "less hassle" than being on campus for regular face-to-face classes.

Summary of Findings and Chapter Summary

There were 253 participant responses from three campuses and 21 different online classes were analyzed for this chapter. Female participants (73%) far outnumbered males and only 17% of respondents were transfer students from a community college. There was a mix of different class years with the participants, with the majority being either Sophomores or Juniors. Nearly half of the participants were in a STEM major with another 25% being liberal arts majors. Ethnic background of the participants was predominately Asian/Pacific Islander (48%), Caucasian (26%) or Hispanic/Latino (17%).

Overall, students were moderately satisfied with their online class experience, with 80% of participants reporting satisfactory or higher ratings of their online course. Means on the survey items indicated that perceptions of satisfaction were moderate on average, reflecting overall student satisfaction with their experience in the online class they completed over the summer.

In terms of relationships between the study's independent variables and dependent variables (three measures of satisfaction), there were a number of positive statistically significant correlations reported. For example, opportunities for interaction-instructor yielded

a .257 correlation with Satisfaction 1 (a composite index for satisfaction, comprised of items A2–A4), and opportunities for interaction-TA yielded a .260 correlation (Table 6).

With regard to predictive relationships, a regression analysis indicated that opportunities available for instructor, TA, and other student interaction emerged as a statistically significant predictor of student satisfaction with their online course; however, the reported frequency of actual participation did not emerge as a significant predictor.

Some differences (and lack of differences) were noted with respect to ancillary research questions that were developed throughout the data collection and analysis phase of this study. For example, there was no difference in satisfaction with online courses between transfer and non-transfer students. However, means of overall satisfaction (Item A5) for students categorized by the type of class they were taking indicated that the lowest mean was 2.26 (Theater Arts) and the highest mean was 3.20 (Engineering). In addition, film courses had students reporting significantly lower means on satisfaction than did students in mathematics (Table 9) and science (Table 10) courses.

Further, an analysis of satisfaction within different majors indicated that the means for satisfaction appeared fairly close to one another; however, the lowest mean was for Undeclared (2.41) and the highest was for STEM (2.70). Further, for ethnicity, two groups were compared on their satisfaction: Caucasian and non-Caucasian (Asian/Latino), revealing no statistically significant difference for satisfaction. In addition, no statistically significant differences were found by class year (freshmen, sophomore, junior, senior) based on the data analysis. However, an inspection of means indicated that Freshmen appeared somewhat lower in their levels of satisfaction (13% less) than the other groups, with a mean of 3.0, on a scale of 1–7, 7 being best ($M = 3.00$. $SD = 4.63$). Finally, an analysis by ethnicity indicated

that with respect to their perceptions of availability of human interactions with TAs or other students, there were significant differences based on ethnicity type. Students from the Individualist Culture (Caucasian) group were more satisfied with online classes and they believed their TAs were more available to them. Furthermore, the Caucasian group perceived that other students were more available compared to the Asian/Latino group, *p*-value = .004. However, it must be acknowledged for the above test results that given current survey items and ethnic background data from this current study, these findings appeared limited regarding cultural differences and only involved a comparison of Caucasian and Asian/Latino respondents.

Relating the qualitative data from open-ended questions and interviews to the quantitative survey items, it appeared that there was consistency among students with their perceived levels of human interaction, their satisfaction with the course, and their open-ended responses. Students who appeared to be moderately satisfied with their overall online course experience also shared fairly positive, open-ended survey responses, and interview responses. However, for the students who reported low levels of human interaction and low levels of satisfaction, their open-ended survey responses and interview responses generally were more negatively worded in terms of valence. Overall, the responses from open-ended survey questions and interviews support the quantitative data collected in this study. There were other findings from the qualitative responses, including that some students do not expect or even want any human interaction with their online classes. For example, one student responded, "I take online [classes] so I don't have to deal with anyone, online class is perfect for me." Another student reported, "Since this was an online course, I didn't expect any interaction with anyone so that was okay."

Although the quantitative results may not have demonstrated strong arguments for the importance of human interaction for student satisfaction per se, the qualitative responses from students were clear that the availability of instructors and TAs are important factors that should be considered. Further that the perceived availability of the TA may actually compensate for the lack of perceived availability with the instructor. Lastly, a substantial number of open-ended answers and interview responses indicated that Participation with the TA was viewed positively by students, especially with instances of the students' not perceiving their instructors were available to them.

In reviewing the three propositions that shaped this study with the data presented in this chapter, it appears there is support for Proposition 1, that students are moderately satisfied with their online classes. With regard to Proposition 2, the findings reflect that when students appear to perceive fewer Opportunities for human interaction with online courses their satisfaction declines. Lastly, relative to Proposition 3, Opportunities as opposed to Participation emerges as a significant predictor of Satisfaction with the online course.

CHAPTER FIVE

SUMMARY, RECOMMENDATIONS AND CONCLUSIONS

The purpose of this study was to explore aspects of human interaction available and utilized by students, with UC online courses and how those aspects or encounters may be related to students' satisfaction with their courses.

In Chapter One of this study, background of the issues, nature of potential problems with online courses, the study propositions, and an overview of what this research project entails were provided. Chapter Two reviewed select literature on online learning, human interaction with online learning, student satisfaction with online learning, and other sources that would aid in illuminating and exploring the three research questions that form the basis for this study. In Chapter Three, the three research questions were stated and the methods for this study were explained. In Chapter Four, results were presented for the quantitative survey, ancillary questions, and interview responses. In this final chapter, I summarize my findings, limitations, recommendations for future research, and conclusions for this study.

Students' Satisfaction with Online Courses (Research Question 1)

Overall, students reported moderate levels of satisfaction with their online course. There was some polarization of responses at each end of the spectrum (very satisfied vs. very unsatisfied) but this is a contemplated outcome with some survey projects (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). The mean findings indicated that students, on average, reported moderate satisfaction with their UC online class.

For the 253 students, the overall students' mean satisfaction score was 2.69 on a Likert Scale of 1–7, 1 being best. These findings are generally consistent with the literature reviewed in Chapter Two, especially with regard to overall levels of self-reported satisfaction

in prior studies relating to online classes in the higher education setting (Allen & Seaman, 2013; Atchley et al., 2013; Cho & Jonnasen, 2009; Picciano, 2002; Schubert-Irastorza & Fabry, 2011; Swan, 2006).

Students' Perceptions of Opportunities for Human Interaction and Participation with Human Interaction (Research Question 2)

In this study, human interaction was measured in two forms: first, as to the perceived availability for Opportunities to interact with instructors, TAs and students; and second, as to the Participation (or frequency) of actual human interaction encounters the students participated in during their online course.

Of note, the reported mean on human interaction Opportunities indicated students perceived more availability for interaction than what students reported for actual Participation with human interaction encounters.

Analyses revealed that students reported moderate Opportunities available to them for human interaction in their online class. On Opportunities for human interaction with TAs, the mean score was 3.45 (between 3 "few opportunities" and 4 "not much opportunity") on a Likert Scale of 1–6,1 being "lots of opportunities."

Participation with human interaction by students appeared lower than perceived Opportunities. The mean score for Participation was 4.34 (between "4. occasionally" and "5. seldom") on a scale of 1–6, 1 being, "always participated."

Finally, an analysis of both Opportunities and Participation was conducted, resulting in a mean of 3.9 on a scale of 1–6, 1 being "lots/always" opportunities ($M = 3.9$, $SD = 1.27$). This analysis suggests a lower overall total mean of perceived aspects of human interaction for the majority of students.

These findings are largely consistent with prior studies reviewed in Chapter Two. However, none of the prior studies explored the use of TAs with online learning. Additionally, most of the existing literature on the topic indicated that instructors were involved with students and that student engagement was higher with more human interaction (DeVellis, 2003; Hill et al., 2004; Netemeyer, Bearden, & Sharma, 2003; Richardson & Swan, 2003; Romiszowski & Mason, 2004; Worthington & Whittaker, 2006).

Human Interaction as a Predictor of Satisfaction with Online Courses (Research Question 3)

Regarding correlations between the study's independent and dependent variables, relationships were examined for three measures of satisfaction. Of 18 possible human interaction correlations examined with the three satisfaction variables, 5 were statistically significant at the .05 level and 11 were statistically significant at the .01 level.

To discover how well the independent variables of Opportunity and Participation, considered together, predicted Satisfaction, a regression analysis was performed. In brief, two variables were entered into the regression: (1) Opportunities for Human Interaction, a composite of Opportunity-Instructor, TA, and Student Peers; and (2) Participation in Human Interaction, a composite of Participation-Instructor, TA, and Student Peers. Participation in human interaction did not emerge as a significant predictor of Satisfaction (β =.060, p =.534); however, Opportunities for human interaction did emerge as a significant predictor (t= 2.244, β = .218, p = 026). Thus, as students' perceptions of opportunities for human interaction increased, their levels of satisfaction also increased.

These results relate to the literature in Chapter Two by Hill et al. (2004), as well as Cho and Jonassen (2009), who found, "positive emotions such as pleasure, happiness, and

satisfaction can be experienced by students engaged in online human interactions and that enjoyment of human interactions is positively related to students' satisfaction with online learning experiences" (p. 14). The results of this study also related to Muilenburg and Berge (2005), with students in both studies reporting Opportunity for human interactions as an important factor leading to satisfaction with online classes.

Further consistency between the literature and the present study results appeared in the work of Murphy and Coleman (2004). These authors found students enrolled in online courses who communicated using only email or discussion forums to be concerned about misinterpretation by other students (versus the ability to have human interaction in other ways), thus being less satisfied with their online course if no other forms of human interaction existed.

As reflected in the results of this study, Picciano (2012) also found a strong relationship between students' perceptions of human interaction and how satisfied they were with learning in the online class. Further relating to Picciano's study, the present study resulted in inconsistencies regarding actual performance and observed interactions. Responses to the open-ended survey questions and interview responses in this study may account for some of the internal inconsistencies in my own results, as well as provide potential explanations for the inconsistencies in Picciano's (2012) research.

Ancillary Research

Ancillary analysis of the data indicated that students in some types of courses had higher levels of satisfaction with their online classes than in other course types. With regard to students reporting higher levels of satisfaction in Science and Math courses rather than other course types, particularly Film (Tables 9 and 10), a possible explanation is that those

students were better able to grasp and organize around online learning without as much human interaction, whereas, for example, a Film major may feel more human interaction was needed with their class experience. Students taking a film course may desire a kind of apprenticeship experience, thus desiring some human interaction.

Ancillary analyses also tested differences between Caucasian-Individualistic Culture and Asian/Latino-Collectivist Culture. In terms of the students from ethnic backgrounds that may potentially reflect "collectivist" cultural backgrounds being less satisfied with online learning, they also reported lower levels of perceived aspects of human interaction as available with their online classes. It is possible that members of collectivist cultures feel more confident and secure with their learning experience when they can have more interaction with instructors, TAs, and other students in the class.

Some of the findings in this study did not appear congruous with common sense assumptions about online learning. The three propositions that formed the research questions were not all confirmed regarding the outcomes of student perceptions of human interaction or satisfaction with their online courses. For example, it was originally believed that a predictive relationship would be found, linking instructor availability to student satisfaction with their online class.

However, there are several findings in this study that are consistent with the literature, including overall student satisfaction and the relationship of human interaction and student satisfaction with online learning. Findings in this study go beyond the literature and perhaps inform future research, especially with regard to the involvement of a TA in the delivery of online classes. As previously mentioned, the question of TAs being utilized in online learning has not generally been included. Another area of this study that goes beyond the

literature is the exploration of the differences and importance of two aspects of human interaction with online classes: Opportunity and Participation. Through the various measurement and analyses of these two variables, new understandings of these aspects and their importance to online learning have been brought to light.

Limitations

This study measured and examined several factors relating to online learning experiences for summer session students in the areas of human interaction and students' satisfaction with their online course. There were several potential limitations to this study. The study was limited to students in courses at three campuses during one summer. Additionally, only students were surveyed for this study and not TAs or instructors. A study that examined students' views of non-summer courses or that used a larger population of students surveyed across more UC campuses may have yielded different results.

The study's limitations were not only related to the overall design of the study but also to the single school system that was included in the survey. Further, as the majority of responses (205 of 253 or 81%) for this study came from one of the three campuses (Campus 2), the sample appeared more representative of that campus.

Another potential explanation for variability that was not explored in this study were online classes that would be considered "easy" by students. Perhaps some students take certain online classes because they are "easy," require less work, and result in higher grades for considerably less effort than an online course. In these instances, it may be more likely for a student to report a higher level of satisfaction with the online course, based solely on the amount of work required compared to the grade they received.

As theoretical concepts of human interaction relating to student satisfaction with online learning are relatively new, there was not a substantive body of literature from which to draw upon to better inform this study. Being that the subject is relatively nascent, more research is needed to better understand different variables, new relationships of the variables, challenges with of these types of online survey project, and with the overall design of survey instruments.

Another limitation of this study was that all study participants were students who reported on their experiences in online classes. No survey was administered to students in face-to-face classes for an A/B comparison of perceptions of human interaction and satisfaction with their class (same class but taught in the traditional, face-to-face environment.).

With regard to exploring how cultural beliefs (individualistic or collectivist) may shape students' perceptions of human interaction and their satisfaction with online learning, this study was not specific enough with the background questions. Although it is possible to suggest a relationship between ethnicity and cultural beliefs, there was not enough basis with the survey items in this study for inferring that a student from a particular ethnic background identified with a particular cultural belief. As discussed in the Opportunities for Future Research below, additional survey items regarding cultural background and current cultural beliefs could be useful in better understanding possible relationships between cultural beliefs (collectivist and individualistic) with education, human interaction, and satisfaction.

Finally, no administrators were interviewed and no campus-wide or system-wide data analyzed that would potentially add new dimensions to a study of this nature.

Opportunities for Future Research

Findings of this study indicate that there is a relationship between students' perceptions of aspects of human interaction and their satisfaction with online classes. Based on the growing number of online class offerings and the focus for more campuses to embrace online learning, there is a need for more research on the topic of human interaction, student satisfaction, and student performance with online classes in the higher education setting.

During the course of this study and particularly after examining the varied results across over 250 participants, it became clear that several opportunities for future research existed. Indeed, the limitations of the study suggest directions for further research. For example, studies might: (a) include a greater number of participants; (b) compare student satisfaction in on online course to the same course taught in a traditional, face-to-face setting; (c) compare student satisfaction to actual performance in the class—measured by final grade; (d) include only the "human interaction encounter-utilization component", to isolate other variability; and (e) measure students' anxiety levels with online learning and how those may related to satisfaction and then possibly to performance.

Additionally, future revisions to the survey items could include a specific Likert scale question (1–7, with 1 being best) about satisfaction with the level of human interaction, "Overall, I am satisfied with the level of human interaction that I experience with this online course."

Survey logic could be added to an online survey that discerns whether there was a TA or not (by asking) and then skipping those related questions if there was not a TA. It is possible that this was a confounding variable in this study as students who did not have a TA

may have answered questions in those matrix blocks in a random and non-comprehensive fashion.

Questions to be explored in future research could also include: Could more interaction with a TA or other students supplement the loss of instructor interaction with online courses? Do office hours with an instructor still allow the class to be considered an online course or does it become some degree of blended or hybrid learning? These issues could be explored as future questions in new research projects and, where possible, initially probed in the interviews planned for this study. Additional related future research may address learning more about differences between intended human interactions (that were planned for in course design) compared with unintended human interactions that may occur as a result of students being involved with online learning environments.

A study on the different types of instructional design utilized for creation and delivery of online classes could also potentially isolate variability in a study of this kind. Perhaps one class that was "well designed" in one subject received higher measures of human interaction and satisfaction, while another class that was "poorly designed" resulted in the opposite. This factor alone could weigh heavily on the outcomes of this project and others similar to it in the future.

Unfortunately, this study was not clear enough in its exploration of Opportunities vs. Participation with human interaction. While it is true that the inconsistencies between variables of Opportunity and Participation were partially accounted from with the open-ended responses and interviews, more research needs to be conducted to better understand the differences and ramifications of how these variables impact one another.

Future research on this topic should better explore the relationship of students' cultural background and beliefs (individualistic or collectivist) as it relates to their perceptions of human interaction and self-reported satisfaction with online classes. For example, more specific survey items should be designed to better understand student participants' past and current cultural beliefs. This could be accomplished by asking Likert-scale questions such as, "Thinking about how you feel today, on a scale of 1–5, do you feel that you identify more with Western culture or perhaps the cultural beliefs of your family?"; "How closely do you believe that your ethnic background matches your current cultural beliefs?"; or, "You previously indicated your ethnic background as [prior response]; how closely do you believe that mirrors your cultural beliefs of [individualistic or collectivist traits]?" Other matching questions could be designed that list some of the criteria from Rosenberg et al. (2010), to better match the students' cultural beliefs. For example, "Thinking of how you feel today, do you believe that [students should work alone] or [students are peers and should work together and help each other]?"; "Do you currently believe that [college instructors should manage the classroom environment indirectly and encourages self control] or that [college instructors are the primary authority but student peers should guide each other's behavior]?"

Lastly, it is possible that study of "flipped," "hybrid," or "blended" classrooms could be included in research as those types of classes over a mixture of both online learning and face-to-face instruction and human interaction.

Suggestions for Educators / Practical Applications

In addition to the study propositions explored, along with research questions answered in this study, educators may also learn about potential issues that impact student

experiences with online learning. For example, the idea of including a TA to facilitate sections within online classes may be a good design and delivery consideration for certain online courses. This study will hopefully better inform designers, facilitators and instructors of online classes to carefully consider what aspects of human interaction will improve student experiences.

Closing Remarks

Over the course of this study, which has taken over one year to complete, online education has again progressed considerably. New literature is being published daily on the topics of online learning, the challenges and successes of online learning, and the looming omnipresence of online learning becoming ubiquitous in the not too distant future. In 2013, 80% of colleges were using forms on online learning technology with over 7 million students enrolled in one or more online courses (Allen & Seamen, 2013). It is likely that in the very near future, perhaps within the next 2–3 years, all colleges and universities will be offering some form of online classes. Although the debate referenced in this study was apparently only between Governor Brown and the executive leaders of UC on the topic of human interaction with online classes, it is most likely that similar debates exist in all other public university systems on both a national and global level.

With limited research and understanding of the impact human interaction (or the lack thereof) has on student experiences with online education, there is also limited information available to administrators and executive leaders of colleges to make informed and well executed decisions to create policy that benefits students with enhanced online learning at their campuses. Perhaps this study and others in the future will help inform this area of

research and aid in greater understanding of how to create more enriching online learning experiences for students.

Conclusion

This study focused on students' perceptions of their own experiences with online classes by exploring how the learning experiences and perception of human interaction affects students' perceptions of their own experiences (including their satisfaction) in the online class environment. Understanding students' perceptions of human interaction in online classes will contribute to our understanding of how to improve online classes for better overall student experiences.

In the course of this study, it was revealed that there were relationships between human interaction and student satisfaction with online courses. Participants reported higher levels of satisfaction with courses that they perceived had more Opportunities for human interaction. On the other hand, actual encounters of human interaction (Participation) experienced did not appear to be as strongly related to Satisfaction when the two variables were considered together in a regression equation.

Among the highest means were in the area of opportunities for human interaction with TAs (3.45, between 3 "a few opportunities" and 4 "not much opportunities") and the lowest means were in the area of participation of human interaction with instructors (5.04, close to "very few opportunities") (Table 6). Further, among the relationships found in the study were between students' perceptions of TA opportunity and their overall satisfaction with the online course (r = .251). The qualitative portion of this study (open-ended questions and interviews) revealed that students' perceived Opportunities for human interaction and Participation with TAs enhanced their experiences with online courses. Implications for

research and practice were identified. For example, design of online courses should consider the use of TAs to enhance student satisfaction.

Moreover, this study suggests that there are other variables that impact student satisfaction with learning in online classes, such as type of college major, class type, and perhaps cultural background (to the extent that it can be quantified and analyzed).

Admittedly, the findings in this study were not completely consistent with my original study propositions. Is it really true that Participation matters less than Opportunity if other variables are tended to, such as merely doing a better job of informing students about Opportunities for human interaction? How could the measurement of actual participation be improved? Questions such as these will be the focus of my next research project. This potential inconsistency should also be considered with instructional design and delivery of online courses. Intuitively, Participation matters. It is apparent from common sense, from prior research, findings of this study, and the sentiments expressed in the open-ended responses and interviews that Participation does matter. This variability and explorations of Participation should be modeled better in future research projects on topic.

Research conducted for this study provides substantial information to both instructors and leaders of higher education institutions on factors that may impact student experiences with online classes. In the context of California's public university systems (UC, with 230,000 students and CSU, with 447,000 students), the number of online classes and student enrollments in these classes continues to increase at a substantial rate. These online classes will certainly impact hundreds of thousands of students, tens of thousands of faculty and staff, and eventually impact many of our communities based on the learning outcomes (both intended and unintended) experienced by students with this plethora of online classes.

As the current financial situation for public universities appears to be at issue in many areas, it is likely that more and more higher education institutions will embrace online classes as a possible solution to decreasing costs and serving more students.

With educational technology evolving and being deployed so rapidly, it is important that education policy makers understand the benefits and detriments of online education. This includes the costs and the rewards and both must be understood carefully prior to further progress being undertaken with online learning in public university systems. As this study demonstrates, it is important to consider human interaction in the design, creation, and delivery of online learning experiences if they are meant to enhance students' experiences and satisfaction with their online classes.

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APPENDICES

Appendix A

Introductory Emails to Instructors and Students

Dear [INSTRUCTOR].

I am writing to ask your permission to have your students involved in a survey that I am working on for my dissertation project. I am a Ph.D. Candidate at the Gevirtz School of Education and I am writing my dissertation on students' satisfaction with online learning as it relates to human interaction involved. As part of my study, I was surveying students, conducting brief interviews with a small number of student volunteers, and also asking you to complete a very brief email questionnaire.

I am writing to ask your permission to conduct research of your class that would include:

- Sending out an invitation email (that I have written and is included below) to students with a link to a survey hosted on Qualtrics. A copy of the survey may be viewed here: https://qtrial2013.qualtrics.com/SE/?SID=SV_8q2IbMzfo5eCMst.
- If you would please cut-and-paste the template below and send as an email plus post on your learning management system as an announcement, it would be greatly appreciated.
- Me giving a $5 Starbucks eCard to each student as an incentive to participate in the 8-10 minute survey.
- Inviting students to be part of an interview, with an additional $10 Starbucks card as incentive.
- Asking you to send a copy of your syllabus, complete an optional brief email questionnaire and as another option, give permission for your student evaluation summary results (on class satisfaction) to be sent to me when they are available.

This project has been approved by Human Subjects. All responses will be confidential and school names will not be used or published in the body of the dissertation. Thank you for your consideration. I will gladly share overall results of the data collection and a copy of my dissertation when it is complete.

With gratitude,
-Ken Sterling

SUBJECT: Earn $5 Starbucks eCard for filling out a survey about your UC online class

Dear [STUDENT].

This email is being forwarded to you by your instructor on my behalf. I am writing as a fellow UC student, working on my dissertation research project. The aim of my study is to understand your satisfaction with how online classes are working and to learn more about how they can be improved for you and other students in the future.

As part of this study, you would fill out an online survey that is expected to take no more than 10 minutes. Your responses are confidential, cannot be traced to you, and will have no impact on your grade. In exchange for your time and consideration to complete the survey, you will receive a $5 Starbucks Gift eCard. At the end of the survey, you will be asked if you want to volunteer for an interview and if you do, you will receive an additional $10 Starbucks gift card. Your responses are 100% confidential and will never be shared with anyone (including your instructor).

Here is a link to the survey: https://qtrial2013.qualtrics.com/SE/?SID=SV_8q2IbMzfo5eCMst

Your participation would be greatly appreciated and could benefit your next online class experience – as well as experiences of other students who take online classes in the UC system.

Thank you for your time,
-Ken Sterling

Appendix B1

Letter to Potential Survey Respondents (Informed Consent)

You are invited to participate in a research study conducted by Ken Sterling from the Department of Education at UC Santa Barbara who can be reached at (805) 895-4700 or ksterling@education.ucsb.edu.

PURPOSE OF THE STUDY
As a graduate student, I am conducting surveys and interviews as a part of my dissertation research. I am interested in studying student experiences with online classes, with the aim of improving classes and student experiences.

PROCEDURE
If you decide to participate, you will be given a survey regarding your participation in W-000 or W-999. The survey will last approximately 8-10 minutes. I will also be asking for volunteers to be interviewed at a later date. These interviews will last approximately 30 minutes and with your permission, will be audio recorded and later transcribed. Data from this study will be used solely for research purposes. I am the only person who will have access to the surveys and original recordings, which will be kept in a secure location and later destroyed. The entire study should be completed by September 2014 and there will be approximately 130 research participants involved.

VOLUNTARY PARTICIPATION WITHOUT RELATION TO YOUR GRADE
Your participation or choice not to participate in this study, survey or interviews will not impact your grade(s) in the course. Furthermore, this research project has no relation to the course at all. As a thank you for filling out the survey, a $5 Starbucks Gift Card will be given to you. You are not obligated to complete the survey once you start it and you will still receive the gift card even if you stop the survey.

POTENTIAL RISKS AND/OR BENEFITS
There are neither direct risks nor direct benefits anticipated to you from your participation in this study. However, despite the use of pseudonyms, there is the possibility that your colleagues (fellow classmates) may recognize you in a publication containing data from this research.

CONFIDENTIALITY
Any information that is obtained in connection with this study and that can be associated with you will remain confidential and was disclosed only with your permission or as required by law. To protect your confidentiality, pseudonyms will be used and all identifying information was removed from the recording and transcript. Participant names was removed from all data once linked. However, absolute confidentiality cannot be guaranteed, since research documents are not protected from subpoena**.**

RIGHT TO REFUSE OR WITHDRAW
It is entirely within in your rights to refuse to participate, change your mind about participating, or quit after the interview has started without consequences of any kind. Further, you have the right to review the survey, recording and transcript to decide whether or not they should be partially or completely destroyed. You will still receive your Starbucks Gift Card, even if you do not complete the survey or interview process.

QUESTIONS
If you have any questions or concerns about this research project, please contact my dissertation advisor, Dr. Sharon Conley, who can be reached at (805) 893-7199 or sconley@education.ucsb.edu. Her office is located at the University of California Santa Barbara, Gevirtz School of Education, 3115 in the Education Building. Additionally, if you have any questions regarding your rights and participation as a research subject, please contact the Human Subjects Committee at (805) 893-3807 or hsc@research.ucsb.edu. Or write to the University of California, Human Subjects Committee, Office of Research, Santa Barbara, CA 93106.

CONSENT: PARTICIPATION IN RESEARCH IS VOLUNTARY. YOUR SIGNATURE BELOW WILL INDICATE THAT YOU HAVE DECIDED TO PARTICIPATE AS A RESEARCH SUBJECT IN THE STUDY DESCRIBED ABOVE. YOU WILL BE GIVEN A SIGNED AND DATED COPY OF THIS FORM TO KEEP.

Name: _____
Printed Name Signature Date

Appendix B2

Letter to Interview Participants (Informed Consent)

You are invited to participate in a research study conducted by Ken Sterling from the Department of Education at UC Santa Barbara who can be reached at (805) 895-4700 or ksterling@education.ucsb.edu.

PURPOSE OF THE STUDY
As a graduate student, I am conducting surveys and interviews as a part of my dissertation research. I am interested in studying student experiences with online classes, with the aim of improving classes and student experiences.

PROCEDURE
If you decide to participate, you will meet with me for an interview as a follow-up to the survey you completed for this project. The interview is estimated to take 30 minutes and with your permission, audio will be recorded and later transcribed. Data from this study will be used solely for research purposes. I am the only person who will have access to the original recordings, notes and transcripts from this interview; all which will be kept in a secure location and later destroyed. The entire study should be completed by September 2014 and there will be approximately 130 research participants involved overall.

VOLUNTARY PARTICIPATION WITHOUT RELATION TO YOUR GRADE
Your participation or choice not to participate in this study, survey or interviews will not impact your grade(s) in the course. Furthermore, this research project has no relation to the course at all. As a thank you for participating in this interview, a $10 Starbucks Gift Card was given to you. You are not obligated to complete the interview once you start it and you will still receive the gift card even if you stop the interview.

POTENTIAL RISKS AND/OR BENEFITS
There are neither direct risks nor direct benefits anticipated to you from your participation in this study. However, despite the use of pseudonyms, there is the possibility that your colleagues (fellow classmates) may recognize you in a publication containing data from this research.

CONFIDENTIALITY
Any information that is obtained in connection with this study and that can be associated with you will remain confidential and will be disclosed only with your permission or as required by law. To protect your confidentiality, pseudonyms will be used and all identifying information was removed from the recording and transcript. Participant names will be removed from all data once linked. However, absolute confidentiality cannot be guaranteed, since research documents are not protected from subpoena**.**

RIGHT TO REFUSE OR WITHDRAW
It is entirely within in your rights to refuse to participate, change your mind about participating, or quit after the interview has started without consequences of any kind. Further, you have the right to review the interview recording and transcript to decide whether or not they should be partially or completely destroyed. You will still receive your Starbucks Gift Card, even if you do not complete the interview process.

QUESTIONS
If you have any questions or concerns about this research project, please contact my dissertation advisor, Dr. Sharon Conley, who can be reached at (805) 893-7199 or sconley@education.ucsb.edu. Her office is located at the University of California Santa Barbara, Gevirtz School of Education, 3115 in the Education Building. Additionally, if you have any questions regarding your rights and participation as a research subject, please contact the Human Subjects Committee at (805) 893-3807 or hsc@research.ucsb.edu. Or write to the University of California, Human Subjects Committee, Office of Research, Santa Barbara, CA 93106.

CONSENT
PARTICIPATION IN RESEARCH IS VOLUNTARY. YOUR SIGNATURE BELOW WILL INDICATE THAT YOU HAVE DECIDED TO PARTICIPATE AS A RESEARCH SUBJECT IN THE STUDY DESCRIBED ABOVE. YOU WILL BE GIVEN A SIGNED AND DATED COPY OF THIS FORM TO KEEP.

Name: _____
Printed Name Signature Date

Appendix B3

Letter to Instructor Participants (Informed Consent)

You are invited to participate in a research study conducted by Ken Sterling from the Department of Education at UC Santa Barbara who can be reached at (805) 895-4700 or ksterling@education.ucsb.edu.

PURPOSE OF THE STUDY. As a graduate student, I am conducting surveys and interviews as a part of my dissertation research. I am interested in studying student experiences with online classes, with the aim of improving classes and student experiences.

PROCEDURE. If you decide to participate, you will be given a brief email questionnaire about the online course you are teaching this Summer. It is estimated it will take between 4-6 minutes to respond to the questions. I will also request a copy of your syllabus (syllabi from each class will be analyzed and coded to determine: how much human interaction was available for students to interface with (a) instructors, (b) TAs, and (c) student peers; and (2) how much human interaction was required for the class). Data from this study will be used solely for research purposes. I am the only person who will have access to the data, which will be kept in a secure location and later destroyed. The entire study should be completed by September 2014 and there will be approximately 130 student research participants and 5 instructor participants involved. The information you provide will be used to provide background information on students' responses to questions about the online class you are teaching. For example, we are interested in learning about the course design and level of human interaction in the class. We may use the background information you provide to help us better understand students' responses. Additionally, I am asking your permission to share/release (Student Survey) summary data to me for this course on students' overall satisfaction with the course. I am only requesting the overall summary score for two questions: (1) How satisfied students were with the course and (2) How satisfied students were with the instructor. **Please initial here _____ to indicate your permission that your campus may share this summary (only) data with me**.

VOLUNTARY PARTICIPATION. Your participation (or choice not to) in this study is purely voluntary.

POTENTIAL RISKS AND/OR BENEFITS. There are neither direct risks nor direct benefits anticipated to you from your participation in this study. However, despite the use of pseudonyms, there is the possibility that your colleagues or students may recognize information you provide in a publication containing data from this research.

CONFIDENTIALITY. Any information obtained in connection with this study and that can be associated with you will remain confidential and will be disclosed only with your permission or required by law. To protect your confidentiality, pseudonyms will be used and all identifying information was removed. Participant names will be removed from all data. However, absolute confidentiality cannot be guaranteed, since research documents are not protected from subpoena**.**

RIGHT TO REFUSE OR WITHDRAW. It is entirely within in your rights to refuse to participate, change your mind about participating, or quit after you have begun responding; you have the right to cancel your response, asking that it be deleted and not used.

QUESTIONS. If you have any questions or concerns about this research project, please contact my dissertation advisor, Dr. Sharon Conley, who can be reached at (805) 893-7199 or sconley@education.ucsb.edu. Her office is located at the University of California Santa Barbara, Gevirtz School of Education, 3115 in the Education Building. Additionally, if you have any questions regarding your rights and participation as a research subject, please contact the Human Subjects Committee at (805) 893-3807 or hsc@research.ucsb.edu. Or write to the University of California, Human Subjects Committee, Office of Research, Santa Barbara, CA 93106.

CONSENT. PARTICIPATION IN RESEARCH IS VOLUNTARY. YOUR SIGNATURE BELOW WILL INDICATE THAT YOU HAVE DECIDED TO PARTICIPATE AS A RESEARCH SUBJECT IN THE STUDY DESCRIBED ABOVE AND THAT YOU AUTHORIZE INSTRUCTIONAL DEVELOPMENT TO RELEASE YOUR SUMMARY ESCI DATA TO ME FOR THIS ONE COURSE. YOU WILL BE GIVEN A SIGNED AND DATED COPY OF THIS FORM TO KEEP.

Name: _____

Printed Name Signature Date

Appendix C

Survey for Students

SECTION 1 – Some background information about you and your course		
Initials + Last 4 Digits of your Phone Number please (ex: KWS4700)	Online Class Number:	Class Title:

SECTION 2 – Your opinions about this online course

How does this most recent online class you took compare with online class(es) you took before:
O Much Better O Better O Slightly Better O Slightly Worse O Worse O Much Worse O No online before

Based on my experience with this online class, I would recommend that others take UC online classes:
O Strongly agree O Agree O Somewhat agree O Somewhat disagree O Disagree O Strongly disagree

This online class provided me with an academic experience consistent with my expectations of UC:
O Strongly agree O Agree O Somewhat agree O Somewhat disagree O Disagree O Strongly disagree

In comparison to other face-to-face UC classes I have taken on campus, this online class was:
O Much better O Better O Slightly Better O Slightly Worse O Worse O Much worse

On a scale of 1-7 (1 = BEST) my overall satisfaction with this online course is (please select with slider):

SECTION 3 – Your opinions about human interaction with the instructor

Please describe the opportunities available to you for instructor interaction in this class.	Lots of opportunity	Some opportunity	Few opportunities	Not much opportunity	Very few opportunities	No opportunity at all
In-person face-to-face lecture						
In-person face-to-face discussion section						
In-person office hours						
Virtual (video, pre-recorded) lecture						
Virtual (video, live stream) lecture						
Virtual discussion						
Virtual office hours						
Email with instructor						
Online discussion forums						
Over the course of the class, how often did you participate in these interactions with your instructor?	Always	Most of the time	Frequently	Occasionally	Seldom	Never
In-person face-to-face lecture						
In-person face-to-face discussion section						
In-person office hours						
Virtual (video, pre-recorded) lecture						
Virtual (video, live stream) lecture						
Virtual discussion						
Virtual office hours						
Email with instructor						
Online discussion forums						

SECTION 4 – Your opinions about human interaction with the Teaching Assistant (TA)

Please describe the opportunities available to you for interacting with the teaching assistant in this class.	Lots of opportunities	Some opportunities	Few opportunities	Not much opportunity	Very few opportunities	No opportunity at all
In-person face-to-face (section)						
In-person office hours						
Virtual discussion						
Virtual office hours						
Email with TA						
Online discussion forums						

Over the course of the class, how often did you participate in these interactions with your teaching assistant.	Always	Most of the time	Frequently	Occasionally	Seldom	Never
In-person face-to-face (section)						
In-person office hours						
Virtual discussion						
Virtual office hours						
Email with TA						
Online discussion forums						

SECTION 5 – Your opinions about human interaction with classmates

Please describe the opportunities available to you for interacting or collaborating with classmates.	Lots of opportunities	Some opportunities	Few opportunities	Not much opportunity	Very few opportunities	No opportunity at all
In-person, face-to-face (section)						
In-person face-to-face group time						
Virtual group time						
Virtual discussion						
Email						
Online discussion forums						
GoogleDocs, Wiki, other software						

Over the course of the class, how often did you participate in these interactions with your classmates?	Always	Most of the time	Frequently	Occasionally	Seldom	Never
In-person, face-to-face during Section						
In-person face-to-face group time						
Virtual group time						
Virtual discussion						
Email						
Online discussion forums						
GoogleDocs, Wiki, other software						

SECTION 6 – Suggestions for how to improve online classes

- How would you describe the options for human interaction in this online class?
- Please discuss your thoughts about your interactions with the instructor and TA in this online class:
- Please discuss your thoughts about your interactions with other students in this class:
- What suggestions do you have about improving human interaction in this online class?
- If you participated in any group projects, please explain how those worked and if you were satisfied with the experience of working in a group:

SECTION 7 Invitation for interview

Are you willing to be interviewed for this project (20 minutes) in exchange for receiving a $10 Starbucks Gift Card? O Yes. If so, please provide daytime phone number and email.
O No, thank you

SECTION 8 – A little more background information on you please

What UC campus hosted your online class:

UC Santa Barbara ○ UC Irvine ○ UC Los Angeles ○ UC Davis ○ UC Santa Cruz ○

What is your current class year	Are you a transfer student?	Are you full-time UC student	What is your major:
O Freshman / First year O Sophomore O Junior O Senior O Other	O Yes O No	O Yes O No	_____

Why did you choose to take an online course instead of a face to face (please choose all that apply):

- O I wanted the flexibility of an online class.
- O The online format suits my individual learning style
- O I was curious about the experience of taking a class online.
- O I have a job or internship that prevents me from attending on-campus classes.
- O I live too far from campus.
- O The online format suits my individual learning style
- O I was curious about the experience of taking a class online
- O I have a job or internship that prevents me from attending on-campus classes.
- O I am enrolled in other classes on campus that take up my day.
- O I wanted to take this particular class.
- O I wanted to study with this particular professor.
- O I needed to fulfill a GE requirement.
- O I needed to fulfill a major/minor requirement.
- O Someone recommended UC online classes
- O Other

What is your Major: _____

What gender do you most identify with: O Male O Female

What ethnicity do you most identify with:

- O Asian or Pacific Islander
- O Caucasian / European
- O Native American or American Indian
- O Black or African American
- O Hispanic or Latino
- O Other

Thank you very much for your valuable time. Please click link on the next page to retrieve your Gift Card. If you would like to receive a copy of this study or have any questions, please email: ksterling@education.ucsb.edu.

Appendix D1

Student Interview Form

Written consent was obtained from all participants. The Informed Consent form explains the purpose, procedures, risks, benefits, confidentiality, and right to withdraw from the interview. After completing the Informed Consent and an explanation of the process is given, the following questionnaire was provided as I set up audio.

I. BACKGROUND QUESTIONS

Class: _____ Term:_____ Major: _____ Age _____

"Thank you for your time today. I am doing a research project about online education and I understand you recently took an online class here. I am hoping to learn more about your own experiences and the learning conditions of the class. Your responses are confidential and I will use a pseudonym for you and the school. I estimate that our interview will take about thirty minutes and I would like to record our conversation, is that okay with you?"

II. INTERVIEW

I wanted to start by asking about your decision to enroll in this summer online course and what your experiences have been."

1. What brought you to UC?

2. Have you ever had an online course before or is this the first experience?
    a. [probe: if you have had an online course before, what can you tell me about:
        i. Course Design (platform, how delivered/accessed, how it worked)
        ii. Interactions with instructor, TAs, students (peers)
    b. Was it purely online or were there any face-to-face interactions (office hours, section, etc.)?

III. PERCEPTIONS

1. How would you describe your overall experience with the current class?
    a. [probes: things you appreciated or strengths, weaknesses]

2. How would you define "human interaction" in the context of this online course you just completed?

3. In this current course, how would you explain your interactions with:
    a. Faculty
    b. TA
    c. Other students (e.g., was there group work)?

4. What suggestions would you have for how your experience with human interaction in the current online course could have been improved?

5. Is there anything I haven't asked you that you feel would be important to know or understand about your experience with this online course?

Thank you. I really appreciate your time and want to honor my promise not to take up too much of your time. Is it okay if I contact you with any follow-up questions and would you like to receive a copy of my research report when it is completed? Are there any questions I can answer for you about my interview or this project?

Appendix D2

Email Question / Interview Protocol for Instructors (Background info on class)

Written consent was obtained from all participants. The Informed Consent form explains the purpose, procedures, risks, benefits, confidentiality, and right to withdraw from completing the questionnaire. After completing the Informed Consent and an explanation of the process was given, the following questionnaire was provided to the instructor.

Dear [Instructor Name],

Thank you for agreeing to participate in this study and also for allowing me to contact your students. I will be happy to share my findings with you and pass along any suggestions that may improve future versions of your class.

If you would please reply to this email with your responses next to the questions, that would be wonderful. It should take you no more than 3-5 minutes to finish all of the questions.

1. Please attach the online class syllabus to this email when replying.
2. Did you design the online version of this class?
    a. Would you be willing to share your online proposal that was approved for the course? If so, please just attach to this email.
3. What course management system and/or technology platform did you use to deliver this class (GauchoSpace, custom program, etc.)?
4. About how many hours per week did you teach the online class?
5. About how many hours per week did you offer office hours?
    a. Where they face-to-face or virtual (via Skype, etc.?)
6. Do students have any live interactions with your online class (instructor, TA, study group)?
    a. If yes, please describe briefly how the live interactions are facilitated.
7. Are you willing to share your student evaluation summary results on the question asked about student's satisfaction with the class?

Thank you. I really appreciate your time and want to honor my promise not to take up too much of your time. Is it okay if I contact you with follow-up questions? Are there any questions I can answer for you about these questions or this project?

Regards,
Ken Sterling
(805) 895-4700
ksterling@eudcation.ucsb.edu

Appendix E

Common Terms with Online Education

The following are common terms used in this paper and within the field of online learning:

Administration. People involved in the administration and/or leadership of schools, departments, and educational systems.

Asynchronous Learning. Interaction between instructors and students that occurs independent of time or location and that is typically facilitated by online learning technology.

Blended Online Learning. Also known as "hybrid online," this type of class is typically more evenly balanced in terms of the percentage of time spent in the classroom and online. MOODLE platforms are typically used to facilitate blended or hybrid learning. As of today, most "online" classes offered through public universities are considered blended learning.

Collaboration. Interaction and cooperation among a group of people (faculty or students) on specific projects in the educational setting.

Course Design. See Instructional Design.

Course Management System. Refer to Learning Management System (LMS).

Discussion Form, threaded discussion, or online discussion forum. Chronological listing of student and faculty comments regarding an organized topic is known as a threaded discussion. Responses are linked to participants' names. Threaded discussion forums are designed to replicate classroom discussion in online course offerings.

Distance Learning. Instruction in which the student and faculty are in different locations and interact through the use of computer and communications technology.

Face-To-Face Instruction. Traditional classroom environment where students and faculty meet synchronously in the same room; also referred to as "traditional," "on-ground" or "on campus" instruction.

Faculty. People who formally deliver instruction to students, including professors, instructors, teaching associates, or teaching assistants.

Human Interaction. Level of contact (virtual or in-person) between students, faculty, and workgroups assigned to work on academic projects. In this study, human interaction was conceptualized as interactions with the instructor, interactions with teaching assistants, and interactions with other students (peers in the online class).

Instructional Design. Involves the identification of the knowledge, information, and skill gaps of a particular group of people and creating learning experiences that close this gap. May also be referred to as Course Design.

Instructional Designer. Faculty or staff that practices instructional design. This person identifies needs of future students to determine best practices to design learner pathways that will encourage students to realize learning outcomes and satisfaction with the course.

Learner Pathway. Pre-designed route (by instructional design) that will guide the student through a combination of learning activities, allowing them to build their understanding and application of knowledge as identified in the learning outcomes for the course.

Learning Management System (LMS). Also referred to as course management system (CMS), the LMS is the technology platform through which online courses are offered. The LMS includes software for creating and editing course content, communication

tools, instructional tools, grade books, assessment tools, and other features designed to enhance online access and ease of use; examples include Blackboard, MOODLE, Coursera, and Udacity.

Learning Outcome. Intended learning consequences for students that are constructively aligned with course assignments, assessments, and the learner pathway.

Learning Conditions. Factors that lead to student learning, including course design, teaching methods, human interaction, and technology platforms.

MOOC. Massively Open Online Courses, usually taken for no credit and with no instructor interaction.

MOODLE. Modular Object-Oriented Dynamic Learning Environment, free software e-learning platform, also known as a Learning Management System (LMS).

Online Course Delivery with Proctored Exams. Very similar to pure online learning, this type of course is offered 100% online, but requires proctored exams, typically one midterm and one final exam. Otherwise, this type of course is completely taught and managed online.

Online Education. Also known as "e-learning," this is faculty-led education, occurring over the Internet, with faculty and student geographically separated, and typically chronologically separated.

Online Environment. Learning environment that is created for students, including courses, discussions, or other communication occurring over the Internet.

Online Learning Platform Providers. Companies that create, host, and maintain web technology (software) solutions, but do not create content or learning materials. Private companies providing these platforms are Coursera, Udacity, and BlackBoard, to name a few.

Online Program. Series of related modules or courses in which instruction and course material is delivered primarily through the Internet, with the majority of the credit hours earned online.

Online Student. A person admitted in an Online Program (see definition above) either as degree, non-degree, or non-credit student. In this study, Online Student refers to enrolled students, seeking credit.

Pure (Completely) Online Learning. Classes that are offered 100% online with no in-person (or face-to-face) interaction.

Post. Submission of text into a discussion forum, typically by a student or faculty.

Performance. Measure of a student's academic accomplishment in the academic setting.

Student. For the purposes of this study, "Student" refers to undergraduate university students who are also enrolled (or have been enrolled) in online classes.

Synchronous Learning. Real-time interaction that occurs independent of location.

Teaching Methods. Techniques and processes faculty use to deliver education to students that are based on the learner pathway and learning outcomes.

Technology Platform. Software programs used to deliver online learning. See Learning Management System.

Traditional Education Supplemented by Online Technology. Category of online education mostly comprised of on-campus, in-class instruction with a small amount of participation on a MOODLE (Modular Object Oriented Dynamic Learning Environment) learning management system platform. Classes within this category will usually have videos and documents available for viewing on the MOODLE and some classes will require

participation in discussion boards with posts and responses. MOODLE platforms can also be used for quizzes, submission of assignments, and generating mass emails to entire class sections.

Technology Enhanced Course. A course or program that uses any one or more various technologies, such as video, audio, and the Internet to augment the traditional delivery of information to students via lecture, text, and printed syllabi.

Video Conferencing. Use of video technology (both hardware and software) that facilitates virtual meetings between two or more people in different physical locations.

Virtual. Connections and communications that are not bound by physical limitation, but instead are accessed via the Internet and software tools.

Virtual Classroom. "Digital classroom" that does not physically exist, yet provides a learning environment that takes place over the Internet, allowing faculty and students to interact.

Webinar. Seminar, class, or section in which faculty and students view same screen image (and sometimes each other) at same time. Audio typically available and moderated by faculty to allow dynamic, two-way conversation (or not). Webinar software typically allows student participant to interact via chat features, polls, and virtually "raising their hand."

Appendix F

UC Online Courses Available for Research and Approved by IRBs

Table 14

Listing of 21 UC online courses contacted for this study (out of 25 contacted)

COURSE DESCRIPTION	COURSE NUMBER	CAMPUS
General Psychology	Psychology W1	UC Berkeley
Expository Writing	UWP 1	UC Davis
Spanish 2V	Spanish 2V	UC Davis
Pre-Calculus Mathematics	Math 1A	UC Irvine
Pre-Calculus Mathematics	Math 1B	UC Irvine
Preparation for General Chemistry	Chemistry 1P	UC Irvine
Principles in the Social Sciences	Social Science 1A	UC Irvine
Writing and Rhetoric	Writing 39A	UC Irvine
Geographic Information Systems	Geography 7	UC Los Angeles
Computer Science I	CS 010V	UC Riverside
Biochemistry Lecture	Chem W 142A	UC Santa Barbara
General Biochemistry	MCDB W 108A	UC Santa Barbara
Geological Catastrophes	Earth W 20	UC Santa Barbara
History of Dance	Dance W 36	UC Santa Barbara
Living with Global Warming	Geog W 8	UC Santa Barbara
Maps and Spatial Reasoning	Geog W12	UC Santa Barbara
Probability and Statistics	Pstat W 120A	UC Santa Barbara
Writing for Science and Technology	Writ W 109ST	UC Santa Barbara
Calculus 19A	Math 19A	UC Santa Cruz
Calculus 19B	Math 19B	UC Santa Cruz
Introduction to Fresh Water	ENVS 65	UC Santa Cruz

Appendix G

Survey Question Table with Rationale

Variable	Question	Question Type	Source
Background	Initials+4 Phone Online Class Number, Class Title, Current Class Year	Closed	UCLA/Self
Student Satisfaction with Course [Dependent Variable]	How does this most recent online class you took compare with the class(es) you took before?	Likert (1–6) 1-Much Better 2-Better 3-Slightly Better 4-Slightly Worse 5-Worse 6-Much Worse	UCLA
	Based on my experience with this online class, I would recommend that others take UC online classes.	Likert (1–6) 1-Definetely 2-Probably 3-Maybe 4-Not Sure 5-Probably Not 6-Definetely Not	UCLA
	This online class provided me with an academic experience consistent with my expectations of UC.	Likert (1–6) 1-Always 2-Usually 3-About ½ time 4-Seldom 5-Hardly Ever 6-Never	UCLA
	In comparison to other face-to-face UC classes I have taken on campus, this online class was _____ than those classes.	Likert (1–6) 1-Much Better 2-Better 3-Slightly Better 4-Slightly Worse 5-Worse 6-Much Worse	UCLA
	On a scale of 1–6 (6 being best) my overall rating of the online course is:	Ratio/Ranking 1-Excellent 2-Very Good 3-Good 4-Mediocre 5-Bad 6-Very Bad 7-Terrible	Self
	Overall, how satisfied were you with this online course?	Likert (1–6) 1-Very Satisfied 2-Satisfied 3-Somewhat Sat. 4-Somewhat Uns. 5-Not very Sat. 6-Not Satisfied at al	UCLA/Self

Opportunity Available Instructor [Independent Variable]	Please describe the opportunities available to you for instructor interaction: • In-person face-to-face lecture • In-person face-to-face discussion section • In-person office hours • Virtual (video, pre-recorded) lecture • Virtual (video, live stream) lecture • Virtual discussion • Virtual office hours • Email with instructor • Online discussion forums • Other _____	Matrix Likert (1–6) 1-Lots of Opp 2-Some Opps 3-A few Opps 4-Not much Opp 5-Very few Opps 6-No Opps at all	Swan (2006); Cho & Jonassen (2009); Self
Utilize Instructor Availability [Independent Variable]	Over the course of the class, how often did you participate in these interactions with your instructor? • In-person face-to-face lecture • In-person face-to-face discussion section • In-person office hours • Virtual (video, pre-recorded) lecture • Virtual (video, live stream) lecture • Virtual discussion • Virtual office hours • Email with instructor • Online discussion forums • Other _____	Matrix Likert (1–6) 1-Always 2-Most of time 3-Frequently 4-Occasionaly 5-Seldom 6-Never	Swan (2006); Cho & Jonassen (2009); Self
Opportunity Available Teaching Assistant [Independent Variable]	Please describe the opportunities available to you for interacting with your Teaching Assistant: • In-person face-to-face discussion section • In-person office hours • Virtual discussion • Virtual office hours • Email with TA • Online discussion forums • Other _____	Matrix Likert (1–6) 1-Lots of Opp 2-Some Opps 3-A few Opps 4-Not much Opp 5-Very few Opps 6-No Opps at all	Swan (2006); Cho & Jonassen (2009); Self
Utilize Teaching Assistant Availability [Independent Variable]	Over the course of the class, did you participate in these interactions with your Teaching Assistant? • In-person face-to-face discussion section • In-person office hours • Virtual discussion • Virtual office hours • Email with TA • Online discussion forums • Other _____	Matrix Likert (1–6) 1-Always 2-Most of time 3-Frequently 4-Occasionaly 5-Seldom 6-Never	Swan (2006); Cho & Jonassen (2009); Self
Opportunity Available Collaborate Students [Independent Variable]	Please describe the opportunities available to you for interacting with other students: • In-person face-to-face group time • Virtual group time • Virtual discussion • Email • Online discussion forums • GoogleDocs, Wiki, or other collaborative software option • Other _____	Matrix Likert (1–6) 1-Lots of Opp 2-Some Opps 3-A few Opps 4-Not much Opp 5-Very few Opps 6-No Opps at all	Swan (2006); Cho & Jonassen (2009); Self

Utilize Student Collaboration/Interaction [Independent Variable]	Over the course of the class, did you participate in interactions to collaborate with other students? • In-person face-to-face group time • Virtual group time • Virtual discussion • Email • Online discussion forums • GoogleDocs, Wiki or other collaborative software option • Other _____	Matrix Likert (1–6) 1-Always 2-Most of time 3-Frequently 4-Occasionaly 5-Seldom 6-Never	Swan (2006); Cho & Jonassen (2009); Self
Suggestions [Exploratory, information gathering]	How would you describe the options for human interaction in this online class? What suggestions do you have about improving human interaction in this online class? Please discuss your thoughts about your interactions with the instructor and TA in this online class. Please discuss your thoughts about your interactions with other students in this class. If you participated in any group projects, please explain how those worked and if you were satisfied with the experience of working in a group.	Open-ended	Swan (2006) Self Self Self Self
Demographic [Possible Independent Variable]	With what ethnicity do you most identify with? Transfer Student? Full-time UC student? Why enrolled in online class?	Multiple choice drop down: -Asian or Pacific Islander -Black or African American -Caucasian -Hispanic or Latino -Native American or American Indian -Other Dichotomous (Yes/No) Dichotomous (Yes/No) -Wanted flexibility. -Online format suits -Curious -Job prevents -Live too far -Enrolled other classes on campus that take up my day. -Wanted this class. -Wanted this prof. I needed to fulfill a GE requirement. -Needed to fulfill a major/minor requirement. -Someone recommended UC online classes -Other	Zhu (2012) and Self Xu / Self Self UCLA

Appendix H

Interview Process and Coding Protocols

According to Kvale and Brinkmann (2009), it is important to create interviewing environments that foster trust and encourage disclosure of native information. Therefore, I focused on the ethics of interviewing by creating protocols to maintain a friendly and conversational tone, ensure confidentiality, and clearly describe the purpose for conducting the interview.

Student participants were contacted via email if they had responded favorably to the request to be interviewed in the initial survey. Once they agreed to participate in the interview, the informants were briefed on the specific conditions of the interview design—that is, the interview would be recorded, would run approximately thirty minutes, and would be analyzed for the purposes of a dissertation research study. All informants willingly agreed to these conditions. At the beginning of the interview, I asked each informant to fill out some basic demographic and background information while I set up the recording device.

First, I requested demographic information from each participant using a brief preliminary questionnaire that was at the top of the interview protocol (Appendix D). The background information was used to verify that each respondent met the student criteria (e.g., UC undergraduate student, recently enrolled in an online course) for participation, and request general demographic information (Merriam, 2009).

Second, after reviewing the preliminary questionnaire and confirming the participant's eligibility, I conducted a one-on-one, semi-structured, opened-ended interview with each student or instructor for approximately 20 to 30 minutes. All eight interviews were conducted in a quiet location and took place through a video Internet call (e.g., Skype or

Google Hangouts), audio recorded, and then transcribed. Transcription was conducted by the paid transcription service, O-desk. I also verified each transcript for accuracy by checking against the recordings.

Third, I assigned each interview a code number to protect the associated interviewee's individual identity. The list with the corresponding participant's name was kept in a separate location, away from the transcribed interview data. To safeguard the data and protect participant privacy, one electronic copy of each interview transcript was stored on a secure, password-protected file on my personal computer. The data files were backed up to a secondary hard drive once per day, in the evening. A second electronic copy was stored in my private, web-based, secure DropBox account, accessible only via password. Hard copies of the interview transcripts were stored in a locked, waterproof, fireproof safe. Interview consent forms were stored on encrypted servers at the Qualtrics facility. Data management included analysis, journaling for trustworthiness, and creating an inventory of all items.

Interview Procedure

For the interviews, I consciously worked on establishing and maintaining rapport with informants. I began each interview by saying, "Thank you for your time today. I am doing a research project to learn about online education and I understand you recently took an online class here on campus. I am hoping to learn more about your own experiences and the human interaction available in the class. Your responses are confidential and I will use a pseudonym for you and your institution, is that okay? I estimate that our interview will take about thirty minutes and I would like to record our conversation, is that okay with you?"

During the interviews, I consciously balanced the need to take notes with the need to be attentive to the informant. I placed faith in the recording device and heeded the advice,

"taking extensive notes during an interview may, however, be distracting interrupting the free flow of conversation" (Kvale & Brinkmann, 2009, p. 138).

After the interview, I thanked the participant, asked if they had any questions, and if they would like a copy of the research after it was prepared.

Once interviews concluded, I was faced with the task of transcribing the data. There were multiple methods of doing so which could potentially skew the data. According to Kvale and Brinkmann (2009), "there is one basic rule in transcription—state explicitly in the report how the transcriptions were made" (p. 139). In order to eliminate potential interpretive biases, I outsourced the transcription to a professional transcriptionist at O-Desk. I then had a research assistant compare the transcript to the audio data from each individual interview as a means of trying to ensure interview transcription reliability.

Interview Questions and Rationale

Through establishing an explicit purpose, interview questions were created using Spradley's (1980) Grand Tour Question as well as Patton's (2002) Matrix of Questions. My hope was to better understand student perceptions and experiences of online education through the eyes of the student interview subjects. The interview protocol contained 7 primary, open-ended questions, though I knew it was possible that not all would apply or be answered. I also knew that based on a response, a new line of questioning could be initiated. As a trained researcher and interviewer, I was alert for the possibility of new explorations if new opportunities were presented during the interview responses.

General and Descriptive Questions

I looked to qualitative interview methods to formulate general interview strategies and create descriptive questions. Initial questions focused on gaining insight into the

experience of the informant in the online class. I used matrix questions from Patton (2002), which enabled me to find out more about the type of behaviors of the students and faculty in the online classes.

Probe Questions

By using clarification and elaboration probes (Patton, 2002), I was able to delve into the opinions and values of the informant to get a clear understanding of what their perceptions were. Examples included, "Can you explain why you feel that way?" or "Was it purely online or where there any face-to-face interactions, what about office hours or sections?"

Question 1 – "What brought you to the UC System" was designed to put the respondent at ease, be neutral, and learn about the participant's experience (Patton, 2002) that led them to the University of California. Remaining questions focused specifically on the student's perceptions of their experiences in the online course: questions 2 through 7 asked, for example, "How would you describe the teaching methods in this class?" or "Please explain your thoughts about how the course was organized." Probe questions were prepared in anticipation of some initial answers, according to suggestions by Patton (2002). At the end of the interview, question 7 was a clearinghouse question, as explained by Spradley (1980): "Is there anything I haven't asked you that you feel would be important to know or understand about your experience with this online course?"

Validity and Reliability

An important part of qualitative research and interviewing is ensuring for validity and reliability. Creswell (1998) explored eight verification procedures in order to increase the

trustworthiness of data. I worked with research assistants to overcome potential reliability and validity issues by adhering to Creswell's procedures:

- Clarification of research bias: exploring and acknowledging my own beliefs, biases, and my potential ignorance in this area, which helped ensure that I asked questions that elicited responses that can be learned from. I also sought out paid research assistants with no interest or bias in this subject.
- Peer review: During the course of this project, I met with other researchers to discuss progress, results, analysis, and recommendations for best practices with this study.

With the implementation of these procedures, I aimed to increase the trustworthiness of my findings towards gaining an accurate understanding of student experiences with human interaction and satisfaction with their online class experiences.

Appendix I

Table 15

Mini Portraits of Interview Subjects

Interview Subject	Gender	Class Year	Major	General Notes	General Sentiment Regarding Online
"Bobby"	Male	Junior	Film	Human interaction (HI) important. Professor not interested, not available, did online to save time.	Close comparison but would rather have face-to-face
"Sara"	Female	Senior	Math	Human interaction desirable. Instructor good, available, just didn't contact. Videos good.	Like both, this was a good experience, will try more.
"Mike"	Male	Senior	Science	HI good with TA, not with teacher. Virtual meetings with TA weekly.	Prefers online
"Michelle"	Female	Sophomore	English	Wanted more HI with students, felt isolated. Professor "okay." No TA.	Prefers face-to-face
"Samantha"	Female	Sophomore	Science	Easier because hard to get to campus and park. TA and instructor good. Good student interaction online	Prefers online
"Erika"	Female	Junior	Psyc.	Prefer face to face. HI not so good with online. Problems with technology.	Prefers face-to-face
"Monica"	Female	Junior	Film	Easy class, less work. Will be taking more. Doesn't matter if instructor available, as long as TA can help. All virtual okay.	Prefers online
"Alexa"	Female	Senior	Econ.	Interaction okay, wish more opportunity with online before last year. TA really good.	No preference-depends on class and professor

Appendix J

Sentiment Analysis Explanation

An additional analysis was performed that involved a summation of the sentiment coded on open-ended responses. Sentiment score per participant for all five open-ended questions was added and then regressed against Satisfaction, resulting in R-squared of .048. ($N = 208$, $R^2 = .0487$, $SD = 2.088$). R-squared is the percentage of the response variable explained by the regression analysis. Values closer to 0% explain less of the variability and values closer to 100% explain more of the variability in the model. In this study, a result of R-squared of .0487 indicated there was little explanation as to the variability in the regression model. Based on these findings, I then conducted an ANOVA (Test of Between-Subjects) to determine whether the two independent variables (Opportunity and Participation) or their interaction were statistically significant as compared to sentiment of open-ended responses. A two-way analysis of variance yielded a main effect for Opportunity, $F(1, 5.836) = 4.361$, $p = 0.017$, such that the average Satisfaction was higher for those students whose open-ended responses had a positive valence sentiment ($M = 25.457$, $SD = 4.361$.) The main effect of Participation was non-significant. However, the interaction effect was significant, $F(1, 140) = 14.529$, $p < .05$, indicating that the human interaction effect was greater with the perception of Opportunity for availability with the TA than it was with actual Participation ($M = 140.029$, $SD = 9.644$).