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THE INFLUENCE OF STUDENT CHARACTERISTICS ON THE PREFERRED WAYS OF LEARNING OF ONLINE COLLEGE STUDENTS: AN EXAMINATION OF CULTURAL CONSTRUCTS

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ABSTRACT

The ongoing popularity and increased availability of online college courses and programs has attracted a greater diversity of students. Along with continued female-majority enrollment, increasing numbers of students of traditional college age and students from a variety of ethnicity groups are taking online courses. The prevailing guiding assumptions that have informed much of the online pedagogical and instructional practices have primarily come from theories of adult learning, particularly andragogy, which has been heavily criticized for not acknowledging student diversity. As online education becomes ever more established in higher education, it is vital to examine the diversity of contemporary student populations and their learning preferences.

This study investigated whether and how student characteristics influence students' preferred ways of learning on (1) Ke and Chávez's (2013) individuated-integrated *Cultural Constructs of Teaching and Learning* analysis model, (2) online interaction, synchronous vs. asynchronous, and (3) learning environment, online vs. face-to-face. The student characteristics studied were age, gender, ethnicity, class level, and prior experience.

This study expanded on Ke and Chávez's qualitative work on cultural constructs in the following ways: (1) Development of a quantitative instrument to test their findings -

Preferred Ways of Learning Survey (PWLS), (2) Examination of additional student characteristics (age, gender, class level, and prior experience), and (3) Addition of two research questions to examine whether and how student characteristics influenced online college students' online interaction and learning environment preferences. The study researched 140 online students at the University of New Mexico in Fall 2014.

The explanatory sequential mixed methods approach chosen entailed quantitative data analysis based on descriptive statistics, factor analysis, and means comparisons, and qualitative data analysis that used coding, theme, and category identification. The results were then merged and compared. The quantitative results did not support Ke and Chávez's findings. Rather than culture, age, gender, and class level were the primary student characteristics that influenced student preferences. Students' cultural backgrounds in the current study were based on their self-selection into one or more ethnicity groups such as Hispanic, Native American, and White. Culture, or ethnicity, was statistically significant on one cultural construct, however, the quantitative results only partially supported Ke and Chávez's findings. Statistically significant differences for gender were identified on the online interaction preference construct with higher asynchronous preference scores for female students. Statistically significant differences for prior online experience were identified on the learning environment preference construct with higher online preference scores for students who had completed four or more online classes. Student interviews provided greater insight on the overall results, but lacked full representation of the quantitative sample to adequately address all statistically significant group differences.

This study illustrates the importance of building an awareness of the changing student population in postsecondary online education. It provides insight into some intriguing

learning preferences, and notes some beneficial ways to improve online instruction. Future researchers can use the findings as an impetus to delve more deeply into the learning preferences of contemporary online college students, and they can use the PWLS to identify these preferences. It is hoped that both the instrument and the results add to the literature on creating equitable learning environments that meet the needs of diverse learners, ultimately, to foster student satisfaction, success, and retention.

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Introduction

Postsecondary online education has enjoyed a steady progress of acceptance at US universities and colleges over the past 15 years. In their most recent annual chronicle of online and distance education in higher education for 2014, Allen and Seaman (2015) reported that 70.8% of institutional leaders believe “that online learning is critical to their institution’s long term strategy” marking this as “an all-time high” since their first published report in 2003 (p. 4). Allen and Seaman also reported that for 2014, online courses were offered at “Over 95% of institutions with 5,000 or more total students” (p. 9), and that both public and private four-year institutions had the largest enrollment increases, up 7.2 percent and 12.7 percent, respectively.

During this same timeframe student populations have progressively begun to reflect the changing demographics of our society, causing universities to accommodate populations of increasing diversity. These changes are evident in online enrollment as online courses and programs have increased in both popularity and availability. Recent statistics released by the National Center of Educational Statistics (NCES), Integrated Postsecondary Education Data System (IPEDS) revealed postsecondary online enrollment for both undergraduate and graduate students taking “any distance education classes” from 2003-04 to 2011-12 has increased by 105 percent and 118 percent, respectively (“Digest of Education Statistics, 2014,” 2014a; 2014b). The NCES/IPEDS statistics also described the characteristics of postsecondary online students, and reported both existing and emerging trends. In addition to ongoing female majority enrollment, increases of both younger and minority students have occurred over time.

Background of the Study

Much of the literature on the development of effective online instruction continues to focus on meeting the needs of *adult*, or *nontraditional*, students. Moore and Kearsley (2011) explain,

> the overwhelming majority of distance education students in the United States are adults, typically between the ages of 25 and 50 years. Consequently, an understanding of the nature of adult learning is an invaluable foundation for understanding the distance learner. (p.150)

Although older students (25 years and older) still represent the majority of online enrollment, younger students (15-24 years of age) are catching up. Recent NCES/IPEDS data revealed that students under the age of 24 represented the largest percentage increase for all undergraduate age groups from 2003-04 to 2010-11, at over 126 percent ("Digest of Education Statistics, 2014," 2014b). Clinefelter and Asianian (2015) corroborated this trend, reporting that in 2015 undergraduate students below the age of 25 represented 34 percent of postsecondary online enrollment, a 9 percent increase from 2012. Clinefelter and Asianian identified this change as one of their key findings for 2015 and explained that, "Age no longer predicts learning behavior in online higher education. While online education has traditionally been marketed toward adult learners, more and more students under 25 years of age are choosing to study online for their undergraduate degrees" (p. 9).

Often the terms *adult* and *nontraditional* are synonymous as both are used to distinguish students with characteristics that differ from those of traditional undergraduate university students. Although age is often the defining characteristic of both adult and nontraditional students, many scholars refer to the 2002 NCES definition that requires nontraditional students meet at least one of seven criteria: no high school diploma (e.g. GED certificate), delayed postsecondary enrollment, full-time employment, part-time college attendance, financially independent (financial-aid eligible), has dependents other than spouse, and single parent (Choy, 2002).

In 1999-2000, NCES/IPEDS reported 73 percent of online undergraduate students met at least one of these criterion, while the most recent report for 2011-12 showed 70 percent (Radford, Cominole, & Skomsvold, 2015). This decrease indicates that more traditional college students are taking their courses online. Other student groups with characteristics that are often associated with nontraditional students, including women and "minorities and individuals of low socioeconomic status" (Jones & Watson, 1990, p. 26) have an established and/or increasing presence in postsecondary online education as well.

Female students continue to represent the gender majority (Clinefelter & Asianian, 2015), while undergraduate "Hispanic enrollment nearly quadrupled . . . and Black enrollment more than doubled" (Kena et al., 2015, p. 93) from 1990 to 2013; during this same timeframe "both Black and Hispanic [graduate] enrollments nearly quadrupled" while "American Indian/Alaska Native [graduate] enrollment more than doubled" (Kena et al., 2015, p. 99).

Despite the constantly evolving makeup of postsecondary online college students, the prevailing guiding assumptions that have informed much of the online pedagogical and instructional practices were developed decades ago.

The study of adult learning in the US began with Lindeman in the 1920s, and has since become an increasingly prominent field of study. *Andragogy* was a European term and concept adopted, refined, and popularized by Malcolm Knowles in the 1970s, to distinguish learning differences between adults and children. Knowles' (1989) "model of assumptions" (p.112) about adult learners "became a rallying point for those trying to define the field of adult education . . . however, it also stimulated controversy, philosophical debate, and critical analysis" (Merriam, Caffarella, & Baumgartner, 2012, p. 85).

A main area of criticism has come from scholars of sociological and critical theoretical orientations. Schapiro (2003) described how research from areas such as critical pedagogy, transformative and emancipatory learning, feminist pedagogy, and multicultural education, have expanded upon Knowles' and other humanistic theories while,

> calling attention to some aspects of learning that the more individualizing and psychologizing theories of andragogy and humanistic education tend to ignore or underemphasize, such as the social context of learning; issues of power and social justice, in society and in the educational process; . . . and a recognition of multiple ways of knowing and learning. (p. 152)

Sandlin (2005) published a critical critique of andragogy when she informally investigated "critically-focused" literature and noted the following issues:

1. Andragogy assumes wrongly that education is value neutral and apolitical.

2. Andragogy promotes a generic adult learner as universal with White middle-class values.

3. Andragogy ignores other ways of knowing and silences other voices.

4. Andragogy ignores the relationship between self and society.

5. Andragogy is reproductive of inequalities; it supports the status quo. (p. 27)

Merriam and Bierema (2014) explain that despite such criticism, as well as the lack of empirical research that supports the assumptions of andragogy, it “continues to be a major theory/model/approach to understanding and planning instruction for adult learners” (p. 59).

Need for the Study

Postsecondary online enrollment data reveal a trend of increasing student diversity. In addition to an ongoing female majority, the number of younger students of traditional college age (18-24) and the number of minority students taking online courses are steadily growing. The failure to examine the changing characteristics of postsecondary online students over time threatens our ability to design effective instruction that meets their needs. The prevailing theoretical assumptions, particularly andragogy, that guide the pedagogical practices for online instruction typically cater to the needs of adult learners without much regard to other student characteristics. It is vital to develop an awareness of the diverse learners who are enrolled in postsecondary online education today – who they are, and how they prefer to learn – in order to ensure that pedagogical and instructional practices are in tune with their needs.

Purpose of the Study

The overarching purpose of this study was to investigate whether and how the student characteristics of contemporary online college students influenced their preferred ways of learning in the online environment. The student groups of particular interest were those that represented both ongoing and emerging enrollment trends, including (a) age, (b) gender, and (c) culture. The aspects of interest in terms of students' preferred ways of learning in the online environment focused on variety of pedagogical and instructional methods and practices, such as approaches to learning, interaction, and the overall learning environment.

Conceptual-Theoretical Framework

Ke and Chávez's (2013) recently published *Web-Based Teaching and Learning across Culture and Age* was the impetus of the current study. Their two-year mixed methods study examined "the influence of online pedagogies and contexts on the learning processes and perceptions of a diversity of college students living in rural and urban areas, with an emphasis on learners of nontraditional age and minority status" (p. 13). While they studied age difference as well as culture, their focus on age difference was primarily in terms of online interaction performance (e. g., content analysis of discussion forum posts) and perceived learning outcomes. The current study focused on their *Cultural Constructs of Teaching and Learning* analysis model.

Ke and Chávez's work on culture came from their own prior research and a "theoretical cross-analysis" (p. 93) of the literature on the anthropological and educational aspects of learning in relation to ethnicity and cultural identity, including Ibarra's (2001) cultural constructs, the effect of learning styles and culture by Rendón (2009), and the indigenous cultural constructs of education developed by Cajete (1994).

Over the course of Ke and Chávez's two-year study, eight cultural constructs had emerged from the student narratives they collected and interpreted. These constructs include *Purpose of Learning*, *Ways of Taking In and Processing Knowledge*, *Responsibility of Learning*, *Time*, *Role of the Teacher/Control*, *Student Interactions*, and *Sequencing*. Each of the constructs consists of two "cultural epistemologies," individuated and integrated, which are situated on a left-to-right continuum, respectively (Figure 1).

Individuated In a culturally <u>individuated</u> worldview or epistemology, a compartmentalized, private, contextually independent conception of the world is common, assumed, and valued.	↔	***Integrated*** In a culturally <u>integrated</u> worldview or epistemology, an interconnected, mutual, contextually dependent conception of the world is common, assumed, and valued
Knowledge, individual competence, to move forward toward goals	***Purpose of Learning***	Wisdom, betterment of the lives of those with whom we are connected
Mind as primary, best, or only funnel of knowledge	***Ways of Taking in & Processing Knowledge***	Mind, Body, Spirit/Intuition, Reflection, Emotions, Relationships
Compartmentalized and separate; belief that understanding how the parts work separately, abstractly, and in isolation will lead to the greatest understanding	***Interconnectedness of What is Being Learned***	Contextualized and connected, belief that understanding how things affect each other within the whole, pragmatically, and within community will lead to understanding
Learning is a private, individual activity, Responsible for one's own learning so that others are not burdened	***Responsibility for Learning***	Learning is a collective, shared activity, Responsible for one's own and others' learning
Linear, task oriented, can be measured and used, to be on time shows respect	***Time***	Circular/seasonal, process oriented, dependent on relationships, to allow for enough time shows respect
Provider and Evaluator of Knowledge -- best perspectives and ways of learning, predetermined/bounded learning; Communication primarily between teacher and students	***Role of the Teacher / Control***	Facilitator of Learning Experiences -- multiple perspectives and ways of learning, emergent / constructivist; wide variety of interactions between students, and between teacher and students
Others' perspectives are optional for learning. Primarily rely on verbal messages; individuals are paramount, few streams of communication	***Student Interactions***	Others' perspectives are important to learning. High use of nonverbals, collective as paramount & multiple streams of communication
Learning by mastering abstract theory first, followed by testing. Rarely includes application /experience/doing in real life	***Sequencing***	Learning by doing, listening to others' experiences or experiencing first, then drawing out abstract theory

Figure 1. Cultural constructs of teaching and learning. Reprinted from Web-Based Teaching and Learning across Culture and Age (p. 95) by F. Ke and A. F. Chávez, 2013, New York, NY: Springer. Copyright 2013 by Springer Science + Business Media. Reprinted with permission.

According to Ke and Chávez,

> Within a culturally *integrated* worldview or epistemology, an interconnected, mutual, reflective, contextually dependent conception of the world is common, assumed, and valued. In a culturally *individuated* worldview or epistemology, a compartmentalized, private, outward, contextually independent conception of the world is common, assumed, and valued. (p. 93).

They found that “Native and Hispanic American students learn best from a very different epistemology and practice than Caucasian Northern European American students within each of the eight constructs” (p.62). In particular, their findings indicated, “that the integrated right side of the model contains cultural epistemologies that are more common to both Hispanic and Native American college students” while the “Northern European Caucasian American students . . . showed learning preferences and norms primarily along the individuated end of the cultural continuum” (p. 96).

Ke and Chávez’s cultural analysis model provided the means to quantitatively test whether online college students’ cultural background influenced their preferred ways of learning on each of the eight cultural constructs. The model provided a useful framework to study contemporary online students in terms of culture, as well as the other student characteristics of interest, including age and gender. In addition, although Ke and Chávez did not make such claims, their data suggested cultural differences for online interaction preference (synchronous versus asynchronous) and learning environment preference (online versus face-to-face).

Ke and Chávez reported that some student interviews had revealed distinct preferences for synchronous or asynchronous interaction in the online environment. Because online students' culture didn't appear to directly affect online interaction preference, Ke and Chávez suggested instead that the preference might be more related to "an individual learner's level of internal or external ways of processing" (p. 108). Interesting, they also reported that, "Native American students in this study preferred more time for internal processing" (p. 109).

In terms of learning environment preference, Ke and Chávez had observed that the Native American students in their study described that "the 'hands-on, doing' (bodily/kinesthetic) nature of online courses [were] more natural to their learning process and point[ed] out that within an online learning context they have 'more time for reflection (intrapersonal) before responding' consistent with their own cultural norms" (p. 101). Based on these intriguing observations on both online interaction and learning environment preferences, it was determined that further investigation was warranted.

The *Preferred Ways of Learning Survey* (PWLS) was created specifically to quantitatively test Ke and Chávez's qualitative findings and observations. Their two-year investigation took place from 2008-2010 and studied a diverse population of online university students in the southwestern US. The current study researched a similar student population – online college students from the University of New Mexico in Fall 2014. The site of the current study provides a snapshot of contemporary online students, and helps to build an awareness of current online student populations.

University of New Mexico. The University of New Mexico (UNM) currently serves a demographically diverse student body, as evidenced by its distinction as a United States Department of Education (USDE) *Accredited Minority Institution*, *Institution with High Hispanic Enrollment*, as well as a Hispanic Association of Colleges and Universities (HACU) *Hispanic-Serving Institution*. The online student characteristics of UNM mirror national figures, including female majority enrollment, and climbing numbers of both younger and minority students (Table 1).

Situated in New Mexico, with a "historical atmosphere . . . represented by its unique fusion of three cultures—Spanish American, Native American, and Anglo American" ("Encyclopedia Britannica, New Mexico Cultural life," 2016), UNM provides a context that is both unique and comparable to national overall college student populations, as they both progressively reflect the changing demographic characteristics of our society.

Table 1

Enrollment of Online UNM Students for Age, Gender, Ethnicity, and Class Level, Fall Semesters 2011-2015

Student Characteristics	2011	2012	2013	2014	2015	Percentage Fall 2015[a]	5 Yr. Change[a]
Age							
22 & younger	113	575	1687	3227	4729	41%	4085%
23-28	2081	3191	3394	2605	1867	33%	-10%
29-34	910	1089	996	785	724	10%	-20%
35-40	506	545	522	454	425	6%	-16%
41-45	261	271	280	245	241	3%	-8%
46-49	144	152	124	125	98	2%	-32%
50-54	143	159	150	125	112	2%	-22%
55 & older	174	171	141	126	97	2%	-44%
Total	4332	6153	7294	7692	8293	0.99%	
Gender							
Female	2884	3948	4690	4915	5087	61%	76%
Male	1448	2205	2604	2777	3206	39%	121%
Total	4332	6153	7294	7692	8293	100%	
Ethnicity							
Native American	234	365	376	375	420	5%	80%
Asian	127	195	235	267	284	3%	124%
African American	118	176	212	241	244	3%	107%
Hispanic	1693	2452	3071	3394	3688	44%	118%
Two or More	98	160	224	252	277	3%	183%
White	1874	2540	2896	2886	3041	37%	62%
Native Hawaiian	120	147	155	114	112	0.2%	-7%
Total[b]	4264	6035	7169	7529	8066	0.952%	
Class Level							
Undergraduate	3542	5257	6372	6848	7530	91%	113%
Graduate	790	896	922	844	763	9%	-3%
Total	4332	6153	7294	7692	8293	100%	

Note. Distinct enrollment figures are provided: Students enrolled in multiple online courses were counted once. Data provided by UNM Office of Institutional Analytics (2016).

[a]Percentage figures rounded
[b]Nonresident and unknown figures are not included in ethnicity category

Research Questions

The following research questions were used to guide this explanatory mixed methods study. Table 2 contains the original constructs and variables for each research question.

1. How do student characteristics influence online college students' preferred ways of learning on individuated-integrated cultural constructs?

2. How do student characteristics influence online college students' online interaction preference (synchronous versus asynchronous)?

3. How do student characteristics influence online college students' learning environment preference (online versus face-to-face)?

Culture – Definition and Usage

Ke and Chávez (2013) defined their conceptualization of *culture* as,

> a set of existing patterns, habits, or rules of thinking and doing of a social group and the dynamic adjustment of this social group to surroundings and needs, which then create a sum total of rules or patterns of acting/ thinking to be inherited by future members of the group. (p. 5)

Ke and Chávez made a distinction between ethnicity-related culture to refer to members within the same society or country and nationality-related culture to refer to members from different societies or countries. Their study participants consisted of Latino/Hispanic American, Native American, Asian American, African American, Northern European Caucasian Americans, and international students. The current study will research a similar group of students and aligns with Ke and Chávez's definition and use of the term culture to describe ethnicity-related culture (unless otherwise noted).

Definition of Preferred Ways of Learning

The use of the term *preferred ways of learning* is meant to match the usage in Ke and Chávez's (2013) study, as well as to distinguished it from the use of popular terms such as *learning styles*, *cognitive styles,* and *learning preferences* found in the literature.

Although not specifically defined in Ke and Chávez's (2013) study, they explain that "Students learn and are most satisfied and successful in web-based courses that at least in some ways match their own natural or preferred ways of learning" (p. 144). The term *natural* is the key concept, and was used as the defining characteristic of the phrase *preferred ways of learning* in this investigation.

Table 2

Research Questions, Original Constructs, and Independent and Dependent Variables

Research Question	**Independent Variables**	**Constructs & Dependent Variables**
1. How do student characteristics influence online college students' preferred ways of learning on individuated-integrated cultural constructs?	Student Characteristics: Age Gender Ethnicity Major Class Level Prior Experience	Cultural Constructs: Purpose of Learning Ways of Taking In and Processing Knowledge Interconnectedness of What is Being Learned Responsibility for Learning Time Role of the Teacher/Control Student Interactions Sequencing
2. How do student characteristics influence online college students' online interaction preference (synchronous versus asynchronous)?	Student Characteristics: Age Gender Ethnicity Major Class Level Prior Experience	Online Interaction Preference: Synchronous Asynchronous
3. How do student characteristics influence online college students' learning environment preference (online versus face-to-face)?	Student Characteristics: Age Gender Ethnicity Major Class Level Prior Experience	Learning Environment Preference: Online Face-to-Face

Significance of the Study

This study will add to our understanding of postsecondary online student diversity. The empirical testing of whether and how student characteristics such as age, gender, culture, class level, and prior experience influence students' preferred, or natural, ways of learning in the online environment, using the individuated-integrated cultural constructs developed by Ke and Chávez (2013) will add to the literature by providing (a) an increased awareness of the diversity of contemporary online students, (b) empirical findings of a qualitative study on cultural constructs developed to explore diverse learners, and (c) a new research instrument developed to test individuated-integrated cultural constructs, online interaction preference, and learning environment preference for diverse learners. This study will provide instructors and designers additional insight for developing more inclusive instructional design models for practical application. The results will inform online course and program evaluators, managers, and administrators as they continually seek to improve the quality of online courses and programs for all students. The creation of equitable learning environments that meet the needs of diverse learners will foster student satisfaction, success, and retention.

Assumptions, Limitations, and Delimitations

The individuated-integrated cultural constructs developed by Ke and Chávez (2013) that were investigated in the current study were unique in the literature. The quantitative testing of their qualitative findings therefore required the development of a new research instrument. The instrument did not include items to address course content, instructional methods, or computer efficacy, all of which could influence student perceptions of online learning. Validity concerns for the instrument were addressed through expert review and pilot testing, and reliability was reported with alpha coefficients. Qualitative validity for this mixed methods study was handled through member-checking to verify accuracy of meaning.

In addition to researching students' cultural differences in relation to the cultural constructs developed by Ke and Chávez, the current study examined additional student characteristics such as age, gender, major, class level, and prior experience. The cultural makeup of the student population at UNM is unique (i.e., Spanish, Native, and Anglo American), and therefore not generalizable to other contexts. In contrast, the other variables (i.e., age, gender, class level, and prior experience) under investigation could be generalizable to other online postsecondary students.

The sample was drawn from only UNM main campus online students and did not include its branch locations. Some of UNM's branch locations represent higher concentrations of minority students, particularly Native American students. Including the branch campus student populations may have enlisted more minority participation.

Definitions

Adult Learner. Individuals who are age 25 and older.

American Indian or Alaskan Native. This definition is from the IPEDS glossary: "A person having origins in any of the original peoples of North and South America (including Central America) who maintains cultural identification through tribal affiliation or community attachment" ("The Integrated Postsecondary Education Data System," n.d.-a).

Asian. This definition is from the IPEDS glossary: "A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian Subcontinent, including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam" ("The Integrated Postsecondary Education Data System," n.d.-a).

Black or African American. This definition is from the IPEDS glossary: "A person having origins in any of the black racial groups of Africa" ("The Integrated Postsecondary Education Data System," n.d.-b).

Culture. The working description of *culture* for this study is taken from Ke and Chávez (2013): "the conceptualization of culture comprises two primary dimensions: a set of existing patterns, habits, or rules of thinking and doing of a social group and the dynamic adjustment of this social group to surroundings and needs, which then create a sum total of rules or patterns of acting/ thinking to be inherited by future members of the group" (p. 5).

Ethnicity. This term is used primarily for reporting purposes (i.e., demographic and statistical tables). Students' cultural backgrounds were based on students' self-selection into categories that matched both US Census and UNM reporting protocol. In this sense, both ethnicity and culture are used to describe the following student groups: (1) American Indian or Alaska Native, (2) Asian, (3) Black or African American, (4) Hispanic or Latino, (5) Native Hawaiian or Pacific Islander, (6), Two or More (those who selected two or more categories, not including Hispanic or Latino), and (7) White.

Fully Online Courses. Courses in which most or all of the class is conducted online and does not require classroom meetings; face-to-face classes may be optional.

Gender. This term is used to denote "the state of being male or female" ("Definition of GENDER," n.d.) without regard to biological differences.

Hispanic. This definition is from the IPEDS glossary: "A person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race" ("The Integrated Postsecondary Education Data System," n.d.-c).

Historically Underrepresented students. From Sierra College website: "'Underrepresented' in higher education refers to racial and ethnic populations that are disproportionately lower in number relative to their number in the general population, and 'historically' means that this is a **ten year or longer** trend at a given school" (Sierra College, n.d.). The literature also specifies the following student groups as historically underrepresented: African American, Hispanic, and American Indian/Native Alaskan, women, and first-generation college students.

Native American. This term is relevant in that the Ke and Chávez's (2013) study uses it rather than using the NCES/IPEDS term/definition of *American Indian or Alaska Native*. The use of *Native American* in this study is comparable to Ke and Chávez's (2013) usage. Specifically, *Native American* refers to individuals who culturally self-identify with any of the tribes of the United States.

Native Hawaiian or Other Pacific Islander. From NCES/IPEDS: "A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands" ("The Integrated Postsecondary Education Data System," n.d.-d).

Nontraditional Student. Descriptions vary, and may include adult students, (age 25 years and older), female students, minority student groups, underrepresented student groups, students with low socioeconomic status, as well as those who meet NCES criteria: (a) no high school diploma (e.g. GED certificate), (b) delayed postsecondary enrollment, (c) full-time employment, (d) part-time college attendance, (e) financially independent (financial-aid eligible), (f) has dependents other than spouse, and (g) single parent (Choy, 2002).

Online Education. For the purposes of this study this term is described as "a flexible instructional delivery system that encompasses any kind of learning that takes place via the Internet" ("Online Education," 2007).

Online Learning. For the purposes of this study, *online learning* refers to Internet based courses accessible through an institutional learning management system (LMS) such as Blackboard Learn, and accessed by computer and/or mobile device.

Race/Ethnicity. This term is used primarily when reporting data from the National Center for Education Statistics (NCES). This definition is from the IPEDS glossary:

> Categories developed in 1997 by the Office of Management and Budget (OMB) that are used to describe groups to which individuals belong, identify with, or belong in the eyes of the community. The categories do not denote scientific definitions of anthropological origins. The designations are used to categorize U.S. citizens, resident aliens, and other eligible non-citizens. Individuals are asked to first designate ethnicity as:
>
> - Hispanic or Latino or
> - Not Hispanic or Latino
>
> Second, individuals are asked to indicate all races that apply among the following:
>
> - American Indian or Alaska Native
> - Asian
> - Black or African American
> - Native Hawaiian or Other Pacific Islander

- White ("The Integrated Postsecondary Education Data System," n.d.-e)

Underrepresented students. See *Historically Underrepresented Students.*

White. This definition is from the IPEDS glossary: "A person having origins in any of the original peoples of Europe, the Middle East, or North Africa" ("The Integrated Postsecondary Education Data System," n.d.-f).

Summary

The trend of increasing student diversity in online college education warrants an investigation of contemporary online students. Current national online enrollment statistics show a continued female majority, and increasing numbers of both minority students and younger students of traditional college age. In light of the demographic transformations taking place, online educators especially need to know who their students are and how these students learn best in the online environment. The prevailing theoretical assumptions that often guide online pedagogical and instructional practices typically cater to the needs of adult learners without much regard to other student characteristics.

This study provides a snapshot of contemporary online student enrollment and examines whether and how student characteristics influence their preferred ways of learning in the online environment. The independent variables in this study include age, gender, culture, major, class level, and prior experience. The dependent variables include a variety of cultural constructs through which to investigate student preferences, as well as two constructs to determine online students' online interaction preference (synchronous versus asynchronous) and learning environment preference (online versus face-to-face). The *Preferred Ways of Learning Survey* (PWLS) was created specifically to conduct this study.

The University of New Mexico was the site for this study conducted in Fall 2014. UNM provided a unique context in which to examine student diversity as a Hispanic-serving institution. In addition UNM also provided a context that is comparable to national online student populations, particularly in terms of an ongoing female majority and increasing numbers of both minority and younger students.

The results of this study will provide online educators important insight on the diversity of contemporary online students and how they prefer to learn in the online environment. It is hoped that online educators and designers will use the findings as inspiration to develop more inclusive online courses that better match student preferences. It is also hoped that the results will inform online course and program evaluators, managers, and administrators to improve the quality of online courses and programs for all students.

In the next chapter, a review of Ke and Chávez's *Cultural Constructs of Teaching and Learning* analysis model is presented along with a comparison to similar existing cognitive and/or learning styles to determine its uniqueness. The literature on the student characteristics of interest in this study is reviewed (age, gender, culture, class level, and prior experience) as well as the research on online interaction preference (synchronous versus asynchronous), and learning environment preference (online versus face-to-face). Finally, the proposed research method, explanatory sequential mixed methods, is discussed.

Chapter 2

Literature Review

This chapter reviews the literature on the constructs under investigation and the characteristics of interest of online college students (age, gender, culture, class level, and prior experience). The student characteristics of interest in this study are those that represent both ongoing and emerging enrollment trends. The impetus of this study was Ke and Chávez's (2013) *Cultural Constructs in Teaching and Learning* analysis model. While the cultural constructs are the focus for only Research Question 1, the remaining two research questions were also inspired by Ke and Chávez's observations in relation to students' cultural background and online interaction preference – synchronous versus asynchronous (Research Question 2) and learning environment preference – online versus face-to-face (Research Question 3). These observations are included in the appropriate sections below.

This chapter begins with a review of Ke and Chávez's cultural analysis model and is followed by a general overview of cognitive and learning styles. Next, specific existing cognitive and learning style models are compared with the individuated-integrated cultural model to determine its unique contribution. The chapter continues with a review of the current research on culture, age, gender, class level, and prior experience in online learning. The literature on online student preference for synchronous/asynchronous interaction and online/face-to-face learning environment are reviewed as well, and finally, the mixed method approach used in this study is reviewed.

The peer-reviewed materials for this literature review were retrieved from UNM University Library's online databases, including Academic Search Complete, Education

Research Complete, ERIC, and Google Scholar. Keyword searches, in various combinations and alternate terms included, "*student (or learner) preference"* and *"online learning (or education)," "learner (or student) preference"* and *"synchronous asynchronous interaction," "learner (or student) preference"* and *"online face-to-face learning," "age (also, gender, ethnicity – or culture, minority, nontraditional, class level – or grade level or undergraduate or graduate, and prior experience) difference and online learning (or education)."*

Cultural Constructs in Teaching and Learning

The conceptual-theoretical framework for this study is drawn from Ke and Chávez's (2013) cultural analysis model. The purpose of their "2-year mixed-method study [was] to explore the influence of online pedagogies and contexts on the learning processes and perceptions of a diversity of college students living in rural and urban areas, with an emphasis on learners of nontraditional age and minority status" (p. 13). While they studied age as well as culture, they studied age difference primarily in terms of online interaction performance (e. g., content analysis of discussion forum posts) and perceived learning outcomes. The current study specifically focused on Ke and Chávez's eight *Cultural Constructs of Teaching and Learning* analysis model.

The foundation of their cultural investigation was developed from their own prior research and a "theoretical cross-analysis" (p. 93) of the literature on the anthropological and educational aspects of learning in relation to ethnicity and cultural identity, including Ibarra's (2001) cultural constructs, the effect of learning styles and culture by Rendón (2009), and the indigenous cultural constructs of education developed by Cajete (1994).

Ke and Chávez defined their conceptualization of *culture* as,

> a set of existing patterns, habits, or rules of thinking and doing of a social group and the dynamic adjustment of this social group to surroundings and needs, which then create a sum total of rules or patterns of acting/ thinking to be inherited by future members of the group. (p. 5)

Over the course of their two-year study eight cultural constructs were identified based on the comparative analysis of student narratives they had collected. They had asked students about how they learned and their college learning experiences. The result of the analysis produced a model of eight cultural constructs: *(1) Purpose of Learning, (2) Ways of Taking In and Processing Knowledge, (3) Interconnectedness of What is Being Learned, (4) Responsibility of Learning, (5) Time, (6) Role of the Teacher/Control, (7) Student Interactions, and (8) Sequencing.*

Each of the constructs consists of two "cultural epistemologies," individuated-integrated, that are situated on a left-to-right continuum, respectively. According to Ke and Chávez,

> Within a culturally *integrated* worldview or epistemology, an interconnected, mutual, reflective, contextually dependent conception of the world is common, assumed, and valued. In a culturally *individuated* worldview or epistemology, a compartmentalized, private, outward, contextually independent conception of the world is common, assumed, and valued. (p. 93).

An overview of each of the eight cultural constructs, including some of Ke and Chávez's findings, is provided below. A visual illustration of how the individuated-integrated epistemologies are situated within each of the eight cultural constructs is provided in Chapter 1 (Figure 1).

Purpose of Learning – Ke and Chávez described the individuated-integrated construct as:

> *Individuated*: Knowledge, individual competence, to move forward to goals
>
> *Integrated*: Wisdom, betterment of the lives of those with whom we are connected (p. 97)

While their study participants were not directly asked why they were pursuing their college degrees, Ke and Chávez found that students

> often discussed ways in which learning plays a role in their lives. Northern European Caucasian American students were more likely to discuss knowledge for its own sake as well as gaining knowledge in the pursuit of educational and professional goals, while Native and Hispanic American students were more likely to connect education to making a difference in their extended families, home communities, and/or tribes. (p. 97)

Ways of Taking In and Processing Knowledge – Ke and Chávez described the individuated-integrated construct as:

> *Individuated:* Mind as primary, best, or only funnel of knowledge
>
> *Integrated:* Mind, body, spirit/intuition, reflection, emotions, relationships (p. 98)

Ke and Chávez found that their study participants expressed differences according to their cultural backgrounds. For Northern European Caucasian American "Learning and processing through the mind were characterized as the best, primary, or even the only ways to learn" while Native and Hispanic American students "described using a variety of ways of taking in and processing knowledge such as the body, spirit, intuition, emotions, mind, relationships, and reflection as essential to any kind of understanding or learning" (p. 99).

Interconnectedness of What is Being Learned – Ke and Chávez described the individuated-integrated construct as:

Individuated: Compartmentalized and separate, belief that understanding how the parts work separately, abstractly, and in isolation will lead to the greatest understanding

Integrated: Contextualized and connected, belief that understanding how things affect each other within the whole, pragmatically, and within community will lead to understanding (p. 101)

Ke and Chávez found that Native and Hispanic American students "discussed benefitting most from learning processes that facilitate connection between the subject of study and the world around, history, context, and their own lives" (p. 102) while Northern European Caucasian American students "described a more compartmentalized way of thinking about teaching and learning" (p. 103).

Responsibility of Learning – Ke and Chávez described the individuated-integrated construct as:

Individuated: Learning is a private, individual activity. Responsible for one's own learning so that others are not burdened

Integrated: Learning is a collective, shared activity, Responsible for one's own and others' learning (p. 103)

Ke and Chávez found that the Northern European Caucasian American students' responses were characterized by "Individual self-reliance and responsibility primarily to self in the learning environment" while Native and Hispanic American students' responses were characterized by "a deep sense of responsibility for peers and peer learning" (p. 103).

Time – Ke and Chávez described the individuated-integrated construct as:

Individuated: Linear, task oriented, can be measured and used, to be on time shows respect

Integrated: Circular/seasonal, process oriented, dependent on relationships, to allow for enough time shows respects (p. 105)

This construct compared the notion of time in face-to-face learning environments with online learning environments. Ke and Chávez found that Native American students believed that having "time to allow for internal processing through reflection, dreams, and prayer [was] considered essential to deeper levels of learning" (p. 105). They found that for Hispanic American students "time [was] often highly relational and also less bounded" (p. 105). To illustrate this comment, Ke and Chávez used a student response that referred to needing "the flexibility to move in and out of my studies, my family, my work" (p. 105). Northern European Caucasian American students' responses indicated that time was "often conceptualized as bounded and 'divied' out between activities" (p. 106).

Role of the Teacher/Control – Ke and Chávez described the individuated-integrated construct as:

Individuated: Provider and evaluator of knowledge – best perspectives and ways of learning, predetermined/bounded learning. Communication primarily between teacher and students

Integrated: Facilitator of learning experiences – multiple perspectives and ways of learning, emergent/constructivist; wide variety of interactions between students, and between teachers and students (p. 106)

Ke and Chávez found that most of the Northern European Caucasian American students in their study “prefer[ed] a content and support approach to course design” (p. 107). Ke and Chávez described that student responses indicated that this approach was “more instructivist and highly structured with predetermined course content and tutorial support” (p. 107). In contrast, Native and Hispanic American students “see the professor as having expertise yet want to be a part of learning within and from the whole group” (p. 108). Ke and Chávez describe this as a “*social constructivism* approach [that] sets online discussions and other interactions at the heart of class activity, and the course content is more fluid and less structure” (p. 107).

Student Interactions – Ke and Chávez described the individuated-integrated construct as:

Individuated: Others’ perspectives are optional for learning. Primarily rely on verbal messages; individuals are paramount, few streams of communication

Integrated: Others’ perspectives are important to learning. High use of nonverbal; collective paramount and multiple streams of communication (p. 108)

This construct was somewhat confusing in the sense that the discussion and student responses provided don’t expressly match the description of the individuated-integrated epistemologies. Ke and Chávez focused on a wide variety of communication issues. For example, they compared synchronous and asynchronous communication tools (e.g., discussion forums and web conferencing) in the online environment, and found that culture was not a deciding factor for preference. They suggested that an individual’s internal or external ways of processing information was more likely to determine a synchronous or asynchronous communication preference.

In this section, Ke and Chávez also discussed a variety of disconnected topics on interaction. They reported on all students' positive perspectives on the beneficial aspects of storytelling and sharing personal experiences, the logistical difficulties students experienced in making time to participate in online discussions, the difficulties students experienced with the structure of online discussions, issues of instructor feedback, and how "Native American and Hispanic American students appreciate the freedom in online course discussions from immediate cultural 'identifiers' and negative nonverbal signals that are present in face-to-face courses" (p. 110).

(8) Sequencing – Ke and Chávez described the individuated-integrated construct as:

Individuated: Learning by mastering abstract theory first, followed by testing. Rarely includes application/experience/doing in real life

Integrated: Learning by doing, listening to others' experiences or experiencing first, then drawing out abstract theory (p. 111)

Ke and Chávez found that Native and Hispanic American students "share a marked preference for first learning by doing (labs, case studies, application), storytelling and/or examples . . . followed by drawing out abstract theory and concepts from these experiences and illustrations" (p. 11). "In contrast, Northern European Caucasian students seem[ed] to prefer to learn abstract theory or concepts (individuated, compartmentalized, abstract ways of learning) followed by application of these ideas to laboratory experiments, case studies or field work" (p. 112).

Overall, while the individuated-integrated continuum allowed for individual differences on each of the cultural constructs, Ke and Chávez found similarities among students from particular cultural backgrounds. The overall results of their study supported the anthropological bases of their work and “suggest[ed] that the integrated right side of the model contains cultural epistemologies that are more common to both Hispanic and Native American college students” while the “Northern European Caucasian American students . . . showed learning preferences and norms primarily along the individuated end of the cultural continuum” (p. 96).

From the generally accepted view that culture is inherently embedded in the educational process, Ke and Chávez further argued that postsecondary teaching practices tend to favor the dominant culture. Citing the works of Fried (1995), Katz (1985), Ibarra (2001), and Rendón (2009), Ke and Chávez explained that the dominant *individuated* postsecondary educational practices in the US are primarily based on “Germanic and English Northern European Caucasian” traditions (p. 112). Ke and Chávez stated that that it is,

> likely with [these] origins of higher education and high prevalence of faculty from cultures based within an individuated epistemology that many domestic and international students of color are experiencing a disconnect between their cultural ways of learning and learning experiences in college courses. (p. 112)

Ke and Chávez’s study has only been recently published, and as yet no other research could be identified that either reviewed or used their cultural analysis model. The *Cultural Constructs of Teaching and Learning* model in its current form provides educators and instructional designers a qualitative model to both access and develop cultural awareness for teaching. The proposed quantitative survey instrument (based on Ke and Chávez’s student narratives) will provide instructors with specific data on their students' preferred ways of learning on each of the eight cultural constructs. The quantitative model will add to the literature on whether online college students' cultural backgrounds influence their preferred ways of online learning. The current study will also broaden the analysis to include other student characteristics (age, gender, class level, and prior experience), and thereby provide a more holistic view of postsecondary online students' preferred ways of learning in the online environment.

The next section provides a general overview of cognitive and learning styles and then compares existing styles that appear to investigate constructs similar to the individuated-integrated construct to determine if the cultural analysis model provides a unique approach to studying online student preferences.

Cognitive and Learning Styles

Learner-centered instruction is the very foundation of online learning, and developing effective instruction necessitates knowledge of how students learn. In order to find out how individuals learn best, many cognitive and learning style theories and models have been developed over the past several decades. However, despite a great deal of learning styles research in the literature, there is a lack of literature on learning styles in relation to cultural diversity generally, and measurement instruments specifically. Ke and Chávez (2013) explain,

> Descriptions of the interaction between students' cultural diversity, online learning environments, and students' learning and participation behaviors are still anecdotal. Suggestions on the design and implementation of multicultural and intergenerational

online learning are typically generic and murky. (p. 13)

Apart from the importance of understanding that people may prefer to learn in different modalities (visual, auditory, kinesthetic, and tactile), more complex learning preferences research may provide useful information for pedagogical practice. Although many different terms are used in the literature (e.g., cognitive styles, learning styles, learning preferences, etc.), they all refer to the same basic concept of understanding how students learn. The main difference among them is the degree to which an individual's learning skills are thought to be fixed, or rigid. Stable perceptions are often referred to as *abilities* (or traits) and are generally thought to be tied to personality and not easily changed, while *styles* are typically thought to be flexible (Messick, 1984).

Cognitive style typically refers to stable, or fixed, learning abilities that individuals cannot easily improve upon in areas where they may be lacking (Coffield, Moseley, Hall, & Ecclestone, 2004). Learning style, however, is generally thought to be more flexible. Felder (1996) described learning style as “characteristic strengths and preferences in the way [learners] take in and process information" (p.18).

In order to determine how students learn best, learning style questionnaires, or inventories, have been developed to test various theories and models. The learning style field is both complex and fraught with criticism for there is little agreement of terms, constructs, and appropriate application. In their meta-analysis of 71 learning style inventories, Coffield et al. (2004) identified some common issues: (a) lack of a unified, common definition of learning style, (b) weakness in reliability and validity research, (c) the classification or grouping of individuals using categories or dichotomies, and (d) the commercial gain that some authors have sought through the sale of their instruments.

Coffield et al. reviewed 13 of the 71 learning style inventories identified which they believed have been the most influential models of learning styles and which also had accompanying literature on validity, reliability, and practical application. The criteria Coffield et al. (2004) used to determine the top 13 learning styles models for comprehensive review included the following:

- The texts chosen were widely quoted and regarded as central to the field as a whole.
- The learning styles model was based on an explicit theory.
- The publications were representative of the literature and of the total range of models available (e. g., experiential, cognitive and brain dominance).
- The theory has proved to be productive – that is, leading to further research by others.
- The instrument/questionnaire/inventory has been widely used by practitioners – teachers, tutors or managers. (p. 5)

The researchers categorized all 71 cognitive and/or learning style types into five "families" placed on a left-to-right continuum, with fixed styles on the far left and more flexible styles on the right (Figure 2).

Using Coffield et al. (2004) learning styles review as a guide, three models were identified that appeared to investigate constructs that had similarities (i.e., bipolar descriptors) with Ke and Chávez's individuated-integrated cultural constructs. The next few sections review the following models: Witkin's Field-Dependence/Field Independence model, Dunn and Dunn's Global-Analytical model, and Sternberger's Global-Local model. In addition, Hofstede's Individualist-Collectivist model is reviewed because it is specifically based on culture differences, and because, at least at face value, the construct descriptors appear to be similar to the individuated-integrated epistemologies proposed by Ke and

Chávez.

The overarching aim of the review is to determine whether or not Ke and Chávez's analysis model is different from existing models and the likeliness that it will contribute a unique perspective. Therefore this review provides the main tenets of each model, rather than a thorough investigation into the numerous studies that have used them.

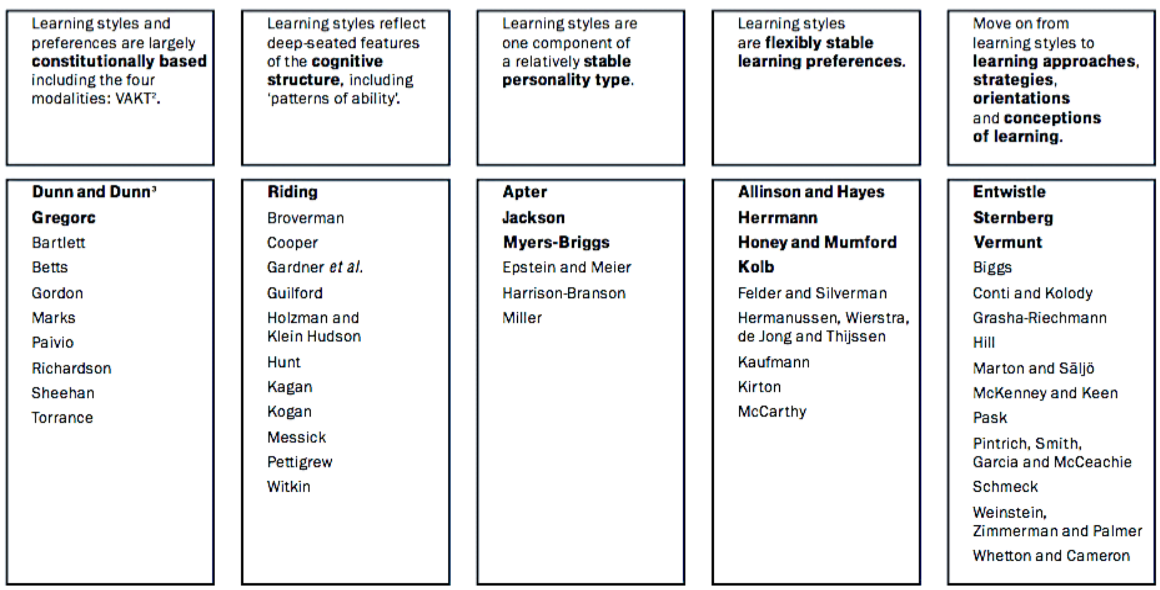


Figure 2. Families of learning styles. Reprinted from Learning Styles and Pedagogy in Post-16 Learning. A Systematic and Critical Review (p. 9) by F. Coffield, D. Moseley, E. Hall, and K. Ecclestone, 2004, London, UK: Learning and Skills Research Centre. Copyright 2004 by Learning and Skills Research Centre.

Field-dependence-Field-independence (Witkin)

One of the most well-known and influential cognitive learning style models was developed by the cognitive psychologist Witkin (1962). He described cognitive style as "the characteristic approach the person brings with him to a wide range of situations . . . [which] encompasses both his perceptual and intellectual activities" (Witkin, Moore, Goodenough, &

Cox, 1977, p. 10). Witkin originally researched the bipolar cognitive constructs of field dependence-field independence (FD/FI) to understand how individuals perceive themselves in space (Witkin, 1950; Witkin & Asch, 1948). Later, Witkin et al. (1977) investigated the constructs and their educational implications. He found that individuals with a field-dependent cognitive style learn best in situations that provide a clear structure or context, while field-independent individuals can construct their own “mediating structural rules that are needed to facilitate learning” (Witkin et al., 1977, p. 31).

The test that is most typically used to measure FD/FI is the Group Embedded Figures Test (GEFT) (Oltman, Raskin, & Witkin, 1971). It is a visual-spatial test in which “The participant is shown a geometric shape and is then shown a complex shape which contains the original shape ‘hidden’ somewhere (Figure 3). The field-independent person can quickly find the original shape because they are not influenced by the surrounding shapes; the opposite is true of the field-dependent person” (Coffield, et al., 2004, p. 37).

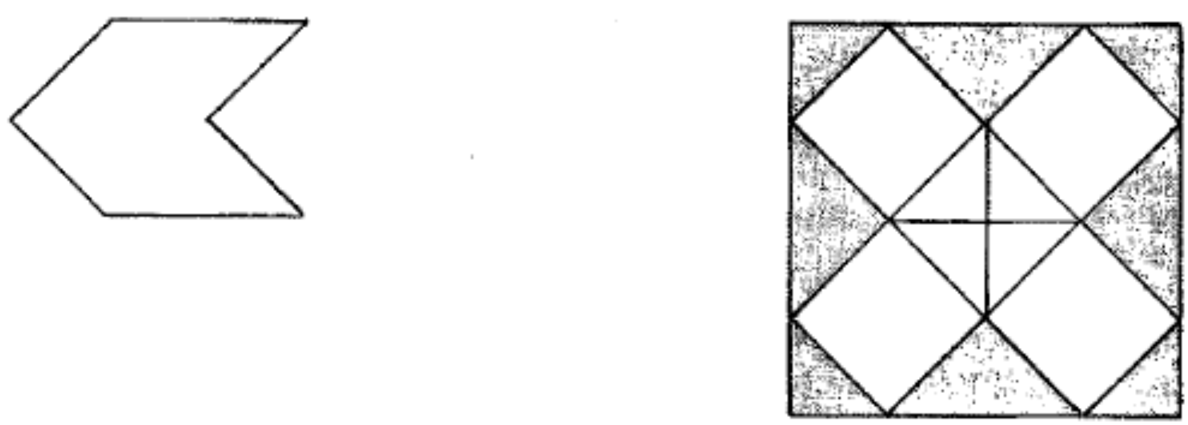


Figure 3. Sample of simple and complex figures similar to those used in the Embedded-Figures Test. Reprinted from “Field-Dependent and Field-Independent Cognitive Styles and Their Educational Implications,” by H. A. Witkin, C. A. Moore, D. R. Goodenough, and P. W. Cox, 1977. *Review of Educational Research*, 47(1), p. 5. Reprinted with permission.

The GEFT has been used in educational research to study FD/FI in all manner of learning contexts. For example, it has been used to study second-language learning, math, and both the natural and social sciences (Coffield et al., 2004). FD/FI has been positively related to spatial ability constructs in science learning (McGee, 1979; Scarr & Carter-Saltzman, 1982) and it has been characterized as perceptual ability (Zhang, 2004).

Despite inconclusive results for the FD/FI construct, the general consensus of those who find the FD/FI construct useful is that field-independent learners have an advantage over field-dependent learners in most situations, and the pedagogical advice to educators is to provide more opportunities to improve field-dependent learners’ independent abilities (Coffield et al., 2004; Evans, Richardson, & Waring, 2013).

While education-based studies using the FD/FI construct have continued over the years, Coffield et al., (2004) found that “its vogue as a purely learning styles instrument has arguably passed” (p. 37). More recently, however, Evans, Richardson, and Waring (2013) argued for its continued usefulness, claiming that the FD/FI construct,

> has an important role to play in the navigation of the complex and information-rich learning environments of the 21st century. It is therefore important to move beyond the present narrow focus on FI as a style or trait by acknowledging, embracing, and exploring the complexity of the interaction between individual and contextual

variables" (p. 210).

Whether or not researchers continue to use the FD/FI construct, Witkin's work has been a major influence in learning styles research, both in terms of the FD/FI construct itself and as a springboard to develop other learning descriptors (Coffield et al., 2004).

In terms of the current investigation, the FD/FI construct is not comparable with the eight individuated-integrated cultural constructs defined by Ke and Chávez. The FD/FI construct is based on cognitive processing ability which is more fixed and not easily changed, while the individuated-integrated construct is more similar to a learning style which is generally flexible. The cultural constructs address very specific learning contexts, and aren't inherently applicable to all learning situations. In contrast the FD/FI construct could be applicable to a variety of learning situations. Finally, FD/FI cannot be easily compared to any of the individuated or integrated preferences described by Ke and Chávez.

Global-Analytical (Dunn and Dunn)

Coffield, et al. (2004) place Dunn and Dunn's learning styles model on the far left side of their table, as being *constitutionally based*. This category denotes models that are based on the "influence of genetics on fixed, inherited traits and about the interaction of personality and cognition" (Coffield et al., 2004, p. 10). The primary reason that Coffield et al. categorize the Dunn and Dunn model here is that the model is based on the idea that individuals' learning styles are fixed in a way so that it requires specific teaching methods to accommodate them (i.e., matching style with method), as opposed to working to improve areas of weakness.

Dunn and Dunn's learning style model combines the notion of fixed learner traits with five influential components of perception (environmental, emotional, sociological, psychological, and physiological factors). Of particular interest in terms of the current study, is the psychological component of Dunn and Dunn's Learning Style Inventory (LSI) which measures global versus analytic information processing.

Analytic students learn "most easily when information is presented step by step in a cumulative, sequential pattern that builds toward conceptual understanding" while global students "learn more easily when they either understand the concept first and can then concentrate on the details, or are introduced to the information through a story or anecdote replete with visual examples" (Dunn & Burke, 2005, p. 4). Dunn and Burke (2005) reported that most young students tend to be global learners, but many become more analytic learners over time.

There are currently four different learning style inventories available on the *Official Site of Dunn and Dunn Learning Styles* website (Dunn, 2014) that are based on age groups: (1) Elementary Learning Style Assessment (ELSA), Ages 7-9, (2) Learning Style: The Clue to You! (LSCY), Ages 10-13, (3) Learning In Vogue: Elements of Style (LIVES), Ages 14-18, and (4) Building Excellence (BE), Ages 17 and older. The *Learning Style Inventory* (LSI) discussed in the Coffield et al. (2004) article could not be located. The four inventories are available for a fee for individuals, students, teachers, parents, and organizations and the assessments are provided to each of these constituencies to help them better understand individual learning styles and include strategies for effective learning. Because the learning style assessments are trademarked and must be purchased, the global-analytic subscale items are generally not reported in the literature. The researcher personally took the BE® inventory in 2013 and identified two items that were likely part of the global-analytical subscale items:

- I usually prefer lots of detail about a task before I begin.

- I usually prefer less detail about a task before I begin.

The Dunn and Dunn Learning Style inventories have been very popular with educators across the globe for decades. Coffield et al. (2004) refute Rita Dunn's claims of numerous research studies that support the utility of her various learning styles inventories in improving student outcomes. Coffield et al. concluded that the "examination of the reliability and validity of [Dunn and Dunn's] learning style instruments strongly suggests that they should not be used in education or business" (p. 118).

In terms of the current study, Dunn and Dunn's global-analytic construct is similar to the Ke and Chávez's *Sequencing* cultural construct (Table 3). The issues of reliability and validity of Dunn and Dunn's survey instruments, however, call into question the effectiveness of the scale they use to measure the global-analytic construct.

Table 3

Comparison of Dunn and Dunn's Global-Analytic and Ke and Chávez's Sequencing Constructs

Global (Dunn & Dunn)	Individuated (Ke & Chávez)	Analytic (Dunn & Dunn)	Integrated (Ke & Chávez)
learn[s] more easily when they either understand the concept first and can then concentrate on the details, or are introduced to the information through a story or anecdote replete with visual examples (Dunn & Burke, 2005, p. 4)	Learning by mastering abstract theory first, followed by testing. Rarely includes application/experience/doing in real life (Ke & Chávez, 2013, p. 111)	[learns] most easily when information is presented step by step in a cumulative, sequential pattern that builds toward conceptual understanding (Dunn & Burke, 2005, p. 4)	Learning by doing, listening to others' experiences or experiencing first, then drawing out abstract theory (Ke & Chávez, 2013, p. 111)

Global-Local (Sternberg & Wagner)

On the opposite end of the families of learning styles table, Coffield et al, (2004) are those that deal with "learning approaches, strategies, orientations and conceptions of learning" (p. 9). Sternberg's theory of thinking styles and Thinking Styles Inventory (TSI) (1991) has been placed here. The Sternberg inventory is founded upon the idea that styles and abilities are separate. Sternberg (1999) believed that "an ability refers to how well someone can do something. A style refers to how someone likes to do something" (p. 8). The TSI inventory is,

> based upon Sternberg's theory of mental self-government which consists of three functions of government (legislative, executive and judicial); four forms (monarchical, hierarchical, oligarchic and anarchic); two levels (global and local); the scope of government which is divided into internal and external; and leanings (liberal and conservative). (Coffield, et al, 2004, p. 110)

Sternberg (1999) believed that humanity's forms of government reflect the ways that people think and organize information. Of particular interest in terms of the current study are the global and local *levels of mental self-government* defined by Sternberg. Sternberg described these as follows:

> The global style. Globalists (a) prefer to deal with relatively large and abstract issues, (b) ignore or don't like detail, (c) like to conceptualize and work in the world of ideas, (d) tend to be abstract, and sometimes diffuse thinkers, (e) can have a tendency to get lost on 'Cloud 9,' and (f) may see the forest but not always the trees within it.
>
> The local style. Localists (a) often like concrete problems requiring detail work, (b) relish detail, (c) are often oriented toward the pragmatics of a situation, (d) are often

down-to-earth, and (e) may not see the forest for the trees. (Sternberg & Wagner, 1991, p. 5)

The survey questions consisted of the following:

Globalists – I like situations or tasks in which I am not concerned with details; I can more about the general effect than about the details of a task I have to do; In doing a task, I like to see how what I do fits into the general picture; I tend to emphasize the general aspect of issues or the overall effect of a project; I like situations where I can focus on general issues, rather than on specifics; I like working on projects that deal with general issues and not with nitty-gritty details; In talking or writing down ideas, I like to show the scope and context of my ideas, that is, the general picture; I tend to pay little attention to details.

Localists – I pay more attention to parts of a task than to its overall effect or significance; I prefer to deal with specific problems, rather than general questions; In discussing or writing on a topic, I think the details and facts are more important than the overall picture; I prefer tasks dealing with a single, concrete problem, rather than general or multiple ones; I like to memorize facts and bits of information without any particular context; I tend to break down a problem into many smaller ones that I can solve, without looking at the problem as a whole; I like to collect detailed or specific information for projects I work on; I like problems where I need to pay attention to details; I pay more attention to parts of a task than to its overall effect or significance. (pp. 11-17)

In their review, Coffield, et al. concluded that since the TSI model was not based on prior theory or research "it may be better to consider it not as a theory of learning or thinking styles, but as an intriguing metaphor which may or may not prove to be productive in stimulating research and in changing practice. It is, at present, too early to offer comprehensive evaluation” (p. 116).

In terms of the current study, the global-local construct of the TSI could be likened to Ke and Chávez’s *Sequencing* construct only (Table 4). Ultimately, however, the global-local scale does not match the very specific individuated-integrated preference for *Sequencing* cultural construct.

Table 4

Comparison of Sternberg’s Global-Local and Ke and Chávez’s Sequencing Constructs

Global (Sternberg)	Individuated (Ke & Chávez)	Local (Sternberg)	Integrated (Ke & Chávez)
(a) prefer to deal with relatively large and abstract issues, (b) ignore or don't like detail, (c) like to conceptualize and work in the world of ideas, (d) tend to be abstract, and sometimes diffuse thinkers, (e) can have a tendency to get lost on ‘Cloud 9,’ and (f) may see the forest but not always the trees within it. (Sternberg & Wagner, 1991, p. 5)	Learning by mastering abstract theory first, followed by testing. Rarely includes application/experienc e/doing in real life (Ke & Chávez, 2013, p. 111)	(a) often like concrete problems requiring detail work, (b) relish detail, (c) are often oriented toward the pragmatics of a situation, (d) are often down-to-earth, and (e) may not see the forest for the trees. (Sternberg & Wagner, 1991, p. 5)	Learning by doing, listening to others’ experiences or experiencing first, then drawing out abstract theory (Ke & Chávez, 2013, p. 111)

Individualist-Collectivist (Hofstede)

Hofstede's (1980) *individualist-collectivist* construct is arguably the most similar to Ke and Chávez's (2013) *individuated-integrated* construct. A deeper comparison of the two constructs, however, reveals some important differences.

First, the most obvious difference between the two constructs is that Hofstede's is concerned with nationality-based cultural differences between societies, while Ke and Chávez's is concerned with the differences of individuals within cultural subgroups of one society (Table 5). Hofstede's focus on societal differences is complex and includes other nationality-based cultural differences. His four original cultural dimensions, despite being somewhat dated and controversial (Wu, 2006), are often still used to research a variety of cultural issues in education. The original four values that distinguish various national dimensions are:

- Power versus distance (hierarchy of human relationships in a society),
- Individualism versus collectivism (relationship between the individual and the group),
- Masculinity versus femininity (gender roles in a society), and
- Uncertainty versus avoidance (extent to which a culture feels threatened or is anxious about ambiguity).

Table 5

Comparison of Hofstede's Individualist-Collectivist and Ke and Chávez's Individuated-Integrated Constructs

Individualist (Hofstede)	Individuated (Ke and Chávez)	Collectivist (Hofstede)	Integrated (Ke and Chávez)
a preference for loosely-knit social framework in which individuals are expected to take care of only themselves and their immediate families (Hofstede, n.d.)	a compartmentalized, private, contextually independent conception of the world is common, assumed, and valued (Ke and Chávez, 2013, p. 95)	a preference for tightly-knit framework in society in which individuals can expect their relatives or members of a particular in-group to look after them in exchange for unquestioning loyalty. (Hofstede, n.d.)	an interconnected, mutual, contextually dependent conception of the world is common, assumed, and valued (Ke and Chávez, 2013, p. 95)

Ke and Chávez's individuated-integrated construct, on the other hand, is based on the cultural differences of individuals within a multicultural environment. Their idea of cultural difference is more nuanced and includes the understanding that individuals simultaneously participate "in multiple cultural traditions that contain inconsistent elements and maintaining multiple cultural frames while adopting a host culture in response to particular contextual cues" (p. 7). It is also worthy to note that Hofstede's I-C construct was developed to study the influence of culture on the value differences of individuals in business organizations while Ke and Chávez's individuated-integrated cultural construct was created to study the influence of culture on postsecondary online college students' preferred ways of learning.

Another difference between Hofstede's and Ke and Chávez's constructs is the framework used to measure cultural difference. A review of Hofstede's I-C survey items as presented in Brewer and Venaik (2011) revealed a sharp contrast with Ke and Chávez's cultural constructs analysis model. A sample of Hofstede's I-C survey items is provided below:

> [Instructions to participants:] Please think of an ideal job, disregarding your present job. In choosing an ideal job, how important would it be to you to:
>
> - Have challenging work to do – work from which you can get a personal sense of accomplishment;
> - Have an opportunity for high earnings;
> - Work with people who cooperate with one another;
> - Get the recognition you deserve when you do a good job;
> - Have a job which leaves you sufficient time for your personal or family life;
> - Have a job respected by your family and friends. (Brewer & Venaik, 2011, p. 444)

These survey items illustrate a distinct difference not only with Ke and Chávez's cultural constructs analysis model, but with Hofstede's overall I-C construct definition as well (Refer to Table 3). This apparent disconnect between the I-C construct definition and survey items has lead Brewer and Venaik (2011) to recommend that Hofstede's I-C scale "be relabeled as Self-orientation vs Work-orientation" (p. 436). The disparity between the construct definition and Hofstede's measurement items has called into question some prior research on I-C. Brewer and Venaik's comprehensive analysis of the literature revealed that "in several instances, [there was] little congruence between the construct labels, the definitions of the constructs, and the items used to measure these constructs" (p. 442).

In terms of the current study, the only similarity between the two constructs is found perhaps in relation to Hofstede's I-C construct definition and Ke and Chávez's *Responsibility for Learning* construct (Table 6).

Table 6

Comparison of Hofstede's Individualist-Collectivist and Ke and Chávez's Responsibility for Learning Constructs

Individualist (Hofstede)	Individuated (Ke and Chávez)	Collectivist (Hofstede)	Integrated (Ke and Chávez)
a preference for loosely-knit social framework in which individuals are expected to take care of only themselves and their immediate families (Hofstede, n.d.)	Learning is a private, individual activity. Responsible for one's own learning so that others are not burdened (Ke and Chávez, 2013, p. 95)	a preference for tightly-knit framework in society in which individuals can expect their relatives or members of a particular in-group to look after them in exchange for unquestioning loyalty. (Hofstede, n.d.)	Learning is a collective, shared activity. Responsible for one's own and others' learning (Ke and Chávez, 2013, p. 95)

Overall, however, while both Hofstede's I-C and Ke and Chávez's individuated-integrated constructs appear to be quite similar, there are distinct differences. In its current form, the *Cultural Constructs of Teaching and Learning* model provides educators and instructional designers a qualitative model to both access and develop cultural awareness for teaching. The proposed quantitative survey instrument (based on Ke and Chávez's student narratives) will provide instructors with specific data on their students' preferred ways of learning on each of the eight cultural constructs.

Neither the qualitative cultural analysis model that currently exists nor the proposed quantitative analysis model are similar to Hofstede's construct or survey items in terms of objective, cultural groups of interest, or measurement/analysis framework. The current study provides an opportunity to quantitatively investigate eight distinct individuated-integrated cultural differences of individuals within cultural subgroups of one society. These constructs will provided insight on online college students and (a) why they pursue a college degree, (b) their approaches to online learning, (c) the role college plays in their lives, (d) how they take personal responsibility in online courses, and (e) their view of online interaction with their classmates.

Summary. None of the four cognitive and/or learning style models that were investigated were found to measure the same constructs that Ke and Chávez (2013) measured. Although two were similar to Ke and Chávez's *Sequencing* construct (e.g., Dunn and Dunn's global-analytic and Sternberg's global-local), and one was similar to their *Responsibility for Learning* construct (Hofstede's I-C), none of them matched the scope or context-specific individuated-integrated cultural constructs as defined by Ke and Chávez. Their cultural analysis model provides a comprehensive opportunity to investigate a variety of online student preferences – from why students pursue a college degree to how they prefer to interact with their online peers. In addition, Ke and Chávez's model provides a framework to study a variety of other student characteristics (i.e., age, gender, major, class level, prior experience) in terms of online learning preferences, and thereby provide a more holistic view of individual differences.

Student Characteristics

The student characteristics of interest in the current study are culture by ethnicity designation, age, gender, class level, and prior online experience. The sections below review the current literature on these characteristics, along with a review of the literature online interaction preference and learning environment preference as well.

Culture

Ke and Chávez's (2013) study provided a working definition of the term culture for the current investigation. They described their conceptualization of *culture* as,

> a set of existing patterns, habits, or rules of thinking and doing of a social group and the dynamic adjustment of this social group to surroundings and needs, which then create a sum total of rules or patterns of acting/ thinking to be inherited by future members of the group. (p. 5)

Ke and Chávez made a distinction between ethnicity-related culture to refer to members within the same society or country and nationality-related culture to refer to members from different societies or countries. Their study participants consisted of Latino/Hispanic American, Native American, Asian American, African American, Northern European Caucasian Americans, and international students. The current study will research a similar group of students and align with Ke and Chávez's definition and use of the term culture to describe ethnicity-related culture (unless otherwise noted).

Much of the existing research on *culture* and online learning tends to focus on nationality-related ethnicity involving comparisons of students from different countries. Ke and Chávez (2013) noted that most of the research on online learning involves "interaction between outer culture characteristics . . . with few conceiving of the inner culture characteristics of individuals in the group" (p. 10). The distinction between nationality-related and ethnicity-related culture is important, as the current study is focused on ethnicity-related culture.

Some scholars provide a broad view of culture that includes a full range of distinguishable cultural behavior patterns. For example, Jung provides a useful three-layer description of culture:

> First, there are the cultural traditions that distinguish a specific society – the shared and inherited language, traditions, and beliefs that set people apart from others. Second, within complex, diverse societies there are identifiable subcultures that display subcultural traits that set them apart from the rest of society, for example in the way they dress, communicate, relate to each other, and relate to other subcultures and society as a whole. Third, there are cultural universals, learned behavior patterns that are shared by all of humanity, for example, the construction of language; the classification of people by age, gender, or kinship (young, old, male, female, father, mother); the organization of families and social groups; and the establishment of some form of leadership roles for making community decisions. (p. 15)

This broad view of culture is helpful to understand Nieto's (2010) description of culture in that it "is dynamic, active, changing, always on the move. Even within their native contexts, cultures are always changing as a result of political, social, and other modifications in the immediate environment" (p. 137). She explains that "even among specific cultural groups there are many and often conflicting cultural identities" (p. 138) and uses an example of how "one Mexican American lesbian may identify herself first and foremost ethnically, [while] another may identify herself as a lesbian, a third as both, and a fourth primarily as a member of the working class" (p. 138).

These ideas are particularly relevant to the current study since the primary focus is on identifying potential ethnicity-related cultural learning preference differences of subgroups, or subcultures of students, rather than looking at nationality-based cultural differences. While Ke and Chávez (2013) did not specifically refer to their participants' ethnicity-related cultural backgrounds as subgroups or subcultures within the "dominant" White American culture, it is useful to make this distinction.

Some scholars have asserted that student characteristics such as culture influence students' ways of learning, communication, and behavior, and that whatever differences are identified in the face-to-face classroom will naturally carry over to the online environment (e.g., Ke and Chávez, 2013). However, studies on culture in online postsecondary education in the US are sparse, and many are from a time when online learning was in its very early stages (i.e., early 21st century).

Postsecondary online student enrollments have continued to climb during this time as well, increasing students' experience and comfort level with various online learning technologies. These rapid changes call into question earlier research results in postsecondary online education. In an effort to find contemporary research on culture, peer reviewed articles were identified from UNM University Library's online databases (see above) with a date range of 2006 to 2016. Additionally, because the main interest of the current study is ethnicity-related cultural differences of subgroups in the US (rather than nationality-based cultural differences), studies on US students were identified for review.

Recent studies on culture often examine other student characteristics as well. For example, culture has been studied along with age (Ke & Chávez, 2013), gender (Ashong & Commander, 2012) age and gender (Huang, Chandra, DePaolo, & Simmons, 2016; Jost, Rude-Parkins, & Githens, 2012), and gender and nontraditional students (Wladis, Hachey, & Conway, 2015). Some of these studies focused on a particular cultural group, like African American students (e.g., Ashong & Commander, 2012) or Hispanic students (Kupczynski & Brown, 2014). Culture has been studied in relation to online institutional commitment and retention (Beck & Milligan, 2014), academic success (Jaggars & Xu, 2016; Jost et al., 2012; Kupczynski & Brown, 2014), online enrollment (Wladis et al., 2015), and perceptions of online learning (Ashong & Commander, 2012).

It is important to note the current terminology used to discuss ethnicity-related culture as a variable in the literature. All of the studies described below were conducted in the US and made no comparisons with students from other countries. Each one referred to student *ethnicity* rather than *culture*, except for Ke and Chávez's study. In addition to Ke and Chávez's study, only one provided a rationale for the term they used (Kupczynski & Brown, 2014). It is likely that both data collection and reporting methods follow current categorization protocol for race/ethnicity identification used by the US Census Bureau and/or educational organizations.

Beginning with the results of Ke and Chávez's (2013) study on the individuated-integrated cultural constructs of teaching and learning, a contemporary view of both Native and Hispanic American college students was reported. They found that Native American students learned best when the learning processes included:

> (1) use of visual models and drawings by the professor; (2) time to make sense of things through visual means – mapping, drawing connections between concepts, charting, etc.; (3) application of course content to self, family, and tribe; (4) time for reflection before discussion and silence during online class time to gather thoughts

> and reflect on ideas presented; (5) learning by doing, through case studies, metaphor, application, labs, and field assignments; and (6) ongoing access to past learning materials, that is, lecture notes, visuals, and videos. (p. 112)

Hispanic American students learned best when the learning processes included:

> (1) learning by doing (application first, theory second); (2) processing with student peers especially to compare and contrast ideas and work collaboratively toward solutions; (3) learning from student peer work including presentations, papers, and projects; (4) storytelling, examples, and illustrations; (5) feeling cared about by the professor; and (6) when professors assist students to connect course content to their lives. (p. 112)

These specific learning preferences for cultural groups are useful to help inform administrators, instructional designers, and educators so that equitable learning materials and environments can be developed to support the success of diverse students. Ke & Chávez's use of the qualitative approach for their study on culture is especially helpful because it provided the student perspective rather than relying on only quantitative survey responses. Most of the current research on culture in higher education fails to provide the student voice.

For example, Beck and Milligan (2014) quantitatively studied online college students' institutional commitment (IC) to build on prior research that suggested face-to-face students' IC was related to both retention and success. They surveyed 831 students (53% Caucasian, 37% Black, 5% Hispanic, and 5% Asian, Native American, and "other") from a southeastern US university, but failed to identify statistically significant correlations for *ethnicity* and IC. Beck and Milligan therefore "suggest caution in generalizing between programs or among students who are members of at-risk groups" (p. 54). Beck and Milligan referred to cultural difference in terms of *ethnicity* as a *student attribute*, a type of *demographic indicator*, and a *demographic variable*. No further discussion was provided for the terminology used.

In contrast to Beck and Milligan's study, *ethnicity* was found to be a statistically significant variable when related to cumulative GPA score for student success. Kupczynski and Brown (2014) researched 959 education majors at a "Hispanic-serving" (p. 1) southern Texas university to examine the relationship between ethnicity and academic success in an online course. This comparative study investigated ethnicity in three groups, Hispanic (64% of sample), White (28%), and "Other" (8 %). The results of their simple main effects tests indicated that for students with low GPA, Hispanic students did significantly better than White students in this course. Kupczynski and Brown (2014) suggested that this result may be related to the more collaborative interactive nature inherent in the online environment. Kupczynski and Brown reported cultural student difference by *ethnicity*, but also provided a discussion on their theoretical framework. They presented a rather convoluted mix of ideals on social identity, ethnic identity, and identity theory but ultimately didn't make a clear case for why they chose to use the term ethnicity rather than culture.

A similar investigation by Jost, Rude-Parkins, and Githens (2012) looked at the effect of ethnicity (also age and gender) on students' online academic performance. The GPA records for 320 randomly selected students from 16 community colleges in Kentucky were used in this study. The criteria for inclusion were students who had completed at least one online course at one of the community colleges by spring 2008. The researchers collapsed the original eight ethnic categories "(i.e., Native American/Alaska Native, Asian, Black/African American, Hispanic/Latino, Native Hawaiian/Other Pacific, White, not applicable, and not reported)" into three: "White, Black/African American, and Other/Not Specified" (p. 660). The percentages for ethnicity were 88% White, 5% Black, and 7% Other/Not Specified. While the ethnic group sizes in this study are troublesome, the results indicated no statistically significant differences for ethnicity (or age or gender) in relation to academic achievement after controlling for previous academic performance. *Ethnicity* was the term used to report their findings, and was referred to as a *demographic* and an *independent variable*. No discussion was provided for their use of this term.

In a recent study that is more aligned with the current investigation, Ashong and Commander (2012) studied ethnicity (and gender) in relation to online students' perceptions of online learning. In particular they were interested in the perceptions of African American students compared to White students. Ashong and Commander researched 120 online college students in the southeastern US over the period of 2011-12. Roughly 46% of the students were African American, 35% were White, 4% were Hispanic and were combined with 15% from the category "Other." About 68% had previous online experience, most of whom had taken at least one course (almost 52%). The survey results indicated that all the participants had positive overall perceptions of online learning, with no statistically significant differences between African American and White students or between African American students and other students. Statistically significant differences were identified, however, between African American and White students on the *Asynchronicity* subscale which measured "the extent to which students enjoy the asynchronous nature (e.g., does it promote reflective thinking)" (Ashong & Commander, 2012, "Table 4"). White students had higher positive perceptions for asynchronous interaction compared to African American students. The authors suggested this may be due to an African American preference for live (face-to-face) collaborative interaction. Ashong and Commander used the term *ethnicity* to report their findings, and also used the term interchangeably with *culture* when they discussed prior research.

Another recent study identified statistically significant differences for ethnicity on transactional distance. Huang et al. (2016) studied 227 undergraduate and graduate students in a variety of disciplines at a Midwestern US university and found that non-Caucasian students reported lower transactional distance (TD) than Caucasian students where “High TD indicate[d] a low level of interpersonal closeness, sharedness as well as perceived learning” (p. 738). Their sample consisted of 81.94% Caucasian, 8.81% African American, 3.08% Asian, 2.64% “mixed,” 1.32% Hispanic, and 1.32% “others.” Huang et al., like the other studies detailed above, chose to use the term *ethnicity* to report their findings. They described ethnicity as a *demographic factor* and a *learner characteristic.*

The recent studies on ethnicity, or culture, outlined above are inconclusive and reveal the need for additional research on college students’ preferred ways of learning in the online environment. Of the studies identified for inclusion in this literature review, only Ke and Chávez’s study used a mixed methods approach which yielded students’ perspectives on learning. The qualitative aspect provided more nuanced data on specific methods and approaches that were conducive to effective learning. More qualitative data is necessary to fully understand quantitative student data. It is recommended that future studies on student learning preference include the qualitative data.

The ever-changing nature of online learning, in terms of advancing technologies, student enrollments, and increasing online experience demands continued exploration by a variety of student characteristics (i.e., age, gender, class level, prior experience). Culture alone may not fully explain student differences in online learning. While quantitative studies may yield a variety of important results to help inform university administrators, educators, and designers create more inclusive learning designs, mixed methods approaches would provide opportunities for deeper understanding. The current study will add to the existing literature on postsecondary online learning. The examination of culture and other student characteristics will provide more new insight in terms of students' preferred ways of learning in the online environment.

Age

While students age 25 and older account for over half of postsecondary online enrollment, students of traditional college age represent increasingly higher percentages of the online population. As noted in Chapter 1, Clinefelter and Asianian (2015) have determined that "Age no longer predicts learning behavior in online higher education. While online education has traditionally been marketed toward adult learners, more and more students under 25 years of age are choosing to study online for their undergraduate degrees" (p. 9).

Much of the literature on postsecondary online education has focused on accommodating the needs of older adult, or nontraditional, learners, and has been based on the theoretical principles and theories of adult education such as Knowles' (1989) assumptions of andragogy. As the use of digital technologies increased and online learning became increasingly more prevalent, it was suggested that older learners might be disadvantaged, particularly older learners who might lack computer and Internet literacy in comparison to younger learners who spend more time using digital technologies (Yu, Kim, &

Roh, 2001). However, as noted in the culture section above, much has changed in online learning over the past 15 years (i.e, increasing numbers of traditional college age student enrollment and continued ongoing online experience) so ongoing research is warranted to keep in step with contemporary instructional technologies and methods and the preferences and needs of contemporary online students as well.

A generational learning difference has been a popular research topic in postsecondary online education for many years. One of the most popular areas of research in this area concern *Millennial* learners. Learners who were born roughly during the decade of the 1980's are often referred to as *Millennials* (Howe & Strauss, 2000), the *Net Generation* (Tapscott, 1998), or *Generation Y* (Jorgensen, 2003), and a common speculation is that these students differ in their ways of learning from students of previous generations due to having grown up with the Internet and Internet-based technologies (Howe & Strauss, 2000; Oblinger & Oblinger, 2005; Prensky, 2001a, 2001b, 2005, Tapscott, 1998, 2009).

Although the notion of generational difference in online learning has intrigued the academic community for some time, there has been much opposition to the Millennials concept with many scholars who argue that the lack of empirical research to support these claims is highly problematic (Bennett & Maton, 2010; Bennett et al., 2008; Bullen et al., 2011; Helsper & Eynon, 2010; Jelfs & Richardson, 2013; Morgan & Bullen, 2011). Several empirical studies have refuted these claims with findings that indicate no significant generational learning differences among college students (Bennett et al., 2008; Bullen et al., 2011; Lai & Hong, 2015).

For example, Bullen, Morgan, and Qayyum (2011) conducted a mixed methods study at a postsecondary Canadian institution with first and second year students from 14 programs across five departments (*N* = 438) to determine whether or not their student population aligned with the Net Generation profile typically found in the literature. Their findings indicated “no meaningful” (“Introduction,” para. 5) evidence of generational differences with regard to “digital literacy, connectedness, a need for immediacy, and a preference for experiential learning” (“Conclusion,” para. 1).

The obvious flipside to the Millennial learner argument is that younger people are naturally tech savvy, but this point has been debated as well. While some research has indicated that younger people may use a greater variety of technologies, their usage is limited in the ways they use it (Bennett & Maton, 2010; Helsper & Eynon, 2010; Lai & Hong, 2015; Kennedy & Fox, 2013). For example, a recent study of Asian students using technologies found that although young students at University of Hong Kong “use[d] a wide range of technologies for personal empowerment and entertainment [they were] not always digitally literate in using technology to support their learning” (Kennedy & Fox, 2013, p. 76).

A particularly compelling result was reported by Helsper and Eynon (2010). They analyzed the data from a national representative survey on Internet use/non-use in Britain (*N* = 2350; age 14 and older). Helsper and Eynon found that “immersion in a digital environment (i.e., the breadth of activities that people carry out online) tends to be the most important variable in predicting if someone is a digital native in the way they interact with technology” (p. 515).

Interestingly, the debate and preponderance of recent empirical results indicating that younger learners don’t have different cognitive abilities because of their age or generation and that older learners can adopt similar digital skills with ongoing experience has appeared to have little effect on authors who continue to propose heuristic instructional advice to accommodate newer generations (e.g., Keengwe, 2013; Leaver, 2012; Neibling, 2010; Spencer, 2013).

Other research on age and postsecondary online education is sparse, and many scholars have found that the existing research is both limited in terms of the context, scope, and analysis methods used, and inconclusive (Chyung, 2007; Jelfs & Richardson, 2013; Ke & Chávez, 2013; Ke & Kwak, 2013). Criticism of the existing research on age includes that they (1) provide only anecdotal data from a single online course or program (Ke & Chávez, 2013; Ke & Kwak, 2013), (2) present results that are confounded by comparisons of delivery method (i.e., online and face-to-face) (Jelfs & Richardson, 2013), (3) contain only quantitative analyses of surveyed responses or grades (Ke & Kwak, 2013), and (4) have "contextual or missing definitions of 'younger' and 'older' used in the studies" (Chyung, 2007, p. 214).

A review of the most recent research on age difference in postsecondary online education in the US, studied either individually or in combination with other variables (e.g., gender, ethnicity, class level), identified a wide range of investigations including motivation and learner engagement (Yoo & Huang, 2013), transactional distance (Huang, Chandra, DePaolo, & Simmons, 2016), academic help-seeking (Dunn, Rakes, & Rakes, 2014), academic learning ability or outcomes (Jost et al., 2012; Strang, 2016), online interaction participation and learner satisfaction (Ke & Kwak, 2013), self-regulation (i.e., motivation) for interaction with peers and instructors (Cho & Kim, 2013), and learner-learner interaction preference (Moore, Warner, & Jones, 2016). Age difference was a statistically significant variable in half of these studies, which indicates the importance of further investigation.

Li, Marsh, & Rienties (2016) investigated online learner satisfaction of undergraduate students (*N* = 62,986) and found students who were both new to online learning and over the age of 60 perceived less overall satisfaction than other age groups. Yoo and Huang (2013) found that graduate students between the ages of 20 and 49 (*N* = 190) reported higher levels of extrinsic career-based motivation than students from other age groups. Huang et al. (2016) surveyed 227 undergraduate and graduate students and found that older students (25 years and older) reported lower transactional distance (TD) than students of traditional college age (18-24) – where "High TD indicate[d] a low level of interpersonal closeness, sharedness as well as perceived learning" (p. 738). Dunn et al.'s (2014) survey of 165 graduate students (age range 21-63; average age 34) found that as online student age increased help-seeking decreased.

Conversely, age was not statistically significant with regard to learning outcomes or interaction. Strang (2016) found no relationship between undergraduate students and student online course outcomes. Similarly, Jost, Rude-Parkins, and Githens (2012) found no statistically significant differences for age (or ethnicity or gender) in relation to academic achievement after controlling for previous academic performance. Ke and Kwak (2013) found that age did not predict online interaction participation or satisfaction of online courses for undergraduate/graduate online students (N = 392, age range 24-59; average age 43). Cho and Kim (2013) found no association between age and undergraduate/graduate students' motivation ("self-regulation") to interact with their online instructors or peers (N = 407; average age 35.54). Similarly, age did not influence graduate students' (*N* = 220) desire to interact with their online peers (Moore et al., 2016). It should be noted that two of the studies mentioned above are problematic in terms of reporting, primarily because specific age demographic information was not reported (Li, et al., 2016) or was insufficient (Moore et al., 2016).

Contemporary research on age difference and postsecondary online remains inconclusive. The increasing numbers of students of traditional college age who are enrolling in online courses, and the accompanying exponential increase of continued online course experience for students overall warrants ongoing research. Age will be included as an additional student characteristic in the current study to support the examination of the cultural constructs analysis model.

Gender

Female students continue to represent the gender majority of postsecondary online enrollment (Clinefelter & Asianian, 2015), although research on the influence of gender in online education has been inconclusive (Ching & Hsu, 2015; Yoo & Huang, 2013). For example female students have been reported to have higher levels of perceived learning in online courses (Rovai & Baker, 2005), higher self-efficacy and performance (Perkowski, 2012), participate more in online discussions (Yukselturk & Top, 2013), more likely to seek help in academics settings (Koc & Liu, 2016; Shen, Cho, Tsai, & Marra, 2013), more positive perception of online learning (Ashong & Commander, 2012), and have stronger intrinsic motivation to take online courses (Yoo & Huang, 2013).

In contrast, female students were found to have lower levels of perceived learning in online courses than male students (Arbaugh, 2014) while other studies identified no gender difference for performance (i.e., learning outcomes, academic achievement) (Jost et al., 2012; Strang, 2016). Other recent studies have failed to identify statistically significant differences for gender. For example, no differences were found for desire for online peer interaction (Moore et al., 2016), self-regulation for instructor and/or peer interaction (Cho & Kim, 2013), or perception of transactional distance (TD) where “High TD indicate[d] a low level of interpersonal closeness, sharedness as well as perceived learning” (Huang et al., 2016, p. 738).

Contemporary research on gender difference in postsecondary online education remains inconclusive. The current study will investigate other student characteristics (i.e., age, culture, class level, and prior experience) and add to the existing literature on gender by providing new insight in terms of online students’ preferred ways of learning in the online environment.

Class Level

Class level (undergraduate-graduate) has been added as a student characteristic variable in the current study because prior research has indicated it may have an affect on student preference. Prior research has suggested differences in class level on a variety of topics. For example, Artino and Stephens (2009) found that compared to graduate students, undergraduate students had more online learning experience, took more online courses, and were more likely to take additional online courses. As for self-efficacy, Artino and Stephens found no statistically significant differences between undergraduate and graduate students.

Shen et. al (2013) also studied self-efficacy by class level. They found that while class level was not a statistically significant predictor of self-efficacy to complete an online course, class level was a statistically significant predictor of self-efficacy for using learning management system tools. Shen et al. found that the graduate students in their study had greater technological self-efficacy than undergraduate students. In another recent study, Cho and Kim (2013) studied self-regulation and found that students with a higher grade level were more likely to self-regulate for interaction with others in online learning environments.

Perhaps an obvious question when studying class level is its potential correlation with age. Of the three studies cited above, only Cho and Kim reported the correlation (moderately positive) between class level and age. Artino and Stephens reported age and class level statistics (i.e., the mean age of the undergraduate participants was 29.1), but did not provide correlation results.

Research on postsecondary online college students by class level is both sparse and inconclusive. The current study will include class level with the other student characteristic variables of interest (i.e., age, gender, culture, and prior experience) and add to the existing literature on students' preferred ways of learning in the online environment.

Prior Online Experience

The continued popularity and growth of online college courses translates to ongoing online learning experiences for students. The effect of continued online learning experiences implies that as students become increasingly familiar and comfortable with the expectations and processes of online learning, the more likely they might be to continue taking online courses. Positive online learning experiences, in particular, are likely to increase the acceptance and ongoing enrollment in online courses (Nguyen & Zhang, 2011).

Studies on the effect of prior online experience on online learning preferences in online postsecondary education in the US are sparse, and earlier research may no longer be relevant as students continue to take more, and multiple, online courses. In an effort to identify contemporary research on prior online experience, peer reviewed articles were identified from UNM University Library's online databases with a date range of 2010 to 2016.

Recent studies have found that satisfaction with prior online course experiences can improve students' self-efficacy to learn online and consequently increase the likelihood of taking additional online courses (Artino, 2010). A recent investigation studied the relationship of various student characteristics and self-efficacy on technology, self-regulated learning, and outcomes. With a sample of 256 undergraduate and graduate students at a southeastern US university, Wang, Shannon, and Ross (2013) found that students with more prior online course experience tended to use more effective learning strategies in their online courses. The researchers suggested that students who use more effective online learning strategies tend to have higher levels of motivation which may lead to higher levels of course satisfaction. Wang, Shannon, and Ross further suggested "that self-regulated learning acts as a mediator between the numbers of previous online courses taken and the course outcomes" (p. 317).

Shen et al. (2013) shifted the more common research focus from self-efficacy with computers in online learning to self-efficacy and (1) completing an online course, (2) socially interacting with peers, (3) handling course "tools", (4) interacting with instructors, and (4) academically interacting with peers. Shen et al. studied 406 online students from two Midwestern US universities, who had collectively taken an average of about five online courses. Prior experience was statistically significant on self-efficacy to complete an online course and to interact academically with peers. Students with more online course experience had higher self-efficacy for completing online courses and for interacting with their peers.

In contrast, Moore et al. (2016) found that prior experience was not a predictor of online peer interaction. Cho and Kim (2013) found no association with prior experience and students' self-regulation for interaction with others and Huang et al. (2016) found prior experience did not influence students' perception of transactional distance.

Going forward, it is likely that increasing numbers of postsecondary students will take multiple online courses. As students become more familiar and comfortable with online learning, prior experience is an important variable to examine. Continuous, ongoing research on the effect of previous online experience is warranted. The current study added this student characteristic variable to further our understanding on how prior online experience influences postsecondary students' preferred ways of learning in the online environment.

Online Interaction Preference (Synchronous and Asynchronous)

Interaction in online learning is most commonly accomplished using asynchronous text-based methods such as discussion boards and email. Ongoing technological advancements have lead to an increased availability of a variety of synchronous interaction tools, particularly in the form of streaming audio and/or video web conferences (i.e., Collaborate, Big Blue Button, Google Hangouts, etc.).

Prior research has suggested that asynchronous discussion allows students more time to develop responses that engage higher order thinking skills (Garrison, Anderson, & Archer, 2000). Asynchronous interaction has also been found to provide a more equitable learning environment particularly with regard to female students. Some research has suggested that female students prefer asynchronous discussion (Bostock & Lizhi, 2005) and tend to participate more in online discussions than male students (Yukselturk & Top, 2013). Other research, in contrast, has found no gender difference for online interaction preference (Lin & Overbaugh, 2009).

The disadvantages of asynchronous interaction have been identified in the literature as well. For example, Rockinson-Szapkiw and Wendt (2015) found that asynchronous interaction placed greater cognitive stress on students, and Girasoli and Hannafin (2008) argued that text-based interaction may be a barrier for some students who have poor reading, writing, and typing skills. Asynchronous discussion may also influence communication and increase the possibility of misunderstanding (Bromme, Hesse, & Spada, 2005; Hew & Hara, 2007).

Synchronous online interaction, on the other hand, can provide direct interaction and immediate feedback for students with their peers and their instructors. Direct interaction with peers and instructors can affect the learning experience and produce student satisfaction (Buxton, 2014). Real-time interaction may reduce misunderstanding by allowing opportunities to directly correct misconceptions, and lead to improved learner engagement (Hrastinski, Keller, & Carlsson, 2010). The largest barrier to synchronous interaction in online courses concerns scheduling conflicts. Many students specifically choose online courses because the overall flexibility they provide (Bolliger & Wasilik, 2009; Buxton, 2014; Fontenot, Mathisen, Carley, & Stuart, 2015; Hill, 2006; Jaggars, 2013; Watts, 2016).

In terms of synchronous versus asynchronous online interaction preference in relation to the student characteristics of interest in the current study (age, gender, ethnicity, class level, and prior experience), the research is quite limited. One recent study (described in the *Ethnicity* section above) investigated gender and ethnicity in relation to online students' perceptions of online learning (Ashong and Commander, 2012). White students were found to have more positive perceptions of asynchronous interaction compared to African American students.

In another recent study, a small sample of pharmacy students ($N = 41$) was used to compare a synchronous webinar course with an asynchronous course on student satisfaction (Buxton, 2014). Statistically significant results were identified for asynchronous course delivery and meeting students learning needs (satisfaction). Buxton collected demographic information for educational background and years of practice in the field, but did not examine other variables such as age, gender, ethnicity, class level, or prior online experience.

The variable synchronous versus asynchronous online interaction preference construct was included in the current study due to limited and inconsistent prior research. This construct was also added because Ke and Chávez (2013) had reported that some of their student interviews had revealed distinct preferences for synchronous or asynchronous interaction in the online environment. While they found that online students' culture didn't directly affect online interaction preference, they Ke and Chávez suggested instead that the preference might be more related to "an individual learner's level of internal or external ways of processing" (p. 108). The finding of the current study will add to our knowledge whether student characteristics (i.e., age, gender, culture, class level, and prior experience) influence online college students' synchronous and asynchronous interaction preference.

Learning Environment Preference (Online versus Face-to-Face)

Contemporary research has demonstrated that there are no significant differences between online and face-to-face courses in terms of academic achievement (Means, Toyama, Murphy, & Baki, 2013). However, there have been differences identified in terms of student satisfaction and perceptions of online learning (Ashong & Commander, 2012; Ke & Xie, 2009; Oguz, Chu, & Chow, 2015). The research on course delivery modality (i.e., online and face-to-face) has expanded in recent years with the increased incorporation of online components into face-to-face courses to include investigations of hybrid courses. The lines between distinct modalities have blurred in recent years.

Overall, research findings remain largely inconclusive with regard to online versus face-to-face preference. For example, some researchers have found that female students tend to prefer online courses (Arbaugh, 2014; Ashong & Commander, 2012) while others have found no gender difference (Cole, 2016).

Age difference has been examined previously with inconclusive results. For example Oguz et al. (2015) identified statistically significant findings for age and perception of online learning/satisfaction. They found that younger students (under 29) had significantly more negative perceptions of online learning than older students. In contrast, Ke and Xie (2009) found no statistically significant differences for age and satisfaction in the online environment.

Ethnicity-related culture has been investigated as a variable in terms of learning environment preference, but many studies failed to produce statistically significant results (Ashong & Commander, 2012; Bradford & Wyatt, 2010; Oguz, Chu, & Chow, 2015).

Overall learning environment preferences are inconclusive as well. Some studies have indicated that students prefer face-to-face courses (Cole, 2016; Nollenberger, 2015) while other studies indicated that students who purposefully enroll in fully online programs had higher perceptions of online learning (Oguz et al. 2016).

This construct was included in the current study primarily due to observations reported by Ke and Chávez. For example, they reported that the Native American students in their study described that “the ‘hands-on, doing’ (bodily/kinesthetic) nature of online courses [were] more natural to their learning process and point[ed] out that within an online learning context they have ‘more time for reflection (intrapersonal) before responding’ consistent with their own cultural norms” (p. 101). These intriguing observations along with the inconclusive findings of recent research suggested that additional research would be useful. The current study will investigate a variety of student characteristics (i.e., age, gender, culture, class level, and prior experience) to investigate whether or not they influence postsecondary college students’ learning environment preference.

Summary

The literature review revealed inconclusive results on each of the student characteristics of interest in the current study. Prior research suggests that little is known about contemporary online college students and how they prefer to learn online. The current study provides the opportunity to adopt a more holistic view of online students by exploring a more comprehensive range of characteristics and their influence on several student preference constructs.

The current study will investigate the influence of age, gender, culture, class level, and prior experience on postsecondary online college student preferences in the online environment in terms of (1) Ke and Chávez’s (2013) individuated-integrated *Cultural Constructs of Teaching and Learning,* (2) Online Interaction Preference, and (3) Learning Environment Preference. The investigation of cultural constructs will provide insight on online college students and (a) why they pursue a college degree, (b) their approaches to online learning, (c) the role college plays in their lives, (d) how they take personal responsibility in online courses, and (e) their view of online interaction with their classmates.

It is vital for educators to develop an awareness of the diverse learners who are enrolled in postsecondary online education today in order to ensure that pedagogical and instructional practices can meet their needs (Dabbagh, 2007). Few studies have focused on contemporary online learners and their needs (Buzwell, Farrugia, & Williams, 2016; Ke & Chávez, 2013; Ke & Kwak, 2013). The findings of this study will address this need and add to the literature by providing an increased awareness of the diversity of contemporary online students and how to better meet their needs.

Mixed Methods Research

A mixed methods approach was chosen for the current study as the best way to address the complex research questions that were proposed. Although a quantitative approach was required to test Ke and Chávez's (2013) qualitative findings for Research Question 1, it was necessary to consider that each research question would be better supported with the inclusion of the student perspective. The quantitative investigation of the influence of student characteristics on online college students' preferred ways of learning provides considerable insight on its own, but it is important to realize that student groups are ultimately comprised of unique individuals. A mixed methods design will allow for the inclusion of individual student perspectives.

In particular, the explanatory sequential mixed methods as described by Creswell and Clark (2011) was chosen to quantitatively measure student group differences and to provide qualitative student perspectives for deeper insight. This design is comprised of a two-phase process in which quantitative data are collected and analyzed first, followed by a qualitative data collection and analysis phase "for the purpose of explaining the initial results in more depth" (Creswell & Clark, 2011, p. 82). A final analysis step merges the findings from each phase and together the quantitative and qualitative data provide deeper understanding of the results (Creswell & Clark, 2011; Tashakkori & Teddlie, 2003).

The nature of the explanatory sequential design combines both deductive and inductive methodologies. The quantitative survey for Phase 1 requires objectivity and deductive methodology, and is based on postpositivist philosophy (Creswell & Clark, 2011). This philosophy entails following specific procedures to ensure that the observations collected are both valid and reliable. The interview process of Phase 2 requires subjectivity and inductive methodology and is based on the constructivist paradigm (Creswell & Clark, 2011). This paradigm is based on an understanding of the uniqueness of each individual, and here too, validity and reliability are important factors.

As with all research methods, the explanatory sequential design is susceptible to both validity and reliability threats. Several strategies will therefore be implemented to minimize them. For example, strategies for data collection will include (a) using the same population for both phases of the study, and (b) collecting data from a larger sample for Phase 1 and a smaller sample for Phase 2. A strategy for data analysis threats will include using the quantitative results to inform the creation of appropriate interview questions. Strategies to reduce threats for interpretation will include following the sequential explanatory design method for data collection (i.e., quantitative first, qualitative second), and for merging the data. In addition, procedures will be developed to validate the new instrument such as verification of constructs and items by subject experts, and informal pilot testing.

The main disadvantage of this design is the amount of time that is necessary to complete both phases of data collection (Creswell & Clark, 2011; Tashakkori & Teddlie, 2003). There are logistical concerns as Phase 2 cannot begin until the data collected from Phase 1 is analyzed. Adequate participation for Phase 2 is another concern. Creswell and Clark (2011) described the importance of selecting interview participants who can help explain the quantitative results, and thereby build a stronger connection between the phases.

Results will be presented with the “side-by-side comparison” (Creswell & Clark, 2011, p. 223) merged data analysis approach. In this approach quantitative results are presented first, and followed by the qualitative results using participant quotes. Interpretation will involve a discussion of how the qualitative findings support or fail to support the quantitative findings (Creswell & Clark, 2011).

The view of the researcher is that a mixed methods approach is vital for studies that involve student preference. It is not enough to collect data and report quantitative statistical results because this ignores the student perspective. The explanatory sequential design was chosen specifically to gain a more comprehensive understanding of postsecondary students’ preferences in the online environment.

Chapter 3

Methods

The previous chapters described the changing demographic makeup of postsecondary students in the rapidly expanding field of online education and the importance of addressing student diversity in higher education. This chapter provides the research questions that guided this study and describes the research design, sampling procedures, and the instrument development process for the *Preferred Ways of Learning Survey* (PWLS) – a measurement tool to examine the three research questions. Ethical considerations and procedures for data collection and analyses are also presented.

Research Questions

The following research questions were used to guide this study. Table 7 describes the original constructs and corresponding variables prior to the development of the research instrument and data analyses.

1. How do student characteristics influence online college students' preferred ways of learning on individuated-integrated cultural constructs?

2. How do student characteristics influence online college students' online interaction preference (synchronous versus asynchronous)?

3. How do student characteristics influence online college students' learning environment preference (online versus face-to-face)?

Table 7

Original Constructs and Variables (prior to instrument development and data analyses)

Research Questions and Constructs	**Independent Variables**	**Dependent Variables**
Research Question 1 Individuated-integrated cultural constructs	Age Gender Ethnicity Major Class Level (undergraduate and graduate) Prior Experience (online and face-to-face – less than four classes and four or more classes)	Purpose of Learning Ways of Taking In and Processing Knowledge Interconnectedness of What is Being Learned Responsibility for Learning Time Role of the Teacher/Control Student Interactions Sequencing
Research Question 2 Online interaction preference	Age Gender Ethnicity Major Class Level (undergraduate and graduate) Prior Experience (online and face-to-face – less than four classes and four or more classes)	Online interaction preference, Synchronous versus asynchronous
Research Question 3 Learning environment preference	Age Gender Ethnicity Major Class Level (undergraduate and graduate) Prior Experience (online and face-to-face – less than four classes and four or more classes)	Learning environment preference, Online versus face-to-face

Research Design

The explanatory sequential mixed methods (Creswell & Clark, 2011) approach was chosen for this study in order to quantitatively measure student group differences and to provide qualitative student perspectives for deeper understanding (Figure 4). This research design consisted of a two-phase process in which quantitative data were collected and analyzed first, followed by a qualitative phase "for the purpose of explaining the initial results in more depth" (Creswell & Clark, 2011, p. 82).

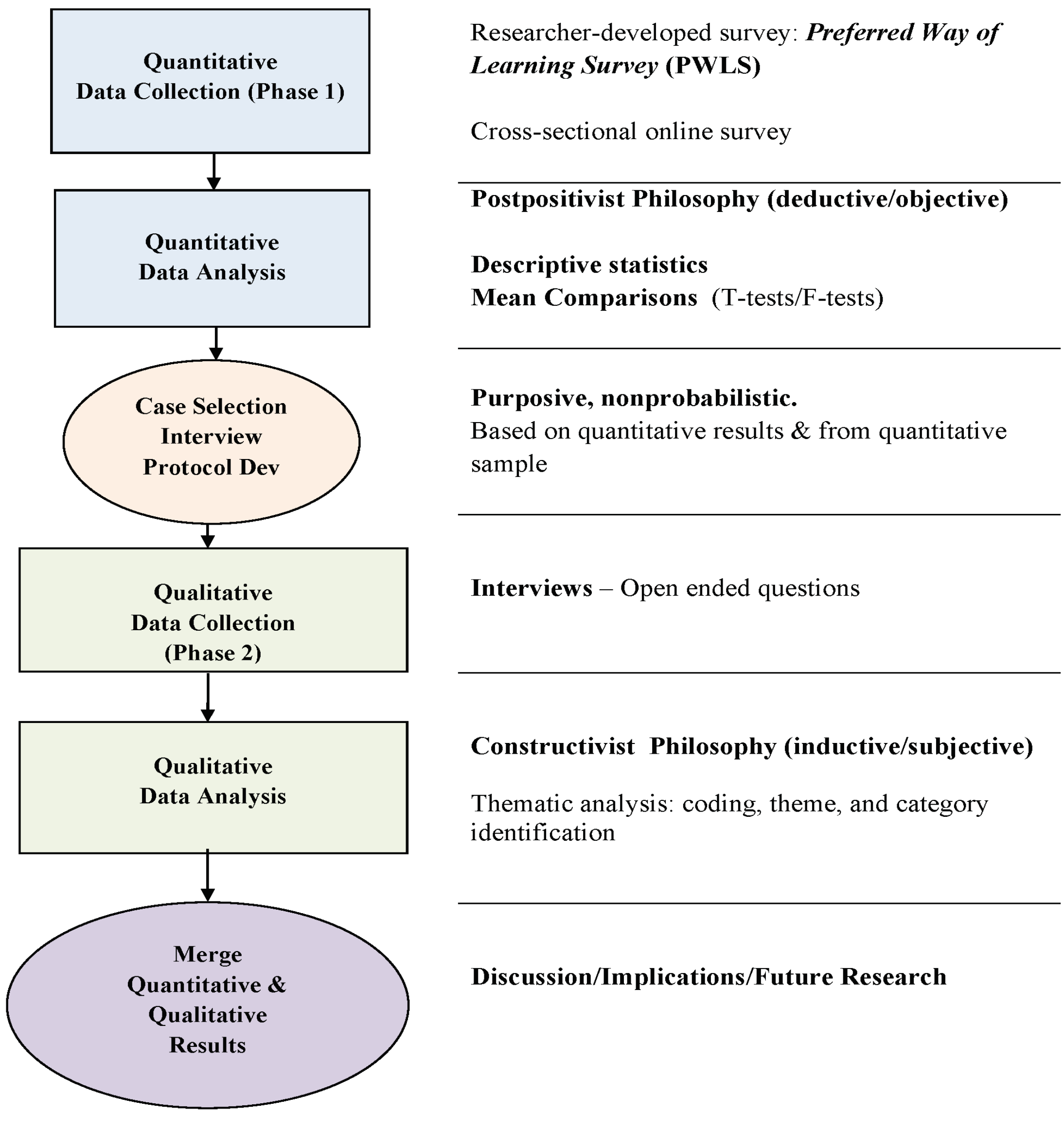


Figure 4. Explanatory sequential mixed methods design used for this study. Adapted from "Using Mixed-Methods Sequential Explanatory Design: From Theory to Practice," by N. V. Ivankova, J. W. Creswell, and S. L. Stick, 2006, *Field Methods, 11*(1), p. 16.

The final step of the sequential explanatory mixed methods design is the interpretation phase which entails merging the quantitative and qualitative results to address "whether and how the qualitative data help explain the quantitative results" (Creswell & Clark, 2011, p. 221). The results for all of the constructs in this study are presented with the "side-by-side comparison" (Creswell & Clark, 2011, p. 223) merged data analysis approach. In this approach quantitative results are presented first, and followed by the qualitative results using participant quotes. Interpretation involves a discussion of how the qualitative findings support or fail to support the quantitative findings (Creswell & Clark, 2011).

Several strategies were implemented to minimize validity threats for connecting data as described by Creswell and Clark (2011, pp. 242-243). For data collection, the quantitative sample was larger than the qualitative sample, and the same population was used for both phases. In addition the researcher used a variety of procedures to develop and validate the new instrument (i.e., verification of constructs and items by subject experts, and informal pilot testing). These procedures are described below in the instrumentation section. For data analysis, the quantitative results were used to determine appropriate interview questions, and the purpose of the study was clearly described to the participants. Interpretation of the results followed the prescribed method for the explanatory sequential method. Specifically, quantitative data was collected and analyzed first, followed by qualitative collection and analysis, and the final step merged the data.

Ethical Considerations

This study was approved by the UNM's Institutional Review Board (IRB) in August 2014. Survey data were secured throughout the project and stored on the researcher's password-protected laptop computer with encryption software, and accessible only to the researcher and her dissertation chairperson. The quantitative data were numeric and non-identifiable with consent established as part of the online survey procedure. Consent protocol for phase one was included within the PWLS and required students to click “OK” to proceed to the survey. Participants were provided the option *Prefer not to respond* for all items to avoid any participant potentially feeling forced to make a disingenuous response. Participants were also notified that they could stop the survey at any time. Consent protocol for student interviews (Appendix B) established that any participant could be removed from the study upon request and that any data would be immediately destroyed (i.e., all documentation, email messages, audio recordings, contact information, and consent forms). Electronic consent forms for phase 2 were printed and stored in a secure location in the dissertation chairperson’s office.

Sampling Procedures

Homogeneous purposive sampling was chosen “To describe a particular subgroup in depth, to reduce variation, [and] simplify analysis . . . ” (Palinkas et al., 2013, p. 535) of online UNM students. Recruitment procedures involved the cooperation of both UNM’s office of New Media and Extended Learning (NMEL) and all fall 2014 UNM online faculty. NMEL provided the researcher a contact list for all UNM faculty teaching online courses in Fall 2014. The researcher had been dissuaded from seeking other university department approvals (i.e., Dean of Students) to directly contact all UNM students for recruitment, citing a university administration concern about “over-polling” the student body.

Two hundred seventy-three faculty members were sent an email request from the researcher's university email account to forward an invitation to their students to anonymously participate in this study (Appendix A). No identifying student information was collected in the survey. The sample for the interview phase of the study was drawn from the survey sample, and students were invited to volunteer to take part in the interview portion. The resulting recruitment procedure posed two possibilities of nonresponse bias for the study: (1) the faculty email request may have not been noticed or read, and (2) the faculty may have elected not to send the participation invitation to their students. There was no mechanism in place to determine how many of the 273 faculty read the email request and/or whether or not they forwarded the invitation to their students. After the initial faculty contact, the researcher sent two reminder email messages during the five weeks the survey was open.

The purposive sampling method posed both voluntary and nonresponse biases. The PWLS elicited voluntary responses for both phases of data collection which may have produced an overrepresentation of participants who had strong opinions. Nonresponse bias "is a function of (a) the magnitude of the difference between respondents and nonrespondents and (b) the proportion of all sampled elements that are nonrespondents" (Lavrakas, 2008, p. 531). In the current study nonresponse bias would include students who received the invitation to participate but declined and students who may have experienced communication barriers (i.e., language, psychological, physical, technological) (Lavrakas, 2008). Although nonresponse bias remains an important consideration, Lavrakas (2008) explained,

> It has long been thought that response rates are a good indicator of survey quality and nonresponse bias; however, recent research has challenged this notion. This is encouraging news for researchers because it means that surveys with lower response

> rates are not necessarily more biased than those with higher response rates. But this does not mean that nonignorable nonresponse bias cannot or will not occur. Nonresponse bias will be present when the likelihood of responding is correlated with the variable(s) being measured, and this correlation can vary across variables even within the same survey. (p. 531)

Despite the intention to appeal to all students about the benefits of the study, it is possible that some students elected not to participate due to the nature of study, particularly the use of student characteristics to define preferred ways of learning (i.e., some students may find the use of labels too limiting).

Instrument Development

The researcher-designed online instrument, *Preferred Ways of Learning Survey* (PWLS) was developed to measure the constructs for each of the three research questions. Overall, the PWLS was created to investigate whether and how the student characteristics of contemporary online college students influenced their preferred ways of learning in the online environment.

As suggested by Briggs and Cheek (1986), the creation of the PWLS required "a careful analysis of the construct under study followed by an attempt to create a pool of items that systematically reflect[ed] this conceptualization" (p. 130). In addition, the development of the PWLS followed the ethical principles for test construction set forth by the American Psychological Association's (APA) to the greatest extent possible, to use, "appropriate psychometric procedures and current scientific or professional knowledge for test design, standardization, validation, reduction or elimination of bias, and recommendations for use"

(p. 13). The following sections outline the development of the PWLS.

Initial development of the four-part instrument included the identification of appropriate student characteristics items (Part A) and the creation of items to accurately measure the constructs for the three research questions (Parts B, C, D). The four sections of the survey also allowed the researcher to signal different aspects of the survey to the participants and to provide them with specific instructions for each section.

Part A consisted of nine items that focused on the student characteristics of interest (i.e., age, gender, ethnicity, major, class level, and prior experience). The ethnicity portion included three different ways for students to define and describe their personal perspectives of their race and/or ethnicities. These items included (a) self-selection into any of the seven racial/ethnic categories in accordance with those used by the US Census, IPEDS, and UNM, (b) a type-in ethnic self-identification textbox, and (c) three ethnic identity questions that were drawn from the "affective component" of Phinney's (1992) *Multigroup Ethnic Identity Measure* (MEIM). The identity questions were meant to "address students' sense of affirmation, belonging, and commitment" (p. 156). Together, the three items were included to allow students greater flexibility in describing their perceived ethnic identity and to provide the researcher some deeper insight on these perceptions. The results of the combined items are presented in Appendix C.

Part B was created to address the constructs for Research Question 1 and the influence of student characteristics on online college students' preferred ways of learning on the individuated-integrated *Cultural Constructs of Teaching and Learning* identified by Ke and Chávez (2013). Ke and Chávez described that each of their constructs consisted of two "cultural epistemologies," individuated-integrated, which were situated on a left-to-right continuum, respectively (Refer to Figure 1 in Chapter 1). The individuated epistemology denoted “a compartmentalized, private, outward, contextually independent conception of the world,” and the integrated epistemology denoted “an interconnected, mutual, reflective, contextually dependent conception of the world” (p. 93).

In order to operationalize the individuated-integrated continuum survey items were developed to individually address each dimension. The survey items were based on both verbatim student narratives provided in *Web-Based Teaching and Learning across Culture and Age* (Ke & Chávez, 2013) and the researchers’ analyses and interpretations. No items were developed for the *Time* construct in order to keep the focus solely on online learning in this study, rather than making a comparison with the “highly time-oriented traditional classes” (p. 105) as Ke and Chávez had done in their study.

Parts C and D were developed to examine whether student characteristics influenced online interaction preference, synchronous versus asynchronous (Research Question 2) and online learning environment preference, online versus face-to-face (Research Question 3), respectively.

The instrument draft was created in Opinio, a secure online program for survey administration and analysis, and sent for review to content experts on the cultural aspects of postsecondary online education. The content experts consisted of the cultural construct authors and researchers Fengfeng Ke and Alicia Chavez. Two rounds of feedback and revision with the content experts provided valuable insight that improved the organizational structure of the survey and add greater clarity to individual items with respect to the constructs being measured.

Once these first revisions were completed the PWLS draft was sent to four departmental colleagues for review. The colleagues were emailed a link to take the survey with a request for detailed feedback for both the individual items and their overall experience. Collegiate responses lead to further design changes, including the removal of the construct labels (i.e., “Ways of Taking In and Processing Knowledge”) and the randomization of survey items within Parts B, C, and D to avoid possible participant presumptions of a greater or misconstrued meaning or agenda. The revised survey was submitted to UNM’s IRB office and approved. The final version of the survey was completed in August 2014 (Appendix D).

The instrument incorporated the use of a 10-point Likert-type scale for parts B, C, and D, with only two labels, *Strongly Disagree* at the number 1 position and *Strongly Agree* at the number 10 position. These design elements were intended to (a) avoid a possible tendency of participants to choose an exact middle, or neutral response, (b) restrict the use of labels that may be limiting for some participants, and (c) provide a greater range of responses along the scale. Despite best intentions, these design choices may receive criticism. For example, Clark and Watson (1995) remarked that the use of an even numbered scale may be found “objectionable” because it “forces respondents to ‘fall on one side of the fence or the other’” (p. 313). In addition, they described the potential problem of using a larger scale:

> providing more response alternatives (e.g., a 9-point rather than a 5-point scale) does not necessarily enhance reliability or validity. In fact, increasing the number of alternatives actually may reduce validity if respondents are unable to make the more subtle distinctions that are required. That is, having too many alternatives can introduce an element of random responding that renders scores less valid.” (Clark & Watson, 1995, p. 313)

This is an important consideration for the scale used in this survey. It's unclear whether participants who chose number 5 on the 10-point scale, for example, were specifically making a choice on the *Strongly Disagree* side of the scale, or if they would have preferred to select a neutral response.

Numerical values were used to denote each of the points of the 10-point range, along with two the labels at the first position, *Strongly Disagree* and the last position *Strongly Agree.* The use of numerical values was intended to help provide a "sense of equidistance" and while often debated, "researchers traditionally have used parametric statistics (which assume at least an interval level of data) to analyze Likert scales" (Lavrakas, 2008, p. 427). According to the Stevens (1951), who developed the four levels of measurement, "… most of the scales used widely and effectively by psychologists are ordinal scales ... [and] there can be involved a kind of pragmatic sanction: in numerous instances it leads to fruitful results." (p.26). Because of the continued debate about the common practice in the social sciences of treating non-parametric data as though they were parametric (i.e., analyses of ordinal data from the Lickert-type scales as though they are interval data), all appropriate sets of validity assumptions per analysis method were tested and reported in Chapter 4.

The original researcher-developed inventories for each of the constructs are presented below.

Individuated-integrated cultural constructs of teaching and learning. Ke and Chávez described that each of their constructs consisted of two "cultural epistemologies," individuated-integrated, which were situated on a left-to-right continuum, respectively (Refer to Figure 1 in Chapter 1). The individuated epistemology denoted "a compartmentalized, private, outward, contextually independent conception of the world," and the integrated epistemology denoted “an interconnected, mutual, reflective, contextually dependent conception of the world” (p. 93). The following sections describe the seven cultural constructs and the original survey items that were developed to measure them.

Purpose of learning. The individuated epistemology was described as “Knowledge, individual competence, to move forward to goals” and integrated as “Wisdom, betterment of the lives of those with whom we are connected” (p. 97). The original scale items are presented in Table 8.

Table 8

Purpose of Learning, Original Survey Items

Item Number	**Survey Items**	
	Individuated	**Integrated**
q10	I'm in college because it’s necessary for my chosen career.	
q11	I’m pursuing my college degree to prove to myself what I can do.	
q12	I’m in college to become self-sufficient and independent.	
q15	My college degree will enable me to support myself.	
q13		My community is counting on me to get my college degree.
q14		My family is counting on me to get my college degree.
q16		I'm pursuing my college degree to benefit both myself and my community.
q17		I view my college studies as an opportunity to develop deep wisdom.

Ways of taking in and processing knowledge. The individuated epistemology was described as “Mind as primary, best, or only funnel of knowledge” and integrated as “Mind, body, spirit/intuition, reflection, emotions, relationships” (p. 98). Table 9 provides the original scale inventory.

Table 9

Ways of Taking In and Processing Knowledge, Original Survey Items

Item Number	**Survey Items**	
	Individuated	**Integrated**
q24	I think my primary and secondary school experiences have shaped the ways I learn most naturally.	
q25	I don't allow my emotions to get in the way when I'm trying to learn something.	
q38	I primarily use the power of my mind (intellect) to learn.	
q41	I find that I often approach learning for my college courses differently from learning for my own personal interests.	
q46	I prefer college courses that are mostly made up of lectures and readings	
q31		I prefer college courses that provide a variety of learning materials, like videos, podcasts, visuals (i.e., charts, diagrams, mind maps, etc.), and etc.
q36		I often use my intuition and emotions to help me learn.
q44		I use different learning approaches depending on the learning task, regardless of whether it's for my college courses or my personal interests.
q50		I tend to use my intellect and some combination of my other senses when I learn (seeing, doing, feeling, sensing).
q57		I think my most natural ways of learning were developed through interactions with my family and/or community

Interconnectedness of what is being learned. The individuated epistemology was described as "Compartmentalized and separate, belief that understanding how the parts work separately, abstractly, and in isolation will lead to the greatest understanding" and integrated as "Contextualized and connected, belief that understanding how things affect each other within the whole, pragmatically, and within community will lead to understanding" (p. 101). Table 10 provides the original scale inventory.

Table 10

Interconnectedness of What is Being Learned, Original Survey Items

Item Number	Survey Items	
	Individuated	**Integrated**
q26	I learn best when I keep what I'm learning in college separate from my everyday life.	
q49	I think what I learn in college is separate from my everyday life.	
q20		My online instructors often encourage us to relate what we learn in class to our personal experiences and/or the world around us.
q21		I often try to figure out how what I learn in school connects with my everyday life and/or the world around me.
q28		I wish my online instructors would encourage me to connect what I'm learning with the other courses in my major.
q33		The courses in my major are structured so that I can easily understand their relation to one another.
q42		My online instructors often encourage us to find connections between the other courses we're taking within our major.
q51		I wish my online instructors would encourage me to relate what I'm learning to my personal experiences and/or the world around me.
q59		I learn best when I can connect the course material to my personal experiences and/or the world around me.

Responsibility for learning. The individuated epistemology was described as "Learning is a private, individual activity. Responsible for one's own learning so that others are not burdened" and integrated as "Learning is a collective, shared activity, Responsible for one's own and others' learning" (p. 103). Table 11 provides the original scale inventory.

Table 11

Responsibility for Learning, Original Survey Items

Item Number	**Survey Items**	
	Individuated	**Integrated**
q29	I tend to learn just the amount required to get good grades.	
q47	I prefer to take personal responsibility for my learning, and do not rely on the support of my online classmates.	
q48	I learn most naturally when I can figure things out on my own.	
q53	I tend to focus more on my own work, and rarely look at what my online classmates are doing.	
q55	I rarely read more than what the instructor says I have to.	
q60		I try to learn above and beyond what my instructors focus on so I can really understand a topic.

Role of the teacher/control. The individuated epistemology was described as "Provider and evaluator of knowledge – best perspectives and ways of learning, predetermined/bounded learning; communication primarily between teacher and students" and integrated as "Facilitator of learning experiences – multiple perspectives and ways of learning, emergent/constructivist; wide variety of interactions between students and between teacher and students" (p. 106) Table 12 provides the original scale inventory.

Table 12

Role of the Teacher/Control, Original Survey Items

Item Number	Survey Items	
	Individuated	**Integrated**
q35	I like instructors who follow a fixed structure with very specific goals that every student must meet.	
q56	I prefer instructors who provide only specific expert information that I need to learn so I can do well on my tests.	
q27		I like instructors who are flexible, and tailor the course to meet student needs and interests.
q37		I prefer instructors who lead us to make our own new discoveries.

Student interactions. The individuated epistemology was described as "Others' perspectives are optional for learning. Primarily rely on verbal messages; individuals are paramount, few streams of communication" and integrated as "Others' perspectives are important to learning. High use of nonverbal; collective paramount and multiple streams of communication" (p. 108). Table 13 provides the original scale inventory.

Table 13

Student Interactions, Original Survey Items

Item Number	**Survey Items**	
	Individuated	**Integrated**
q22	I only participate in online discussions when they're required.	
q23	The only interaction I really need in my online courses is with my instructor.	
q43	I think my online classmates' ideas and interpretations can be distracting.	
q52	I learn well enough on my own in my online courses, without any interaction with my classmates.	
q18		I like to participate in online discussions even when they aren't required.
q34		My learning is enhanced when I can interact with others in my online courses.
q39		Interacting with my online classmates helps me gain a deeper understanding of the course material.
q45		I learn best when I can compare and contrast my views with those of my online classmates.

Sequencing. The individuated epistemology was described as "Learning by mastering abstract theory first, followed by testing. Rarely includes application/experience/doing in real life" and integrated as "Learning by doing, listening to others' experiences or experiencing first, and drawing out abstract theory" (p. 111). Table 14 provides the original scale inventory.

Table 14

Sequencing, Original Survey Items

Item Number	Survey Items	
	Individuated	**Integrated**
q40	I prefer learning about the "big picture" of a subject first in order to better understand how the separate parts fit.	
q58	When I learn something new, I prefer to start with abstract theories and concepts.	
q19		I prefer learning step-by-step, from the smaller parts of a subject first, in order to better understand the whole
q32		When I learn something new, I prefer to start with activities (labs, case studies, story-telling.

Online interaction preference. This construct was included in the study to investigate another point presented in Ke and Chávez's study. They found "Some students interviewed expressed a marked preference for asynchronous written class discussions, while others preferred synchronous written chats and/or class sessions where participants can hear and interact with others" (p. 108). While they were unable to identify cultural differences for the preference, they suggested that this preference might be linked more to an individual's internal or external ways of processing than to ethnicity. This research question was posed to investigate whether student characteristics might influence student preference for synchronous versus asynchronous interaction in the online environment.

This construct addressed whether online students found either written discussions (asynchronous interaction) or web conferences (synchronous interaction) more engaging. The asynchronous preference sought to determine whether students enjoyed written discussions primarily for the time allowed for reflection, or web conferences, primarily for the opportunity to receive immediate feedback (with instructors and/or peers). Table 15 provides the original scale inventory.

Table 15

Online Interaction Preference, Original Survey Items

Item Number	**Survey Items**	
	Synchronous	**Asynchronous**
q61	In general, I think live web conferences are more engaging than written discussions in my online courses.	
q62	I prefer real-time web conferences in my online courses because I can receive immediate feedback from my instructor and classmates.	
q63		In general, I find written discussions more engaging than live web conferences in my online courses.
q64		I prefer written discussions in my online courses because they allow me time for reflection.

Learning environment preference. This question was also added to the survey based on the observation by Ke and Chávez that the Native American students in their study described that "the 'hands-on, doing' (bodily/kinesthetic) nature of online courses [were] more natural to their learning process and point[ed] out that within an online learning context they have 'more time for reflection (intrapersonal) before responding' consistent with their own cultural norms" (p. 101). This research question was posed to investigate whether or not ethnicity, or any of the other student characteristics, might influence student preference for an online versus face-to-face learning environment. Table 16 provides the original scale inventory.

Table 16

Learning Environment Preference, Original Survey Items

Item Number	Survey Items	
	Online	**Face-to-face**
q30	I find that I can use my most natural ways of learning more easily in my online college courses than in my face-to-face courses.	
q65	I prefer blended learning classes that have some face-to-face and some online components	
q66	I general, I feel more comfortable in my online courses that I do in my face-to-face courses.	
q67	I tend to have a stronger connection with my instructors in online courses than with my instructors in face-to-face courses.	
q68	I tend to engage more deeply with the subjects I take in online courses than I do in face-to-face courses.	
q69	I tend to engage more easily with my online classmates than my face-to-face classmates.	
q70		I prefer the social aspect of my face-to-face courses.
q71		I prefer face-to-face courses because they're what I'm most used to.
q72		I tend to feel isolated from my instructor and classmates in my online courses.
q73		I just don't think I can learn as well online as I can in face-to-face courses .

Data Collection and Analysis

The two-phase data collection procedure recommended by Creswell and Clark (2011) required the collection and analysis of quantitative data for Phase 1, and based on these results, qualitative collection and analysis followed for Phase 2. The collection analyses procedures are described in the sections below.

Phase 1

Responses to the PWLS were collected over the course of 5 weeks from online UNM students during the fall semester in 2014 (October-November). The students had to have completed at least one online UNM course and one college-level face-to-face course. Once the survey closed, data from 181 respondents were exported from Opinio into Microsoft Excel for initial data examination and then imported to *IBM SPSS Statistics (SPSS)*, version 23, for all subsequent analyses.

The cases were sorted by completion date to identify incomplete surveys, and following the protocol established for the study, from the overall 181 sample received, 41 incomplete cases were identified and removed. There were 140 complete responses.

The data were screened for errors and missing data. Descriptive statistics including frequency distributions were examined for all variables. Missing Value Analysis (MVA) using Little's MCAR test was conducted with results that indicated that the missing data were missing completely at random (MCAR) for all scales except *Student Interactions*. Missing data consisted only of responses obtained from the *Prefer not to respond* option for all survey items, and were handled using the expectation-maximization (EM) method to impute missing values. Items on the *Student Interaction* scale and one outlier case on the *Interconnectedness with What is Being Learned* scale that had a z-score greater than -3.29 were handled using the "exclude cases pairwise" option. EM is a type of "maximum likelihood procedure that works with the relationship between the unknown parameters of the data model and the missing data" (Outhwaite & Turner, 2007, p. 219). "EM has the advantage that it produces unbiased – or nearly unbiased – estimates of means, variances and covariances" and it is also not sensitive to non-normal multivariate distributions (Outhwaite & Turner, 2007, p. 219).

Prior to transforming the items into the measurement scales and reliability analysis, individual survey items were reviewed to ensure appropriateness with each of the constructs under investigation. Because the seven cultural constructs investigated for Research Question 1 encompassed two distinct "cultural epistemologies" (individuated-integrated), exploratory factor analysis was conducted to explore the interrelationships among the items in each scale. The principle component method and Direct Oblimin (oblique) rotation with two factors was used to identify the two expected scales within each construct. The resulting pattern and structure matrixes (Appendix E) were used solely as a guide for the researcher to create the individuated and integrated preference scales for each cultural construct with the goal to improve instrument validation. This particular use of factor analysis was supported by Briggs & Cheek (1986), who suggested that "factor analysis is not an end in itself but a prelude to programmatic research on a particular psychological construct" (p. 137).

Validity is a primary concern for the researcher-developed PWLS instrument. It is especially difficult to devise a new instrument in terms of validity because it involves the collection of empirical evidence. Although limited time and resources were available to adequately determine validity, the following steps were taken to ensure the highest possible validity for the instrument: (a) research was conducted to locate existing items and scales with existing validity for the constructs used in this study, (b) verification of constructs and items was reviewed by subject experts, and (c) the instrument was informally pilot tested.

Reliability is an important indicator of a scale's quality. "For a scale to be reliable, the scores it yields must represent some true state of the variable being assessed" (DeVellis, 2012, p. 31). The goal of internal reliability is to achieve a high correlation of the items within each scale. Cronbach's alpha was used to evaluate internal consistency. Alpha values range from 0 to 1, with 1 indicating higher reliability. The specific procedures for determining reliability and results are presented in Chapter 4.

Phase 2

Qualitative data were collected after the quantitative data analysis was completed in Phase 1. Seven participants who volunteered after taking the PWLS were interviewed – two participants via recorded phone conversation and the remaining five via email correspondence. The semi-structured and open-ended interview questions (Appendix F) were based on the constructs investigated from the quantitative phase, with the goal to provide greater insight to the quantitative responses received as well as to provide greater validity to the quantitative results (Creswell & Clark, 2011). Recorded phone conversations were transcribed and input, along with verbatim email responses received, into *NVivo for Mac*, version 11.3.1, a qualitative data analysis software program, and thematically analyzed for both individual and across cases (i.e., responses comparison) using the prescribed constructivist approach of the explanatory design (Creswell & Clark, 2011) through coding, theme, and category identification.

Qualitative data were collected from seven participants who volunteered to also participate in the interview phase. The demographic information of the interview participants is provided in Table 14. The number of students for the interview phase was less than ideal;

Onwuegbuzie and Leech (2007a) recommend at least 3 participants for each subgroup. In the current study, for example, three age groups and three ethnicity groups were not represented in the student interviews, and there were less than 3 participants in all groups. The small qualitative sample posed a possible *Effect size* threat in terms of both internal and external credibility. This type of threat according to Onwuegbuzie and Leech pertains to "meaningfulness of interpretation" (Onwuegbuzie & Leech, 2007b, p. 238). In order to avoid misinterpretation of the results, reference to the makeup of the qualitative sample are provided in the analyses sections in Chapter 4. To ensure qualitative validity, member-checking was used after the data findings were summarized, and participants were contacted and provided with transcripts to verify accuracy of meaning.

Summary

This chapter presented the research questions that guided this study and the research design. Sampling procedures and the PWLS instrument development process were described, along with data collection and analyses procedures. The next chapter describes the results of the analyses on the influence of student characteristics on students' preferred ways of learning on the cultural constructs, their online interaction preference (synchronous versus asynchronous), and their learning environment preference (online versus face-to-face).

Chapter 4

Results and Discussion

In this chapter the results from the methods described in the previous chapter are presented. The following sections present the (1) participants in the study, (2) preparation of the demographic data, (3) construct scales, factor analysis, and reliability testing, (4) statistical tests and procedures, and (5) results of the *Preferred Ways of Learning Survey* (PWLS).

Participants

The explanatory sequential mixed methods design consisted of a two-phase process in which quantitative data were collected and analyzed first, followed by a qualitative phase to provide student perspectives and deeper understanding. The sample for Phase 1 (survey) consisted of 140 students who were enrolled in any online UNM course during October-November 2014, and who had completed (a) at least one fully online UNM course, and (b) one college-level face-to-face course. The participants represented a wide variety of academic disciplines across the university, including education, nursing, business, engineering, natural science, social sciences, and humanities. Participants for Phase 2 (interview) consisted of seven students who had participated in the survey and volunteered to take part in the interview portion. Table 17 illustrates the demographic information collected from the *Preferred Ways of Learning Survey* (PWLS) for the independent variables that were investigated.

Table 17

Descriptive Statistics of Participants for Phase 1 (N=140)

Student characteristics	Description	Frequency	Percent
Age	22 and younger	36	25.7
	23-28	25	17.9
	29-34	20	14.3
	35-40	17	12.1
	41-45	10	7.1
	46-49	11	7.9
	50-54	13	9.3
	55 and older	8	5.7
Gender	Female	98	70.0
	Male	42	30.0
Class Level	Undergraduate	99	70.7
	Graduate	41	29.3
Prior Online Experience	1 class	23	16.4
	2 classes	19	13.6
	3 classes	15	10.7
	4+ classes	82	58.6
Prior Face-to-Face Experience	1 class	6	4.3
	2 classes	3	2.1
	3 classes	6	4.3
	4+ classes	123	87.9
Ethnicity	Native American	6	4.3
	Asian	7	5.0
	Black or African American	6	4.3
	Hispanic or Latino	39	27.9
	Two or More	8	5.7
	White	71	50.7

Note: More that 60 majors were selected on the survey, and due to such a varied response this variable was exclude from the analysis.

Qualitative data were collected from seven participants who volunteered to also participate in the interview phase. The demographic information of the interview participants is provided in Table 18. As noted in Chapter 3, number of students for the interview phase of this study was less than ideal (Onwuegbuzie and Leech (2007a) recommend at least 3 participants for each subgroup). No students were interviewed from three of the age groups and three of the ethnicity groups, and there were less than 3 participants in all groups. The small qualitative sample posed a possible *Effect size* threat in terms of both internal and external credibility according to Onwuegbuzie and Leech (2007b). In order to avoid potential misinterpretation of the results, reference to the makeup of the qualitative sample are provided in the analyses sections below.

Table 18

Descriptive Statistics of Participants for Phase 2 (N=7)

Student characteristics	Description	Frequency	Percent
Age	22 and younger	0	0
	23-28	0	0
	29-34	1	14
	35-40	1	14
	41-45	2	29
	46-49	1	14
	50-54	2	29
	55 and older	0	0
Gender	Female	5	71.0
	Male	2	29.0
Class Level	Undergraduate	4	57
	Graduate	3	43
Prior Online Experience	1 class	0	0
	2 classes	2	29
	3 classes	1	14
	4+ classes	4	57
Prior Face-to-face Experience	1 class	0	0
	2 classes	0	0
	3 classes	0	0
	4+ classes	7	100
Ethnicity	Native American	0	0
	Asian	0	0
	Black or African American	0	0
	Hispanic or Latino	1	14
	Two or More	1	0
	White*	5	86

* One student reported Native American and White ethnicity, but explained that s/he generally self identifies as White to reflect how s/he was raised.

Comparison to Ke and Chávez (2013) study. Because one of the goals of this study (Research Question 1) was to quantitatively test Ke and Chávez's qualitative findings with regard to their individuated-integrated *Cultural Constructs of Teaching and Learning*, a comparison of both studies is provided.

Both studies used a mixed methods design and collected data from online undergraduate and graduate students in multiple majors from a southwestern US university. The Ke and Chávez study used multilevel sampling, while the current study used homogeneous purposive sampling. The multilevel strategy "facilitate[s] credible comparisons of two or more subgroups that are extracted from different levels of study" (Onwuegbuzie & Leech, 2007a, p. 240). This strategy allowed Ke and Chávez to sample students particularly from different disciplines and difference courses that (a) were delivered using an online learning management system (LMS), (b) had student diversity (i.e., nontraditional, minority) enrollment of at least 30 percent, (c) involved online interaction (i.e., discussions), and (d) employed different kinds of learning strategies (i.e., facilitation and activities). The homogeneous purposive sampling strategy in the current study focused on online UNM college students who met the criteria explained above. Ke and Chávez recruited students over a two-year period, while the current study recruited students from one semester (Fall 2014).

Other differences between the samples included the collection of age statistics, where the Ke and Chávez study collected distinct participant ages (between 18 and 64) and the current study collected participant ages within eight ranges. Ke and Chávez also collected international student data, while the current study did not make this distinction. Figure 5 compares the undergraduate and graduate online student population in this study in terms of ethnicity to the demographics reported in Ke and Chávez's study, the institution from which the participants came (UNM), and national statistics. The current study sample is representative of the UNM student population and closely matches those in Ke and Chávez's study. The national figures are included to provide a broad context for this sample.

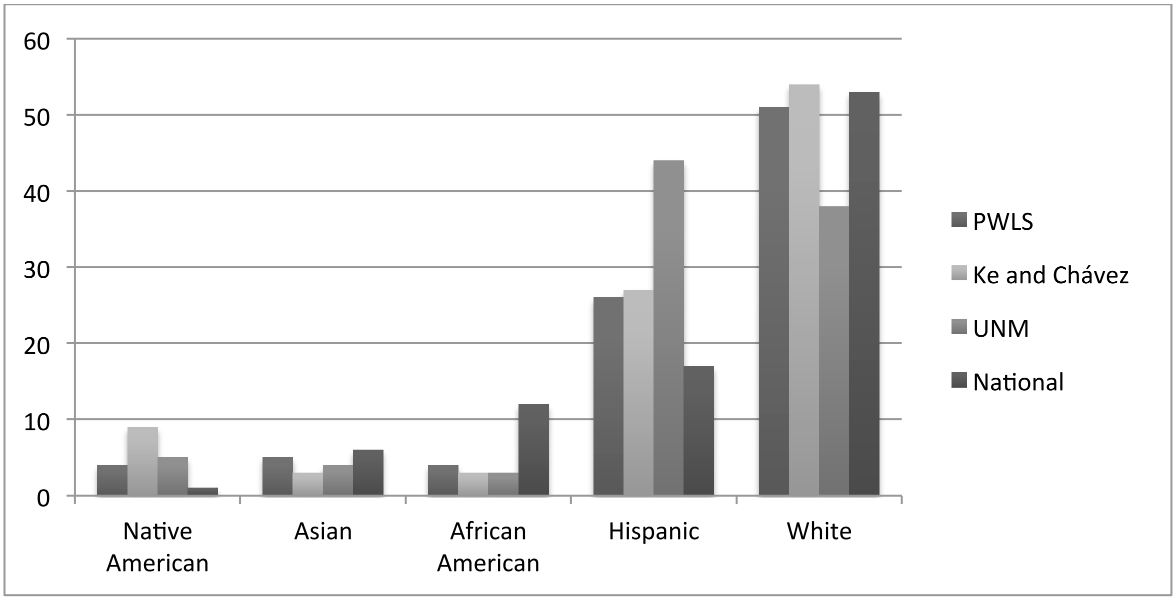


Figure 5. Comparison of ethnicity demographics for the current study (PWLS) with Ke & Chávez's (2013) study, UNM enrollment data (Fall 2014), and National Integrated Postsecondary Education Data System (IPEDS) enrollment data (Fall 2014). IPEDS data 2014 is provisional and includes all title IV institutions (4-year, 2-year, and less than 2-year).

Preparation of the Demographic Data

Some revisions to the dataset were required to prepare the data for statistical analyses. The following section describes the procedures that were taken.

More than 60 different majors were selected on the survey, and due to such a wide and varied response, the *major* variable was excluded from further analysis.

Due to low observations, unclear response, and preference for no response, the following changes were made to the ethnicity and class level groups:

(a) Ethnicity – Three students were excluded from ethnicity analyses as described below. This resulted in an overall ethnicity analyses of 137 students.

- One student who selected *Native Hawaiian or Pacific Islander*
- One student who selected both *White* and *Prefer Not to Respond* – it was determined that the preference to not respond took precedence over ethnicity selection
- One student who selected *Prefer Not to Respond*

(b) Class Level

- One *Non-degree Undergraduate* student was moved to the *Undergraduate* category
- All graduate categories were combined into the *Graduate* category (*Graduate, master's degree, Graduate, doctor's degree, Non-degree - Graduate*)

Non-degree status students at UNM were retained in the sample because this distinction was not determined to affect the overall goal of the study to examine online students' preferred ways of learning. Because non-degree students earn college credit for these courses, it was presumed that their responses were equally relevant. In addition to the fact that non-degree students are ineligible to receive financial aid, UNM provides the following description of this classification:

> The Non-Degree credit program allows individuals to earn academic credit without being formally admitted in a degree-seeking status. This program accommodates non-traditional students who wish to begin taking academic courses at the University

> without taking college entrance exams; those who missed the degree status deadline; and those who wish to take academic courses to prepare for graduate studies, career changes, or for professional and/or personal development. (“UNM Office of Admissions, Non-degree,” 2016)

Table 19 illustrates the reclassifications that were made for ethnicity and class level groups. The changes for Hispanic students were made to match UNM reporting protocol:

> For Federal reporting, anyone who selects Hispanic is reported as Hispanic regardless of any race choices they select” and “Anyone who selects Not Hispanic and two or more races is reported as ‘Two or More.’ (University of New Mexico, 2014, p. 14)

Table 19

Re-categorization of Ethnicity and Class Level Groups

Categories	Original Selection	Change	Final
Ethnicity			
Native Am or Native Alaskan	6	-	6
Asian	7	-	7
Black or African American	6	-	6
Hispanic or Latino	25	Combined all who selected Hispanic or Latino	39
White	71	-	71
Native Hawaiian or Pacific Islander	1	Excluded from ethnicity analyses	0
Native Am and White	4	Two or more	0
Hispanic or Latino and White	10	Hispanic or Latino	0
Native Am and Hispanic or Latino and White	4	Hispanic or Latino	0
Black/African Am and White	2	Two or more	0
Asian and White	2	Two or more	0
White and Prefer not to respond	1	Excluded from ethnicity analyses	0
Prefer not to respond	1	Excluded from ethnicity analyses	0
Two or more	0	New	8
Total	140		137
Class Level			
Undergraduate	97	-	98
Graduate – Masters	25	Graduate	0
Graduate – PhD	13	Graduate	0
Undergraduate – Non-degree	1	Undergraduate	0
Graduate – Non-degree	4	Graduate	0
Graduate	0	Combined	42
Total	140		140

Construct Scales, Factor Analysis, and Reliability Testing

Individual survey items were reviewed prior to the development of the measurement scales, and three items were identified as inappropriate in relation the constructs under investigation. Three survey items were therefore removed from further analysis:

(1) q30. I find that I can use my most natural ways of learning more easily in my online college courses than in my face-to-face courses.

(2) q54. In general, I find that my online college courses are structured so that I can learn in ways that feel the most natural to me.

(3) q65. I prefer blended learning courses that have some face-to-face and some online components.

The first two items refer to “natural” – a concept that was outside the main focus of student preference in this study. The third item introduced “blended learning,” and was similarly determined inappropriate for any of the constructs under investigation.

Prior to reliability testing and statistical analyses the survey items were grouped into scales to represent each construct under investigation. In order to quantitatively test Ke and Chávez’s (2013) individuated-integrated *Cultural Constructs of Teaching and Learning* for Research Question 1, exploratory factor analysis was conducted to explore the interrelationships among the items within each construct. Because the cultural constructs each encompassed two distinct “cultural epistemologies” (i.e., individuated-integrated), exploratory factor analysis using the principle component method and Direct Oblimin (oblique) rotation with two factors was used to identify the two expected scales within each construct. The pattern and structure matrixes results (Appendix E) were used solely as a guide for the researcher to assist in creating the individuated and integrated preference scales. As described in Chapter 3, this particular use of factor analysis was supported by Briggs & Cheek (1986), who suggested that "factor analysis is not an end in itself but a prelude to programmatic research on a particular psychological construct" (p. 137).

Two scales, one to represent the individuated preference and one to represent the integrated preference, were therefore created for each of the cultural constructs, *Purpose of Learning, Ways of Taking In and Processing New Knowledge, Interconnectedness to What is Being Learned, Role of the Teacher/Control, Student Interactions,* and *Sequencing*.

The items for Research Question 2 were grouped into one scale to measure online interaction preference; and the items for Research Question 3 were transformed into one scale to measure learning environment preference.

Next, each of the multi-item scales for all the research questions was examined for internal consistency. Item-Total statistics were used to remove items with low correlations as suggested by Pallant (2013), and only scales with alpha coefficients >.50 were retained for analysis.

Four cultural constructs were removed. Two constructs, *Role of the Teacher/Control* and *Sequencing* had very poor reliability coefficients ($\alpha = <.50$) that were not improved by removing items with low correlations, and were excluded from further analysis (Table 20). In addition, the individuated preference scale for the *Ways of Taking in and Processing Knowledge* construct was excluded from further analysis due to very poor internal consistency ($\alpha = <.50$). And finally, due to an oversight of the researcher after the final survey revision, the final survey items for *Responsibility for Learning* consisted of only one item to measure the integrated preference scale, and it was also excluded from further analysis.

Table 20

Item-Total Statistics, Role of the Teacher/Control and Sequencing

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation
Role of the Teacher/Control				
Individuated, α = .07				
I like instructors who follow a fixed structure with very specific goals that every student must meet.	5.00	7.965	.035	.001
I prefer instructors who provide only specific expert information that I need to learn so I can do well on my tests.	3.40	5.147	.035	.001
Integrated, α = .31				
I like instructors who are flexible, and tailor the course to meet student needs and interests.	7.30	4.255	.186	.035
I prefer instructors who lead us to make our own new discoveries.	8.52	3.042	.186	.035
Sequencing				
Individuated, α = .38				
I prefer learning about the "big picture" of a subject first in order to better understand how the separate parts fit.	5.95	6.549	.231	.054
When I learn something new, I prefer to start with abstract theories and concepts.	4.34	5.772	.231	.054
Integrated, α = .49				
I prefer learning step-by-step, from the smaller parts of a subject first, in order to better understand the whole	6.50	5.978	.322	.104
When I learn something new, I prefer to start with activities (labs, case studies, story-telling.	7.38	6.381	.322	.104

The influence of the removal of the two complete constructs is unfortunate and means a missed opportunity to investigate online students' perspectives on the role of the online teacher and the order in which they prefer to receive learning materials (in accordance with Ke and Chávez's constructs). It also clearly indicates that a revision of the items measuring these constructs is required. The influence of the missing individuated-integrated preference scales on the *Ways of Taking in and Processing Knowledge* (individuated) and *Responsibility* *for Learning* (integrated) constructs meant that the results reflected students' preferred ways of learning on only one side of the individuated-integrated cultural construct. In other words, only half of the construct was measured, and comparisons between the two could not be made. Future investigation requires revision to develop more suitable items to measure the missing individuated-integrated preference scales.

Table 21 provides the scales that were retained for analysis that had reliability coefficients >.50. These scales were included in the analysis based on Nunnally's (1967) advice that for "the early stages of research on predictor tests or hypothesized measures of a construct, . . . reliabilities of .60 or .50 will suffice" (p. 226). Although Nunnally (1978) later increased the acceptable value to .70 for instrument development, the scales with alpha coefficients ≥.57 were analyzed and reported in order to assist future researchers.

Table 21

Alpha Coefficients for All Retained Constructs, Research Questions 1-3

Research Question	Construct	Alpha
Research Question 1	Purpose of Learning, Individuated	.79
	Purpose of Learning, Integrated	.75
	Ways of Taking In and Processing Knowledge, Integrated	.57
	Interconnectedness of What is Being Learned, Individuated	.69
	Interconnectedness of What is Being Learned, Integrated	.74
	Responsibility for Learning. Individuated	.66
	Student Interactions, Individuated	.64
	Student Interactions, Integrated	.90
Research Question 2	Online Interaction Preference	.84
Research Question 3	Learning Environment Preference	.88

Statistical Tests and Procedures

Statistical tests for comparing groups were chosen to examine the influence of student characteristics on the constructs investigated in this study (Table 22). T-tests were used for all two-group comparisons, and F-tests, or ANOVAs, were used to compare more than two groups. With the goal to conduct statistical tests for group comparisons to examine the influence of student characteristics on all of the constructs in this study, the sample of 140 for Phase 1 analysis was sufficiently large. According to Cohen (1988) the sample size met the minimum requirements for group comparisons (1988) with a medium effect size of .30, statistical power of .80, and probability level of .05 (Cohen, 1988, p. 7). All quantitative analyses involved the investigation of normality, primarily via visual inspection of histograms and Q-Q plots for each of the retained scales (Appendix G). In addition, an examination of error distributions was conducted for all ANOVA tests.

Table 22

Statistical Tests to Investigate the Influence of Student Characteristics on All Constructs

Variable	**T-Test**	**ANOVA**
Age		22 and younger 23-28 29-34 35-40 41-45 46-49 50-54 55 and older
Gender	Male Female	
Ethnicity	Native American/White Asian/White Black or African American/White Hispanic or Latino/White Two or More/White	Native American Asian Black or African American Hispanic or Latino Two or More White
Class Level	Undergraduate Graduate	
Prior Online Experience	Less than four classes Four or more classes	One class Two classes Three classes Four or more classes
Face-to-Face Experience	Less than four classes Four or more classes	One class Two classes Three classes Four or more classes

For instances of violations of Levene's test for homogeneity of variances (<.05) for ANOVA analyses, both Welch and Brown-Forsythe Robust Tests of Equality of Means values were reported as recommended by Pallant (2013). In addition comparisons were made between Tukey and Games and Howell post hoc comparisons to identify any means differences due to unequal group sizes. The results are provided in the sections below, and all complete statistical tables are provided in the Appendix (H-N).

Effect size calculation. The process used in the statistical analyses to interpret the strength of the different effect sizes relied on Cohen's (1988) guidelines for assessing comparisons of different groups for eta squared:

Small - .01

Medium - .06

Large - .14

Reverse coding. To provide clarity of interpretation, various survey items were recoded so that high scores would denote the following:

- Research Question 1 – integrated preference. Items measuring an individuated preference were reverse coded (1 indicated individuated preference, 10 indicated an integrated preference).
- Research Question 2 – asynchronous preference. Items measuring a synchronous preference were reverse coded (1 indicated synchronous preference, 10 indicated an asynchronous preference).
- Research Question 3 – online preference. Items measuring face-to-face preference were reverse coded (1 indicated face-to-face preference, 10 indicated an online preference).

This information is provided to acknowledge and refute the potential for researcher bias in the interpretation and discussion of the results.

Qualitative data. Qualitative data (interviews) were collected to provide more in-depth understanding of the quantitative findings (survey), and student comments are provided in the sections below, following the quantitative results. However, as previously noted, the qualitative sample did not fully represent the quantitative sample. In particular,

- No students were interviewed who were age 28 and younger or 55 and older,
- No students were interviewed from Native American, Asian, or Black or African American ethnicity groups,
- Only one student was interviewed from the Hispanic ethnicity group.

Because the qualitative sample did not fully represent of the quantitative sample it could not be used for direct comparisons with Ke and Chávez's (2013) findings. Comparisons that are made in the Results section below focus on quantitative data analyses.

Results

The selections below present only statistically significant results. All statistical test results are provided in the appendixes (H-N).

Research Question 1. How do student characteristics influence online college students' preferred ways of learning on individuated-integrated cultural constructs?

The following sections report the results on five of Ke and Chávez's (2013) *Cultural Constructs of Teaching and Learning:* (1) *Purpose of Learning*, (2) *Ways of Taking In and Processing Knowledge*, (3) *Interconnectedness of What is Being Learned*, (4) *Responsibility for Learning*, and (5) *Student Interactions*.

As noted in Chapter 1, Ke and Chávez described that each of their constructs consisted of two "cultural epistemologies," individuated-integrated, situated on a left-to-right continuum, respectively (Refer to Figure 1). The individuated epistemology denoted "a compartmentalized, private, outward, contextually independent conception of the world," and the integrated epistemology denoted “an interconnected, mutual, reflective, contextually dependent conception of the world” (p. 93).

Analyses of the individuated-integrated continuum required two separate scales to measure each epistemology, or *dimension,* for each of the five constructs under investigation. Reverse coding of individuated items meant that low scores indicated an individuated preference and high scores indicated an integrated preference (Figure 6) for each scale within each construct.

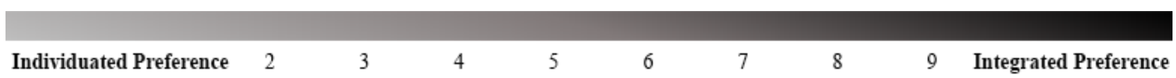


Figure 6. Individuated-integrated scale.

Purpose of learning. The individuated-integrated cultural epistemologies for the *Purpose of Learning* construct were defined by Ke and Chávez as:

Individuated: Knowledge, individual competence, to move forward to goals

Integrated: Wisdom, betterment of the lives of those with whom we are connected (p. 97)

This construct addressed why students pursue a college degree. The individuated preference scale addressed whether students’ reasons were based on goals to become self-sufficient and independent, and to support themselves. The integrated preference scale addressed whether students’ reasons were related to family or community expectations. Table 23 presents the scale and item description for this construct.

Quantitative analyses. Both dimensions, individuated preference and integrated preference, were analyzed. Analyses consisted of both independent samples t-tests and ANOVA statistics to compare mean scores for all student characteristics. Statistically significant results are presented below, and all statistical tests are provided in Appendix H.

Table 23

Scale and Item Description, Purpose of Learning

# of Items	Description/questionnaire items		*N*	Mean	SD	Range Min/Max	Alpha
	Individuated Preference Scale: 0-20	Integrated Preference Scale: 0-20					
2	**I'm in college to become self-sufficient and independent.** **My college degree will enable me to support myself.**		140	6.59	5.02	2-20	.79
2		My community is counting on me to get my college degree. My family is counting on me to get my college degree.	140	10.53	5.82	2-20	.75

Bold text denotes reverse-coded items so high scores indicated integrated preference.

Means scores for all student characteristics on the individuated preference scale indicated that all students had both individuated and integrated preferences, with a stronger individuated preference. Figure 7 graphically illustrates the overall results that suggested while the online students in this study had both individuated and integrated reasons for pursuing their college degrees, they had a stronger individuated preference (i.e., low scores on the individuated scale). Specifically, most of the students in this study primarily view a college degree as a means to become more self-sufficient and independent, and to enable them to support themselves. It is important to note that at the same time, students also generally noted the connection between a college education and their family and community.

Age. The results of the one-way analyses of variance (ANOVA) identified statistically significant differences with large effect sizes for age on both *Purpose of Learning* scales. Three different groups of younger students (22 and younger, 23-28, 35-40) had lower mean scores on the individuated preference scale compared with age group 5 (41-45). This result suggested that the younger students in this study had a stronger individuated preference for pursuing their college degree than older students.

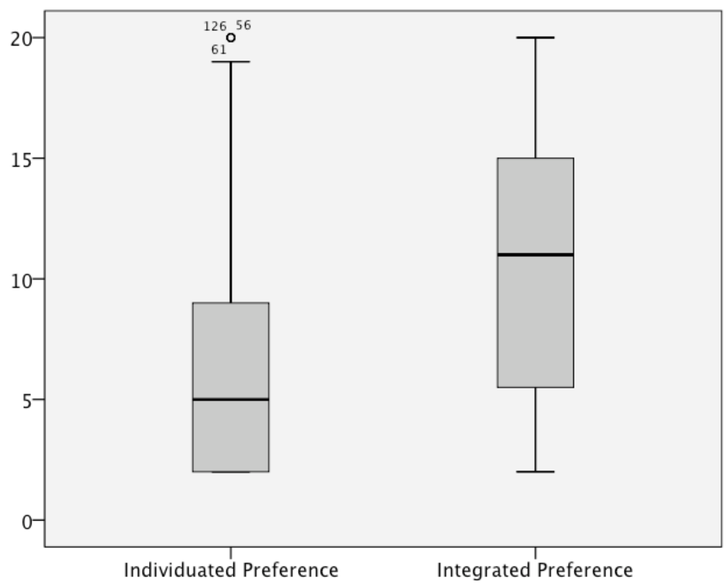


Figure 7. Boxplot, Purpose of Learning, individuated and integrated – All student characteristics. Scale: 0-20 (0 = individuated preference and 20 = integrated preference).

On the integrated scale, the two youngest age groups (22 and younger, 23-28) had the highest mean scores of all age groups, with statistically significant differences compared to age groups 5 (41-45) and 7 (50-54). This suggested that younger students also had a stronger integrated preference for pursuing their college degree than older students. Table 24 presents the ANOVA statistics and Figure 8 graphically illustrates the results for age on both scales.

Table 24

Purpose of Learning, ANOVA Statistics for Age

	N	Mean	SD	SE	Levene's Test	df	f	Sig (2-tailed)	Mean Diff (Tukey HSD)	CI-L	CI-U	ES/ Eta^2
Individuated												
Age												
1) 22 & <	36	4.83	3.05	.508					6.77*	4	6	
2) 23-28	25	4.36	2.56	.513					7.24*	3	5	
3) 29-34	20	8.35	6.54	1.46						5	11	
4) 35-40	17	5.53	4.02	.974					6.07*	3	8	
5) 41-45	10	11.60	5.58	1.77					-6.77*	8	16	
									-7.24*			
									-6.07			
6) 46-49	11	8.41	5.75	1.73						5	12	
7) 50-54	13	8.89	5.78	1.60						5	12	
8) 55 & >	8	6.88	6.06	2.14						2	12	
Total	140	6.59	5.02	.424	$<.001^{+}$*	7	3.9	<.001*		6	7	.19
						7^{+}	3.89^{+}	$.003^{+}$*				
						7^{+}	3.59^{+}	$,002^{+}$*				
Integrated												
Age												
1) 22 & <	36	12.64	4.68	.780					6.54*	11	14	
									7.1*			
2) 23-28	25	13.64	5.02	1.00					7.5**	12	16	
									8.1*			
3) 29-34	20	9.75	6.70	1.50						7	13	
4) 35-40	17	9.94	6.01	1.46						7	13	
5) 41-45	10	6.10	4.73	1.49					-6.54*	3	9	
									-7.5*			
6) 46-49	11	9.09	4.35	1.31						6	12	

7) 50-54	13	5.52	4.64	1.29					-7.1*	3	8	
									-8.1*			
8) 55 & >	8	10.13	6.49	2.30						5	16	
Total	140	10.53	5.82	.492	145	7	4.9	<.001*		10	12	.21
						7	5.5^{+}	<.001^{+}*				
						7	4.7^{+}	<.001^{+}*				

$^{+}$ Due to violation of Levene's test (unequal variance), the Welch (second row) and Brown-Forsythe (third row) Robust Test of Equality of Means values are provided; * Statistical significance at <.05. Likert-type scale, 0 = Prefer not to respond, 1 = individuated preference, 10 = integrated preference. Maximum score for each scale = 20.

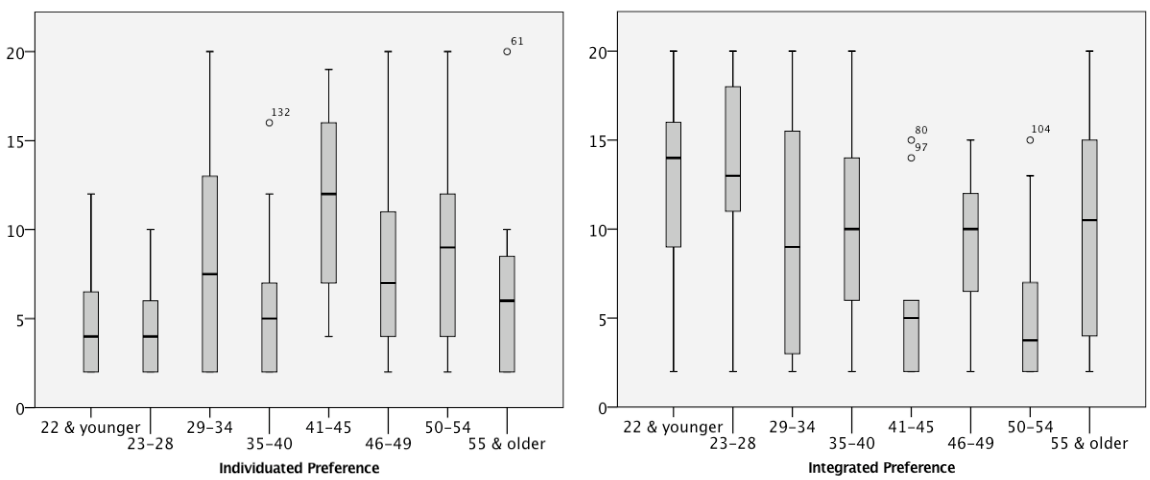


Figure 8. Boxplot, Purpose of Learning, individuated and integrated – Age. Scale for each preference: 0-20 (0 = individuated preference and 20 = integrated preference).

Class Level. Statistically significant differences in mean scores on both scales were identified for class level, each with a large magnitude of means differences (Table 25). Undergraduate students had lower mean scores than graduate students, which suggested that undergraduate students in this study had a stronger individuated preference for pursuing their college degree than graduate students.

On the integrated scale, undergraduate students had higher mean scores than graduate students, which indicated they had a stronger integrated preference. Figure 9 graphically illustrates the results for class level on both scales of the *Purpose of Learning* construct.

Table 25

Purpose of Learning, Independent Samples T-tests

Learner Characteristic	N	Mean	SD	SE Mean	Levene's Test	df	t	Sig (2-tailed)	Mean Diff	CI-L	CI-U	ES
Individuated												
1) Undergrad	99	5.92	4.50	.453	.014+	138	-2.3	.028*	-2.3	-4.3	-.254	
2) Grad	41	8.21	5.82	.909								.21
Integrated												
1) Undergrad	99	11.28	5.64	.567	.572	138	2.43	.016*	2.58	.481	4.7	
2) Grad	41	8.70	5.91	.922								.22

+ Because Levene's test was statistically significant, equal variances *not assumed* figures are reported. *Statistical significance at <.05.
Likert-type scale, 0 = Prefer not to respond, 1 = individuated preference, 10 = integrated preference. Maximum score for each scale = 20.

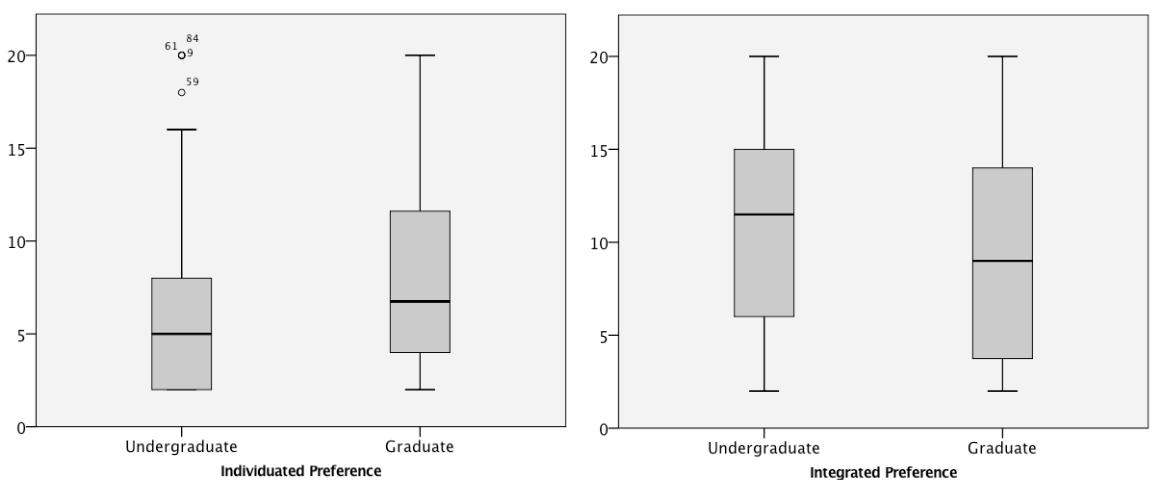


Figure 9. Boxplot, Purpose of Learning, individuated and integrated – Class level. Scale: 0-20 (0 = individuated preference and 20 = integrated preference).

Cross-tabulation for age and class level. In order to determine the potentially strong relationship between age and class level, Spearman's rank order correlation coefficient was conducted to account for the non-normal distribution of these two independent variables, as both were positively skewed and indicated a majority of both younger and undergraduate respondents in the sample. There was a medium positive correlation between age and class level, $r_s = .35$, n = 140, $p < .001$. Figure 10 illustrates the cross-tabulation for age and level.

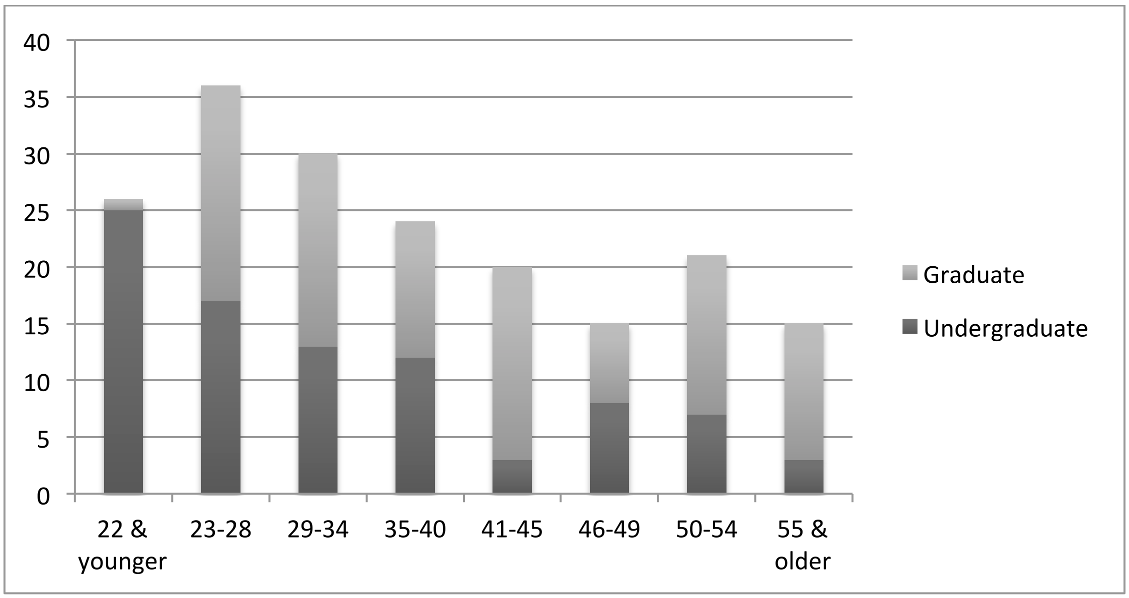


Figure 10. Cross-tabulation for age and level.

Qualitative analysis. The interview item asked, "Please share the reasons why you decided to get a college degree."

Student responses, while not fully representative of the survey sample, provided insight for the overall quantitative results. In particular, student interviews supported the overall individuated scores on the individuated preference scale. Each of the seven participants who were interviewed described a relationship between their education and their careers and/or income, regardless of their individual characteristics.

Student responses on why they pursued a college degree included: (1) to increase earning potential, (2) to provide job advancement opportunities, (3) to enable secondary career opportunities (i.e., postsecondary teaching), (4) to support career-changing opportunities, and (5) to improve job security.

The interview responses also provided some understanding of the integrated preference scale results. This scale addressed whether one's family and community was counting on them to get their college degrees. Only one student revealed how her advanced degree would serve both her career interests and benefit her community as well. She explained that an advanced nursing degree would allow her "to work with patients at the provider level in order to be more influential in their health and wellbeing processes."

While other students described how their families supported their goals to earn their degrees, only when specifically prompted did most of the students describe that their degrees would benefit their communities. For example, one student explained, "I'm hoping to be able to help my community, and help my family, and then I find it [school] very satisfying personally." In general, helping one's community appeared to be a secondary benefit of earning a college degree, rather than a primary motivating factor. Because no students were interviewed from the younger age groups during the interview phase the statistically significant differences for age could not be further explored.

The results of the quantitative analyses did not support Ke and Chávez's findings that ethnicity would be a primary determinant of individuated or integrated preference on the *Purpose of Learning* cultural construct. Ke and Chávez had found that "Northern European

Caucasian American students were more likely to discuss knowledge for its own sake as well as gaining knowledge in the pursuit of educational and professional goals, while Native and Hispanic American students were more likely to connect education to make a difference in their extended families, home communities, and/or tribes" (p. 97). No statistically significant differences were identified for ethnicity, while statistically significant differences were identified for age and class level.

Summary. The quantitative and qualitative results of the *Purpose of Learning* construct revealed that the online students in this study had both individuated and integrated reasons for pursuing their college degrees. Overall, students had a stronger individuated preference and primarily viewed a college degree as a means to become self-sufficient, independent, and to support oneself. Students who were interviewed described the relationship between their education and their careers and/or income. The integrated scale addressed the connection between a college education and one's family and community. The overall results indicated that the students in this study generally agreed that this connection plays a part in their decision to pursue a college degree, but it appeared to play a secondary role.

The statistically significant findings for age and class level indicated that both younger and undergraduate students have different preferences compared to older and graduate students. Interestingly, the two youngest age groups (22 and younger, 23-28) had the lowest scores of all age groups on the individuated scale, which suggested that they had stronger individuated reasons for pursuing a college degree (to become self-sufficient, independent, to support oneself). The result for class level was similar, with lower mean scores for undergraduate students compared to graduate students. On the integrated preference scale both younger and undergraduate students reported higher integrated preference mean scores than those of older and graduate students. In this case, the younger, undergraduate students had a stronger sense of connection between their educational goals and the expectations of their families and their communities. Further exploration of these differences is warranted as increasing numbers of traditional college age students enroll in online courses and programs.

Ways of taking in and processing knowledge. The individuated-integrated cultural epistemologies for the *Ways of Taking in and Processing Knowledge* construct were defined by Ke and Chávez (2013) as:

Individuated: Mind as primary, best, or only funnel of knowledge

Integrated: Mind, body, spirit/intuition, reflection, emotions, relationships (p. 98)

Due to very poor internal consistency (α = <.50) of the individuated cultural epistemology, this construct was measured with only the integrated cultural dimension. The integrated preference scale included four items that addressed whether students (a) preferred learning with a variety materials (i.e., videos, podcasts, and visuals such as charts, diagrams, concept maps), (b) used their intuition and emotions to help them, (c) used their intellect and other senses when they learn, (d) applied flexible learning approaches dependent on the task, and (e) whether they thought their learning processes were developed in informal settings through interactions with family or community. Table 26 provides the scale and item description for this construct.

Table 26

Scale and Item Description, Ways of Taking In and Processing Knowledge

# of Items	Description/questionnaire items		*N*	Mean	SD	Range Min/Max	Alpha
	Individuated Preference	Integrated Preference Scale: 0-50					
5	No analysis: Very poor internal consistency (α = <.50) and excluded from analysis.	I prefer college courses that provide a variety of learning materials, like videos, podcasts, visuals (i.e., charts, diagrams, mind maps, etc.), and etc.. I often use my intuition and emotions to help me learn. I use different learning approaches depending on the learning task, regardless of whether it's for my college courses or my personal interests. I tend to use my intellect and some combination of my other senses when I learn (seeing, doing, feeling, sensing). I think my most natural ways of learning were developed through interactions with my family and/or community	140	35.57	6.85	12-50	.57

Quantitative analyses. Analyses consisted of both independent samples t-tests and ANOVA statistics to compare mean scores for all student characteristics. Statistically significant results are presented below, and all statistical tests are provided in Appendix I.

The results indicated that overall, most of the online students in this study had an integrated preference on this construct. Figure 11 provides a graphical representation of the results for all student characteristics.

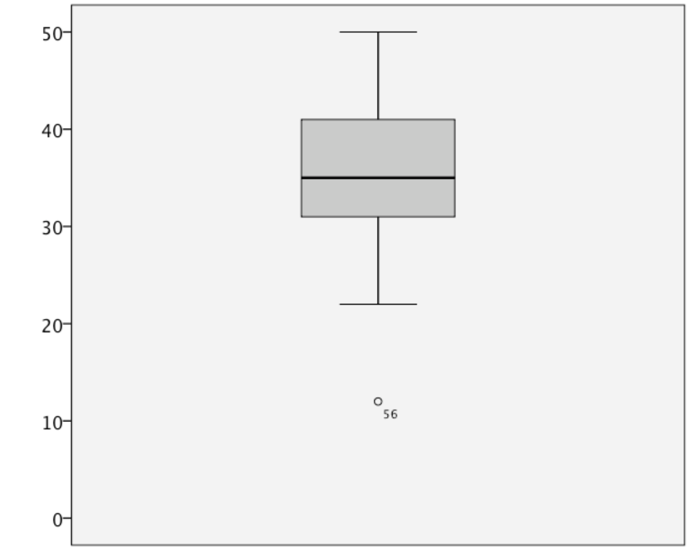


Figure 11. Boxplot, Ways of Taking In and Processing Knowledge, integrated – All student characteristics. Scale: 0-50 (0 = individuated and 50 = integrated).

Gender. Statistically significant differences in mean scores were identified for gender. Male students' scores (M = 37.34, SD = 6.47) were higher than those of female students (M = 34.82, SD = 6.90; t (138) = -2.02, p = .045, two-tailed). The magnitude of the differences in the means (mean difference = -2.5, 95% CI: –5 to -.06) was large (eta squared = .19). The results indicated that male students had a higher integrated preference on this scale than female students. However, both genders had similarly high means scores for this construct (Figure 12).

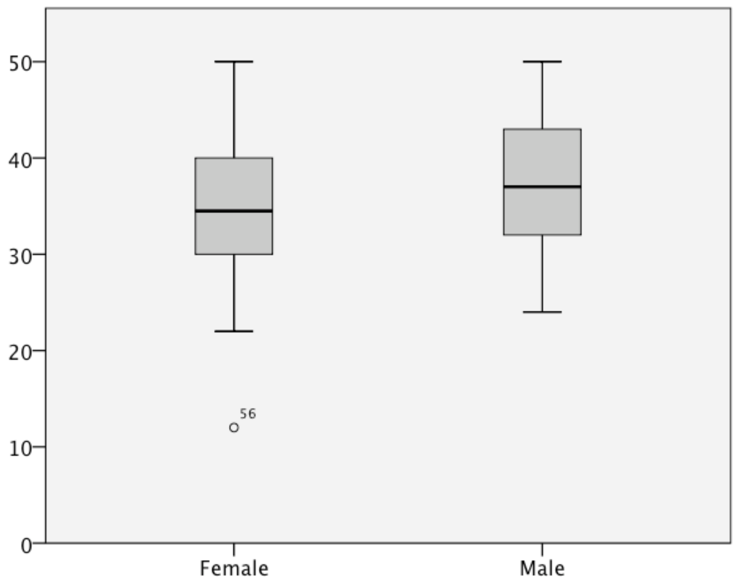


Figure 12. Boxplot, Ways of Taking In and Processing Knowledge, integrated – Gender. (0 = individuated and 50 = integrated).

Qualitative analysis. The interview question asked, “Describe how you learn best in your college courses. Consider: your personal processes of learning - do you tend to rely primarily on your cognitive powers or do you incorporate your intuition, your thoughts, feelings, etc.? Does your process differ when you learn other, non-college, things?

Although qualitative sample did not represent the quantitative sample, the student interviews provided some insight for the overall integrated preference of all participants. Three of the seven students interviewed described that they primarily used their cognitive abilities rather than their other senses, such as emotions, intuition, and feelings, when learning. One student explained, “In the engineering field, I don't find my emotions and feelings to be terribly relevant except as they relate to my personal pride in my work and my enthusiasm in do it, so I would say I rely most heavily on my ‘cognitive powers’.”

All seven students' responses indicated that their learning approach was largely dependent on the subject, task, or objective at hand. For example, one student remarked, "I incorporate a variety of learning methods [which] can expand even further depending on what the course subject is." Another student responded,

> While studying it depends on the subject material but [for] science and science based materials I usually approach in a logical way using my cognitive reasoning. If I was trying to come up with new ideas or be creative I would use more of intuition or feelings.

The use of reflection as a key component of the learning process was revealed in several student responses. One student explained, "I do mostly use my mind in online learning as mostly it is information delivery. However, I do use my personal reflection in writing responses." Other responses included, "I spend a lot of time thinking about the course material [and] I find this helps me generate questions to solidify the things I have learned" and "I tend to use previous work experiences to draw upon to apply to the learning environment."

The results of the quantitative analyses did not support those of Ke and Chávez (2013) who found

> distinct differences between Hispanic, Native, and Mestizo [people of mixed Hispanic and Native American ethnicities] students and their Northern European Caucasian peers. Learning and processing through the mind were characterized as the best, primary, or even the only way to learn by many Northern European Caucasian students, while most Hispanic, Native, and Mestizo American students described using a variety of ways of taking in and processing knowledge such as the body,

> spirit, intuition, emotions, mind, relationships, and reflection as essential to any kind of understanding or learning. (p. 99)

Summary. The quantitative results indicated an overall integrated preference for all the online students in this study, regardless of individual characteristics. This finding indicates that all students generally preferred to (a) use a variety materials (i.e., videos, podcasts, and visuals such as charts, diagrams, concept maps), (b) use their intuition and emotions to help them, (c) use their intellect and other senses when they learn, (d) apply flexible learning approaches dependent on the task, and (e) they thought their learning processes were developed in informal settings through interactions with family or community.

The qualitative interviews focused primarily on students' learning approaches (e.g., personal processes of learning), and whether they relied primarily on their cognitive powers or if they also incorporated their intuition and other senses as well. Despite the fact that the students who were interviewed did not represent the survey sample, the qualitative results reflected the quantitative findings and highlighted students' flexibility of learning approaches. The interviews indicated that students freely and fluidly use their intellect, intuition, emotions and other senses depending on the subject, topic, or task. The statistically significant differences identified for gender in the quantitative analysis suggested that school subject or program may be a confounding variable in relation gender for this construct.

Interconnectedness of what is being learned. The individuated-integrated cultural epistemologies for the Interconnectedness of What is Being Learned construct were defined by Ke and Chávez (2013) as:

Individuated: Compartmentalized and separate, belief that understanding how the parts work separately, abstractly, and in isolation will lead to the greatest understanding

Integrated: Contextualized and connected, belief that understanding how things affect each other within the whole, pragmatically, and within community will lead to understanding (p. 101)

This construct was based on the individuated-integrated cultural epistemologies described by Ke and Chávez, and addressed whether students preferred to keep what they learn in college separate from their everyday lives (individuated preference scale) or preferred to connect what they learn in college to their personal lives and the world around them (integrated preference scale). Table 27 provides the scale and item description.

Table 27

Scale and Item Description, Interconnectedness of What is Being Learned

# of Items	Description/questionnaire items		*N*	Mean	*SD*	Range Min/Max	Alpha
	Individuated Preference Scale: 0-20	Integrated Preference Scale: 0-40					
2	**I learn best when I keep what I'm learning in college separate from my everyday life.** **I think what I learn in college is separate from my everyday life**		140	14.07	4.83	2-20	.69
4		I often try to figure out how what I learn in school connects with my everyday life and/or the world around me. I wish my online instructors would encourage me to connect what I'm learning with the other courses in my major. I wish my online instructors would encourage me to relate what I'm learning to my personal experiences and/or the world around me. I learn best when I can connect the course material to my personal experiences and/or the world around me.	140	29.76	6.81	4-40	.74

Bold text denotes reverse-coded items so high scores indicated integrated preference.

Quantitative Analyses. Both individuated preference and integrated preference scales were analyzed using both independent samples t-tests and ANOVA statistics to compare mean scores for all student characteristics. Statistically significant results are presented below, and all statistical tests are provided in Appendix J.

The overall mean scores on both preference scales indicated a stronger integrated preference for all learners (i.e., mean scores well above the midpoint). This result suggested that most of the online students in this study don't strongly believe that what they learn in college is separate from their everyday lives or that such a separation would support their learning.

On the integrated preference scale, no statistically significant differences were identified. This result suggested that the online students in this study (a) try to figure out how what they learn in school connects with their everyday lives and the world around them, (b) would like their instructors to encourage them to connect what they learn to other courses in their major, (c) would like their instructors to encourage them to relate what they learn to their personal experiences and the world around them, and (d) they believe that they learn best when they can make these connections. Figure 13 illustrates the overall integrated preference all students had on this construct.

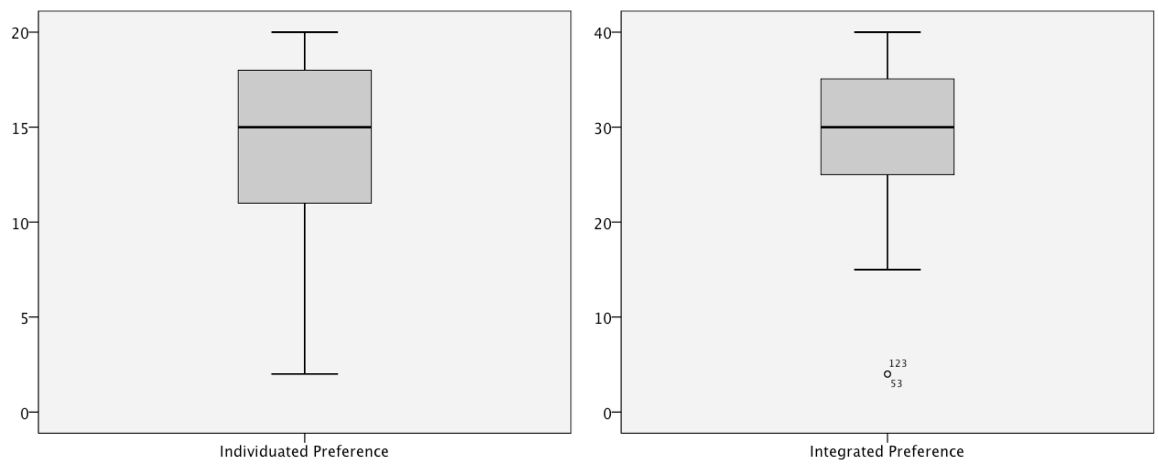


Figure 13. Boxplot, Interconnectedness of What is Being Learned – All student characteristics. (Individuated scale 0 = individuated and 20 = integrated. Integrated scale 0 = individuated and 40 = integrated).

Statistically significant differences were identified for age, gender, and class level on the individuated preference scale. Younger students, male students, and undergraduate students all had lower mean scores which indicated that they responded more strongly than older students, female students, and graduate students, that they think what they learn in college is separate from their everyday lives and that learned best when the kept what they learned in college separate from their everyday lives.

Age. There was a statistically significant difference identified for age on the individuated preference scale with a medium effect size (Table 28). The two youngest age groups (22 and younger, 23-28) had the lowest mean scores of all age groups, with a statistically significant difference with age group 8 (55 and older).

This result indicated that the younger students in this study responded more strongly than older students that they think what they learn in college is separate from their everyday lives and that learned best when the kept what they learned in college separate from their everyday lives. Figure 16 provides a graphical representation of the result for age on the individuated scale.

Table 28

Interconnectedness of What is Being Learned – Individuated, ANOVA Statistics

	N	Mean	SD	SE	Levene's Test	df	f	Sig (2-tailed)	Mean Diff (Tukey HSD)	CI-L	CI-U	ES - Eta²
Age												
1) 22 & <	36	12.35	4.77	.794					-6.52	11	14	
2) 23-28	25	12.04	4.70	.941					-6.84	10	14	
3) 29-34	20	14.90	5.73	1.28						12	18	
4) 35-40	17	15.88	3.59	.870						14	18	
5) 41-45	10	16.00	2.63	.830						14	18	
6) 46-49	11	14.41	4.56	1.37						11	17	
7) 50-54	13	14.38	4.99	1.39						11	17	
8) 55 & >	8	18.88	1.64	.581					6.52	18	20	
									6.84			
Total	140	14.07	4.83	.408	.038⁺	7	3.46	<.001/		13	15	.05
						7	8.53⁺	<.001⁺*				
						7	4.02⁺	.001⁺*				

⁺ Due to violation of Levene's test (unequal variance), the Welch (second row) and Brown-Forsythe (third row) Robust Test of Equality of Means values are provided; * Statistical significance at <.05. Likert-type scale, 0 = Prefer not to respond, 1 = individuated preference, 10 = integrated *preference*. Maximum score for scale = 20.

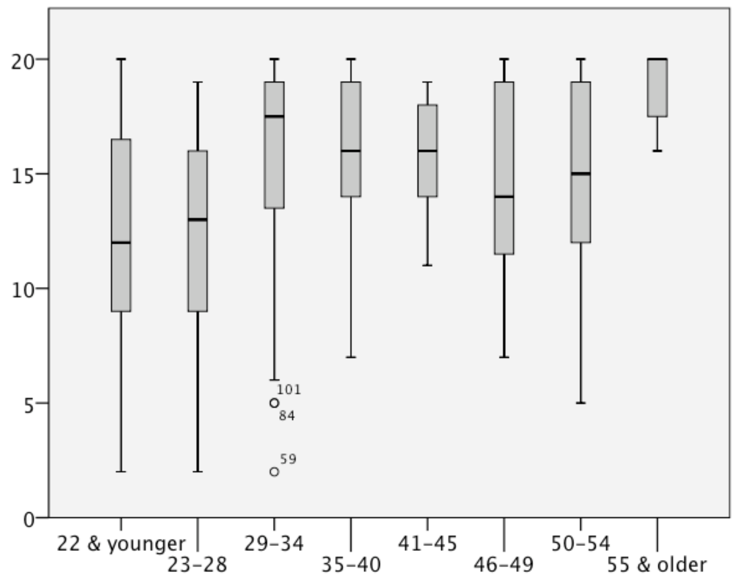


Figure 14. Boxplot, Interconnectedness of What is Being Learned, individuated – Age. For this scale 0 = individuated and 20 = integrated.

Gender. A statistically significant difference was identified on the individuated preference scale for gender with a large effect size (Table 29). Male students' mean scores were lower than female students' mean scores, which indicated that the male students in this study had a stronger individuated preference. Figure 15 provides a graphical representation of the result for gender on the individuated scale.

Table 29

Interconnectedness of What is Being Learned – Individuated, Independent Samples T-tests

Learner Characteristic	N	Mean	SD	SE Mean	Levene's Test	df	t	Sig (2-tailed)	Mean Diff	CI-L	CI-U	Effect Size
1) Female	98	15.27	3.83	.387	<.001+*	138	4.14+	<.001+*	4.00+	2+	6+	.38
2) Male	42	11.27	5.74	.886								
1) Undergrad	98	12.94	4.99	.504	.001+*	138	-5.4+	<.001+*	-3.77+	-5+	-2+	.41
2) Grad	42	16.71	3.16	.487								

+ Because Levene's test was statistically significant, equal variances *not assumed* figures are reported. *Statistical significance at <.05. Likert-type scale, 0 = Prefer not to respond, 1 = individuated preference, 10 = integrated preference. Maximum score = 20.

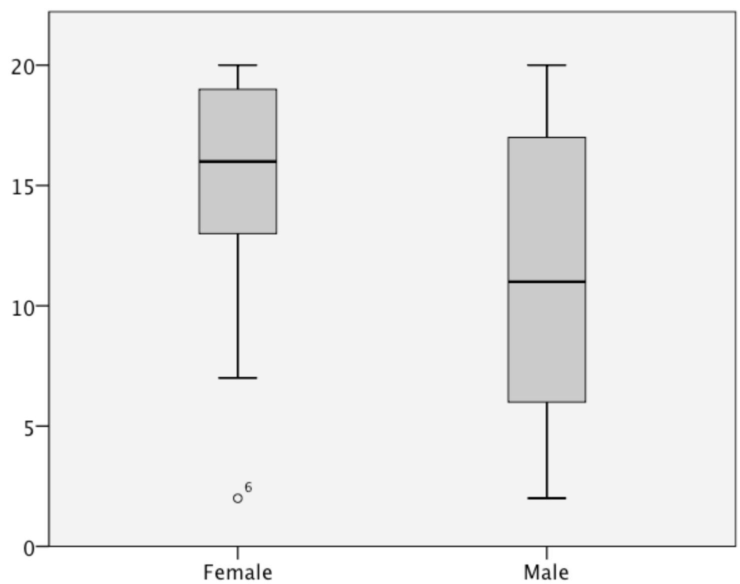


Figure 15. Boxplot, Interconnectedness of What is Being Learned, Individuated – Gender. For this scale 0 = individuated and 20 = integrated.

Class level. On the individuated preference scale, a statistically significant difference with a large effect size was found for class level (Table 29). Undergraduate students had lower mean scores compared to graduate students. This result indicated that the undergraduate students in this study had a stronger individuated preference than graduate students. Figure 16 provides a graphical representation of the result for class level on the individuated scale.

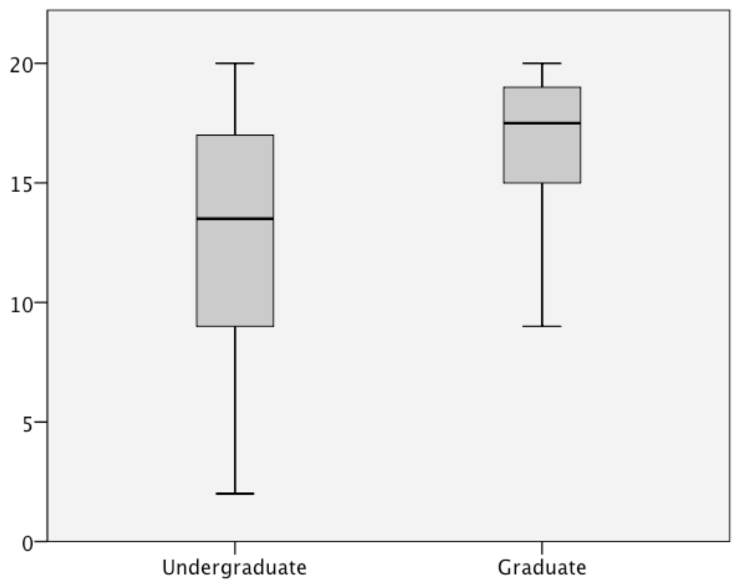


Figure 16. Boxplot, Interconnectedness of What is Being Learned, individuated – Class level. (0 = individuated and 20 = integrated).

***Qualitative analysis*.** The interview question asked, “Do you think what you learn in college is connected to your personal life and/or the world around you (consider: do you make connections between what you learn in college with the world around you and/or your personal life; if so, how do you make these connections; do these connections matter to you – why)?”

Student responses provided some understanding of the quantitative results, both overall and with regard to gender. The quantitative results identified a statistically significant difference on the individuated preference scale for gender that indicated male students had a more individuated preference than females. One male student explained,

> I make a conscious effort not to have my education and work relate to my personal life. I try to keep them separate . . . However, college is very much connected to my professional life.

The second male student said,

> I only take classes which I intend to apply in my life and work. I do not appreciate being forced to learn material which I do not see as relevant to myself since it is essentially a waste of time to learn something you will never use.

The four female student responses all reflected a more integrated preference for connecting school with their everyday lives. One of these students spoke about how all the courses she'd taken in her multidisciplinary sociology program have been interconnected and useful. She described her experience in a course,

> . . . called Nonviolent Alternatives [where] I am learning about my responsibility to be involved, accountable and educating others when it comes to protesting, mediation techniques, restorative justice and non-conflict communication in general.

Another female student spoke even more broadly about her education: "[what I learn in school] informs the decisions I make and it affects how I try to help my family members." The third female student shared even more inclusive and overarching ideas about the benefits of education: "To best understand and survive in the world, you must educate yourself on how and why it works the way it does." And the fourth female student said,

> I think to be well educated has everything to do with one's (personal) life. Not only is a basic education necessary for one to be a productive member of society

(understanding how to think critically is fundamental) but also university education is important in inspiring thoughts for the future, career, professionalism within one's chosen career, volunteerism, community involvement, parenting, etc. These connections are the foundation of life's purpose: to learn, to grow, to interact with people and be able to consider other points of view that might be different from one's own and to be respectful and empathetic as you contemplate alternate points of view.

The results of the quantitative analyses did not support Ke and Chávez's (2013) finding that ethnicity would influence preference on this construct. Ke and Chávez found that, "Hispanic and Native American students . . . discussed benefitting most from learning processes that facilitate connection between the subject of study and the world around, history, context, and their own lives" (p. 102) while "Northern European Caucasian American students . . . described a more compartmentalized way of thinking about teaching and learning" (p. 103).

Summary. This construct addressed whether students preferred to keep what they learn in college separate from their everyday lives or preferred to connect what they learn in college to their personal lives and the world around them. Statistically significant differences were identified on the individuated scale for age, gender, and class level. Younger students, male students, and undergraduate students had lower scores on the individuated preference scale which indicated they had a more individuated preference than older, female, and graduate students to keep school separate from other areas of their lives and believed they learned best with this separation. Overall results, however, on both preference scales indicated an integrated preference for all the students in this study.

The qualitative results suggested individual differences in male perception to take courses that directly support their career goals or specific interests than female students. The female students' responses, on the other hand, were philosophical and almost poetic, as they shared their thoughts on the overarching and far-reaching benefits of education. They spoke of education in terms of better understanding social issues and community involvement, "survival," and understanding and appreciating alternative points of view.

Responsibility for learning. The individuated-integrated cultural epistemologies for the Responsibility for Learning construct was defined by Ke and Chávez (2013) as:

Individuated: Learning is a private, individual activity. Responsible for one's own learning so that others are not burdened

Integrated: Learning is a collective, shared activity, Responsible for one's own and others' learning (p. 103)

Due to an oversight of the researcher after the final survey revision, only one item remained to measure the integrated preference scale, so it was excluded from further analysis. This construct was measured with only the individuated preference scale. The individuated preference scale addressed whether online students (a) preferred taking personal responsibility for their own learning, without relying on the support of their classmates, (b) believed they learn most naturally when they can figure things out for themselves, and (c) tended to focus more on their own work and rarely look to see what their classmates are doing. Table 30 provides the scale descriptions and items for this construct.

Table 30

Scale Description and Items, Responsibility for Learning

# of Items	Description/questionnaire items		*N*	Mean	SD	Range Min/Max	Alpha
	Individuated Preference Scale: 0-30	Integrated Preference					
3	**I prefer to take personal responsibility for my learning, and do not rely on the support of my online classmates.** **I learn most naturally when I can figure things out on my own.** **I tend to focus more on my own work, and rarely look at what my online classmates are doing.**	No analysis: Final survey items for this scale consisted of only one item, and it was excluded from analysis.	140	10.71	5.49	3-27	.66

Bold text denotes reverse-coded items so high scores indicated integrated preference.

Quantitative analyses. The construct was analyzed using both independent samples t-tests and ANOVA statistics to compare mean scores for all student characteristics. Statistically significant results are presented below, and all statistical tests are provided in Appendix K.

The results indicated that overall, most of the online students in this study had an individuated preference on this construct (Figure 17). This suggested that most of the students in this study (a) preferred taking personal responsibility for their own learning, without relying on the support of their classmates, (b) believed they learn most naturally when they can figure things out for themselves, and (c) tended to focus more on their own work and rarely look to see what their classmates are doing.

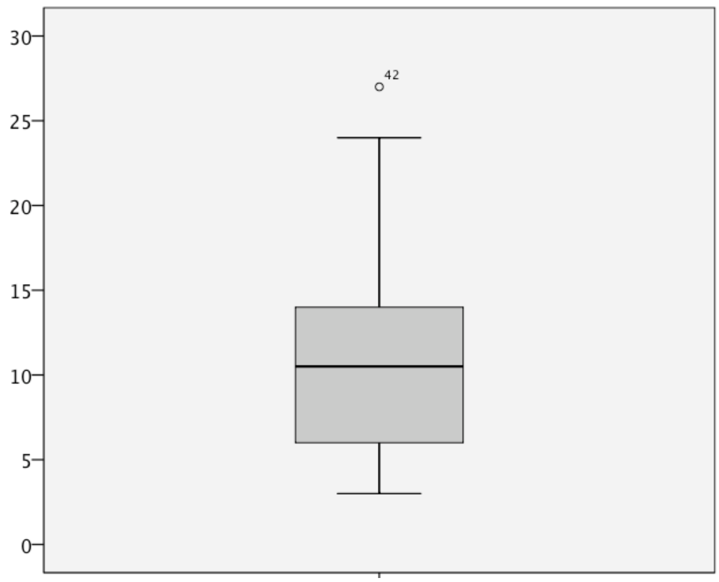


Figure 17. Boxplot, Responsibility for Learning, individuated – All student characteristics. (0 = individuated and 30 = integrated).

Ethnicity. Statistically significant differences were identified on the two-group comparison between Hispanic and White students, with higher mean scores reported for Hispanic students (M = 12.54, SD = 6.54) than for White students (M = 10.10, SD = 5.13; t (108) = 2.16, p = .033, two-tailed). The magnitude of the differences in the means (mean difference = 2.44, 95% CI: .2 to 5) was large (eta squared = .20).

A statistically significant difference in mean scores was also identified in the ANOVA test for all ethnicity group comparisons. Hispanic students mean scores were higher than Native American students with a medium effect size (Table 31). This result suggested that the Hispanic students in this study had a stronger integrated preference than Native American students. Figure 18 graphically illustrates the results for ethnicity.

Table 31

Responsibility For Learning, ANOVA Statistics

	N	Mean	SD	SE	Levene's Test	df	f	Sig (2-tailed)	Mean Diff (Tukey HSD)	CI-L	CI-U	Eta^2
Ethnicity												
1) N. Am	6	6.50	2.59	1.06					-6.04	4	9	
2) Asian	7	9.14	2.73	1.03						7	12	
3) Black	6	10.17	5.23	2.14						5	16	
4) Hispanic	39	12.54	6.54	1.05					6.04	10	15	
5) Two +	8	11.13	3.44	1.22						8	14	
6) White	71	10.10	5.13	.609						9	11	
Total	137	10.65	5.46	.466	$.032^{+}$*	5	1.97	.087		10	12	.07
						5	3.24^{+}	$.027^{+}$*				
						5	3.01	$.020^{+}$*				

$^{+}$ Due to violation of Levene's test (unequal variance), the Welch (second row) and Brown-Forsythe (third row) Robust Test of Equality of Means values are provided; * Statistical significance at <.05; Games-Howell post hoc mean differences were used to determine group differences. $^{+}$ Likert-type scales, 0 = Prefer not to respond, 1 = individuated preference, 10 = integrated preference. Maximum score = 30.

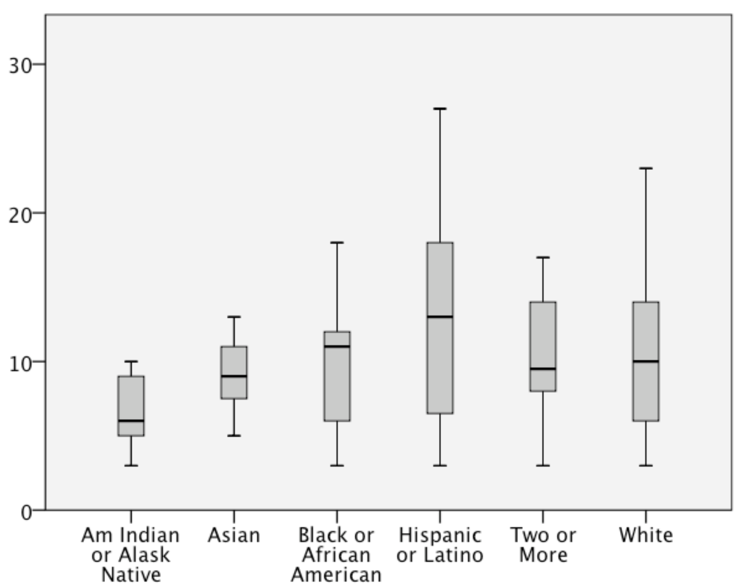


Figure 18. Boxplot, Responsibility for Learning, individuated – Ethnicity. (0 = individuated and 30 = integrated).

Although Hispanic students' mean scores were higher when compared with White students in the two-group comparison, and higher than Native American students when compared with all ethnicity groups, Hispanics students' mean scores didn't indicate a particularly strong integrated preference.

Qualitative analysis. The interview question asked, "Please share your thoughts on how you take personal responsibility for learning in your online classes. Consider: do you prefer to learn on your own; do you prefer to learn in groups – why?"

In addition to asking about personal responsibility, generally, the interview question specifically asked about group work to address the integrated preference that was not quantitatively analyzed.

Six of the seven students interviewed said they preferred to learn on their own, with responses that centered primarily on the logistical problems of group work in the online environment, rather than a lack of appreciation for engaging with their classmates. A couple of students explained that working together was best suited to particular subjects (i.e., Humanities) but also explained that group work could potentially get in the way of the flexibility and convenience that they expect from their online classes (i.e., the ability of students to complete their assignments and meet course deadlines in accordance with their own schedules), and potentially create even more work for some. For example, one student remarked,

> AY AY AY!!! I cannot stand working with a group to complete assignments! It makes everything more challenging in terms of coordination and I tend to be one of the better writers so not only do I have to write my own section, but then have to edit everyone else's!!

Three students remarked about how the actions of the instructor directly affected their motivation for taking personal responsibility for their own learning. One student explained,

> Poorly administered online classes are often essentially self-taught which, in my opinion, is not worth the money or effort required for them.

One of the graduate students' shared,

> My personal responsibility quickly dissolves into just doing the bare minimum to achieve an A. My personal responsibility seems to mirror the commitment of the faculty who is administrating the course . . . the majority of my online classes, have had minimally involved to completely absent faculty and my level of interest deteriorates to almost zero in these classes. I have a terrible time teaching myself content through 100% reading and as a consequence, it seems that I am just going through the motions, producing the answer they want to hear and never really absorbing/understanding the content.

The third student who had several years of online learning experience discussed some "disappointing" experiences he has had with faculty. He complained that online teachers "barely read [his] paper[s], and [he] still got an A[s]." In addition, he has felt that he often receives "very little feedback [and] was very disappointed in some of the quality of education" he has received. Based on these experiences, he has determined that ultimately, the responsibility of learning falls primarily on the individual student:

> If you wanna learn something, you can learn something in college. If you don't wanna learn something, you cannot learn something in college too because unfortunately, not every instructor is vested in your education.

One of the students offered an example of how her online instructor increased her motivation. She found that her learning was enhanced when the "faculty was involved in online discussions and [provided] weekly video virtual classrooms." She explained that both of these processes "inspired me to learn the content and do the readings and really make best use of the assignments for my own learning."

Of the seven students who were interviewed, only one voiced a preference for group work, "I prefer learning in groups. Everyone contributes their own knowledge, and we put it all together. I remember best when it has been discussed extensively in a group setting." Interestingly this student was the only student interviewed from the Hispanic ethnicity group. Unfortunately there were no students available from the Native American ethnicity group to discuss their ideas on this construct, which perhaps might have helped to provide a better understanding of why this student group had the lowest mean scores of all ethnicity groups.

The quantitative results overall did not support Ke and Chávez's (2013) findings that,

> Conceptions of responsibility for learning differ substantially between Native and Hispanic American and Northern European Caucasian American students. Individual self-reliance and responsibility primarily to self in a learning environment characterize Northern European Caucasian American student responses, while a deep sense of responsibility for peers and peer learning is common among Native, Hispanic, and Mestizo American students in this study. (p. 98)

Although statistically significant differences in mean scores were identified for Hispanic students when compared with White students, all ethnicity group mean scores were below the possible midpoint score of 15. The statistically significant difference identified for Hispanic and Native American students when all ethnicity groups were compared, indicated that

Native American students had the lowest mean scores of all groups. Unfortunately no insight could be gained from the student interviews for this result since there was no representation for Native American students.

Summary. The *Responsibility for Learning* construct was measured by the individuated preference scale which addressed whether online students preferred taking personal responsibility for their own learning, without relying on the support of their classmates, whether they believed they learn most naturally when they can figure things out for themselves, and whether they tend to focus more on their own work and rarely look to see what their classmates are doing.

The results indicated that the online Hispanic students in this study had the highest mean scores of all ethnicity groups, and therefore the strongest integrated preference. However, the Hispanic student groups' scores were below the possible midpoint of the scale which indicated an overall individuated preference for this group. Although the student interviews did not help to explain the statistically significant differences for ethnicity groups, they did provide insight for the overall individuated preference of all participants.

Primarily, the students discussed the logistical problems of working with others in their online courses, and felt that group work conflicted with their overall expectations for online learning – that it should be flexible to accommodate their already busy schedules, and allow them the convenience to complete their work on their own time, without having to rely on others.

Several students discussed the motivational role of the instructor in their online courses, and shared that a lack of instructor participation (i.e., interaction and feedback) reduced their motivation to do their best in their online courses.

Student interactions. The individuated-integrated cultural epistemologies for the Student Interactions construct was defined by Ke and Chávez (2013) as:

Individuated: Others' perspectives are optional for learning. Primarily rely on verbal messages; individuals are paramount, few streams of communication

Integrated: Others' perspectives are important to learning. High use of nonverbal; collective paramount and multiple streams of communication (p. 108)

The individuated preference scale for this construct addressed whether students thought the only interaction they needed in their online courses was with their instructor, and a whether students thought they learn well enough on their own without interaction with their classmates. The integrated scale addressed whether students felt their learning was enhanced through online interaction with their peers, and whether peer interaction helped them gain a deeper understanding of the course material. Table 32 illustrates the scale descriptions and items of the construct that was measured.

Table 32

Scale and Item Description, Student Interactions

# of Items	Description/questionnaire items		*N*	Mean	*SD*	Range Min/Max	Alpha
	Individuated Preference Scale: 0-20	Integrated Preference Scale: 0-20					
2	**The only interaction I really need in my online courses is with my instructor.** **I learn well enough on my own in my online courses, without any interaction with my classmates.**		139	9.23	4.91	2-20	.64
2		My learning is enhanced when I can interact with others in my online courses. Interacting with my online classmates helps me gain a deeper understanding of the course material.	139	11.27	5.5	2-20	.90

Bold text denotes reverse-coded items so high scores indicated integrated preference.

Quantitative analyses. Both individuated preference and integrated preference scales were analyzed using both independent samples t-tests and ANOVA statistics to compare mean scores for all student characteristics. Statistically significant results are presented below, and all statistical tests are provided in Appendix L.

The overall mean scores for all student characteristics on the individuated preference scale suggested an individuated preference. This result indicated that most of the online students in this study were more inclined to think that the only interaction they need in their online courses is with their instructor, and that they learn well enough on their own without interaction with their classmates.

The overall mean scores for all student characteristics on the integrated preference scale suggested an integrated preference. This result suggested that all the online students in this study thought their learning was enhanced through online interaction with their peers, and that peer interaction helped them gain a deeper understanding of the course material.

Taken together, the results of both scales for this construct suggested that overall, students can appreciate the value in opportunities for working with their peers to enhance their learning, but it is not absolutely necessary for their learning. Students seem to find that they can function well enough on their own, but can also appreciate interaction with their classmates. Figure 19 shows both scales for all student characteristics for the Student Interactions construct.

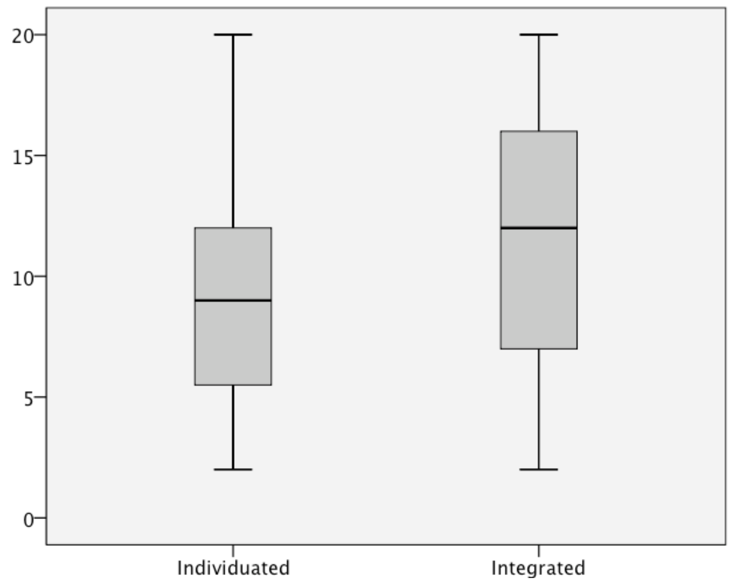


Figure 19. Boxplot, Student Interactions – All student characteristics. (0 = individuated and 20 = integrated).

Statistically significant differences were identified on the individuated preference scale for age and class level. Both younger students and undergraduate students had lower scores (more individuated preference) than older students and graduate students which suggested they were more likely to believe that the only interaction they need in their online courses is with their instructor, and that they learn well enough on their own without interaction with their classmates.

Age. The youngest age group (22 and younger) had the lowest mean scores (M = 7.43, SD = 4.35) for all age groups with a statistically significant difference compared with age group 5 (41-45): (M = 12.40, SD = 3.86): F (7, 131) = 3.09, p = .005, with a large effect size (eta squared = .14). Figure 20 provides a graphical representation of the results for age, and shows that the three youngest age groups (through age 34) had lower mean scores than students aged 35 and older.

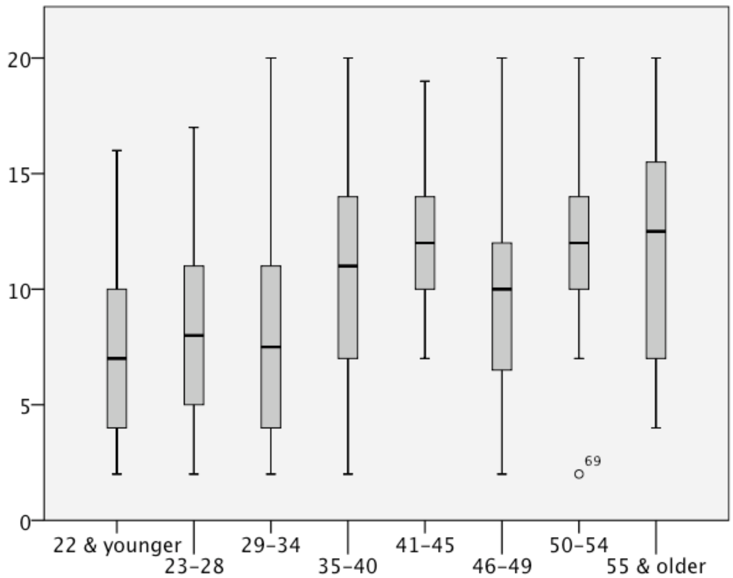


Figure 20. Boxplot, Student Interactions, individuated – Age. 0 = individuated and 20 = integrated.

Class Level. Statistically significant differences were identified for class level, with lower mean scores reported for undergraduate students (M = 8.51, SD = 4.74) compared to graduate students (M = 10.90, SD = 4.94): t (137) = -2.7, p = .008, two-tailed). The magnitude of the differences in the means (mean difference = -2.4, 95% CI: -4 to -.65) was large (eta squared = .24). Figure 21 graphically illustrates the results for class level on the individuated preference scale.

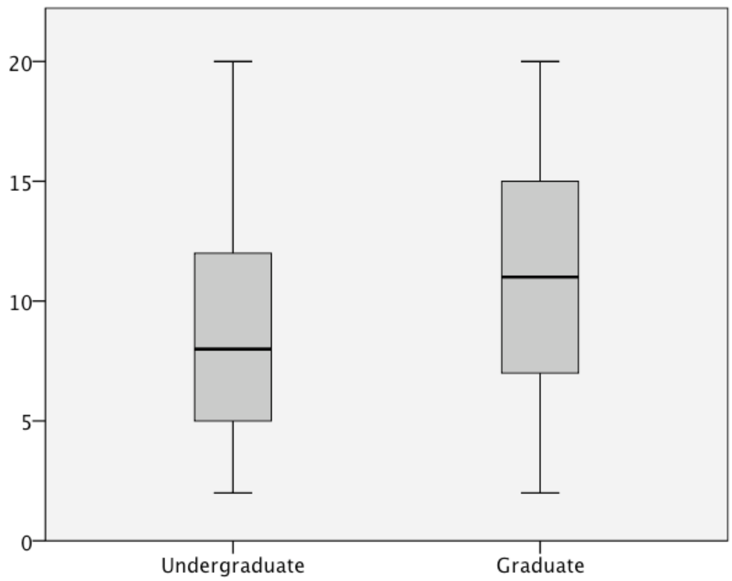


Figure 21. Boxplot, Student Interactions, individuated – Class level. (0 = individuated and 20 = integrated).

Although statistically significant differences were identified for age and class level on the individuated preference scale, the overall mean scores for all student characteristic groups suggested an individuated preference. This result indicated that most of the online students in this study, and particularly younger, undergraduate students, were more inclined to think that the only interaction they need in their online courses is with their instructor, and that they learn well enough on their own without interaction with their classmates.

Qualitative analysis. The interview item asked, “Please describe why peer interaction is important to you or not in your online classes…”

Student responses helped to provide greater insight for the overall quantitative results for both preference scales. In general, most of the students’ responses reflected their views of online discussion forums as the way they were most likely to interact with their classmates in online classes. The general consensus of all the students interviewed was that student interaction was useful, however, the methods most often used (discussion forums) can be problematic.

Three of the students described the beneficial aspects of peer interaction, with two who discussed the importance of learning from multiple perspectives and one student who noted a motivational aspect to online student interaction:

> Although [peer interaction] is not critical, it is certainly helpful. It is far too easy to fall behind in the class if there is no interaction. Also complicated topics are easier to understand if they are discussed among the students, but online chat/discussion boards are not very effective in that regard.

Other students provided specific examples of why they do not prefer to work with their classmates in online classes. One student explained, “I don’t really enjoy studying with other people, although I do so from time to time.” She went on to say that she doesn’t “mind group projects – as long as everyone pulls their weight.” Another student, in response to a follow-up question that asked, “Do you value your classmates’ responses in your online classes (would you read them if they weren’t required?),” said,

> Mostly no, I don’t value them, as they are mandated responses and often not offering any new idea (just regurgitation of material that I have already read). Additionally, classmate’s responses are often incorrect and rarely does the teacher correct the response, so it becomes confusing. Only occasionally, and depending on the question at hand will I read classmate’s responses and hear a novel idea or perspective.

Similarly, another student replied, “I am not sure if there is peer interaction,” and noted that all too often required peer replies in discussion forums are superficial without “honest questions or information related directly to” the original post.

The results of the quantitative analyses did not support Ke & Chávez’s findings that ethnicity would determine individuated-integrated preference on the construct. Student responses did however show similarities with Ke & Chávez’s findings that “Although participants generally value peer discussions, not all deem collaborative inquiry for meaning making.” They also reported, “similarity across cultural groups” however, the students in their study described logistical matters as the primary issue affecting interaction with their classmates, while the students in the current study described the instructional method, or interaction approach (i.e., discussion forum), as the primary issue.

Summary. The overall results for this construct indicated that the online students in this study had both individuated and integrated preferences on the *Student Interactions* construct. It appeared that even though online students believe they can learn well enough on their own, and interacting with only their instructors, they can also appreciate that interaction with their classmates enhances their learning and helps them gain a deeper understanding of the course material. Interestingly, the younger students (age 28 and younger) and undergraduate students had stronger individuated preferences on the individuated preference scale than older and graduate students.

The student interviews revealed that the problem might lie with the how the interaction methods are used. Required discussion forum postings, for example, where all students are required to respond to the same question or prompt, can be superficial and devoid of true peer interaction. This appears to be a fairly typical method used for peer interaction in online courses, and one that requires further investigation and revision.

Summary for Research Question 1. This research question examined the influence of student characteristics (age, gender, class level, and prior experience) on college online students' preferred ways of learning on five of Ke and Chávez's individuated-integrated *Cultural Constructs of Teaching and Learning*. Table 33 provides an overview of the results and the following sections summarize the main findings.

Purpose of Learning – The students in this study primarily viewed a college degree as a means to become self-sufficient, independent, and to support themselves (individuated preference). Students described the relationship between their education and their careers and/or income. Although students acknowledged the connection between their college degree and the expectations of their family and community (integrated preference), it appeared to play a secondary role as a motivating factor. Statistically significant differences were identified for age and class level. Both younger students (28 years old and younger) and undergraduates had stronger individuated and integrated reasons for pursuing a college degree than older and graduate students.

Ways of taking in and processing knowledge – All students had a strong integrated preference, which indicated that they preferred to (a) use a variety materials (i.e., videos, podcasts, and visuals such as charts, diagrams, concept maps), (b) use their intuition and emotions to help them, (c) use their intellect and other senses when they learn, (d) apply flexible learning approaches dependent on the task, and (e) they thought their learning processes were developed in informal settings through interactions with family or community. Student interviews revealed that they tend to freely and fluidly use their intellect, intuition, emotions and other senses depending on the subject, topic, or task at hand. The use of reflection as a key component of their online learning processes was also revealed.

Table 33

Results of the Influence of Student Characteristics for Research Question 1

Construct	Characteristics of Statistical Significance		Overall Findings
	Individuated	**Integrated**	
Purpose of Learning	Age, Class Level* Younger and undergraduate students: more IND preference	Age, Class Level* Younger and undergraduate students: more INT preference	Individuated and Integrated Preference Students had both preferences, but more IND preference
Ways of Taking In and Processing Knowledge		Gender Male students: more INT	Integrated Preference
Interconnectedness of What is Being Learned	Age, Gender, Class Level* Younger, male, and undergraduate students: more IND preference	No Significance	Integrated Preference
Responsibility for Learning	Ethnicity Hispanic students, compared to White and N. American students: more INT preference		Individuated Preference
Student Interactions	Age, Class Level* Younger and undergraduate students: more IND preference	No Significance	Individuated and Integrated Preference Students had both preferences, but more IND preference

* Age and class level had a medium positive correlation. IND = Individuated, INT = Integrated; Shaded scales represent constructs that were not analyzed.

Statistically significant differences for gender were identified with higher integrated mean scores for male students compared with female students, however both genders' scores indicated an overall integrated preference for both groups.

Interconnectedness of What is Being Learned – Students had an overall integrated preference which suggested that the online students in this study (a) try to figure out how what they learn in school connects with their everyday lives and the world around them, (b) they would like their instructors to encourage them to connect what they learn to other courses in their major, and (c) relate what they learn to their personal experiences and the world around them, and (d) they believe that they learn best when they can make these connections. Younger students (28 and younger), male students, and undergraduate students had a stronger individuated preference than older, female, and graduate students to keep school separate from other areas of their lives. The male students who were interviewed had a stronger, more selective focus on taking courses that directly support their career goals or specific personal interests, while female students' responses were philosophical as they spoke about the overarching and far-reaching benefits of education.

Responsibility for Learning – The students in this study (a) preferred taking personal responsibility for their own learning, without relying on the support of their classmates, (b) believed they learn most naturally when they can figure things out for themselves, and (c) tended to focus more on their own work and rarely look to see what their classmates are doing. The Hispanic students in this study had the highest mean scores of all ethnicity groups, and therefore the strongest integrated preference. However, all online student ethnicity groups, including the Hispanic group had mean scores that indicated an overall individuated preference. Primarily, the students discussed the logistical problems of working with others in their online courses, and felt that group work conflicted with their overall expectations for online learning – that it should be flexible to accommodate their already busy schedules, and allow them the convenience to complete their work on their own time, without having to rely on others. Several students discussed the motivational role of the instructor in their online courses, and shared that a lack of instructor participation (i.e., interaction and feedback) reduced their motivation to do their best in their online courses.

Student Interactions – Students had both individuated and integrated preferences on this construct. Students believed they can learn well enough on their own, interacting with only their instructors, but they can also appreciate and value interaction with their classmates. The younger students and undergraduate students scores indicated they had a stronger individuated preference. Student responses suggested that required discussion forum postings can be superficial and devoid of true peer interaction.

Research Question 2. How do student characteristics influence online college students' online interaction preference (synchronous versus asynchronous)?

This construct was included in the study to investigate another point presented in Ke and Chávez's (2013) study. They found "Some students interviewed expressed a marked preference for asynchronous written class discussions, while others preferred synchronous written chats and/or class sessions where participants can hear and interact with others" (p. 108). They were unable to identify cultural differences for the preference, and suggested instead that it might be attributed more an individual's internal or external ways of processing than to ethnicity. This research question was posed to investigate whether student characteristics might influence student preference for synchronous versus asynchronous interaction in the online environment.

This construct addressed whether online students found either written discussions (asynchronous interaction) or web conferences (synchronous interaction) more engaging. The asynchronous preference sought to determine whether students enjoyed written discussions primarily for the time allowed for reflection, or web conferences, primarily for the opportunity to receive immediate feedback (with instructors and/or peers). Table 34 illustrates the scale and item description.

Table 34

Scale and Item Description, Online Interaction Preference

# of Items	Description/questionnaire Items Scale: 0-40	*N*	Mean	*SD*	Range Min/Max	Alpha
4	**In general, I think live web conferences are more engaging than written discussions in my online courses.** **I prefer real-time web conferences in my online courses because I can receive immediate feedback from my instructor and classmates.** In general, I find written discussions more engaging than live web conferences in my online courses. I prefer written discussions in my online courses because they allow me time for reflection.	140	24.78	9.67	4-40	.84

Bolded text = Reverse coded items so high scores indicated asynchronous preference.

Quantitative analyses. Both independent samples t-tests and ANOVA statistics were used to compare mean scores for all student characteristics. Statistically significant results are presented below, and all statistical tests are provided in Appendix M.

The overall result suggested that the students in this study had a stronger preference for asynchronous online interaction using the discussion forum tool than synchronous interaction using the web conference tool (Figure 22).

Gender. Statistically significant differences were identified for gender. Female students had higher scores (M = 25.88, SD = 9.40) compared to male students (M = 22.21, SD = 9.94; t (138) = 2.08, p = .039, two-tailed) which indicated that female students preferred asynchronous online interaction using the discussion forums more than male students. The magnitude of the differences in the means (mean difference = 3.7, *CI*: .18 to

7.2) was statistically large (eta squared = .19). Figure 23 graphically illustrates the results for gender.

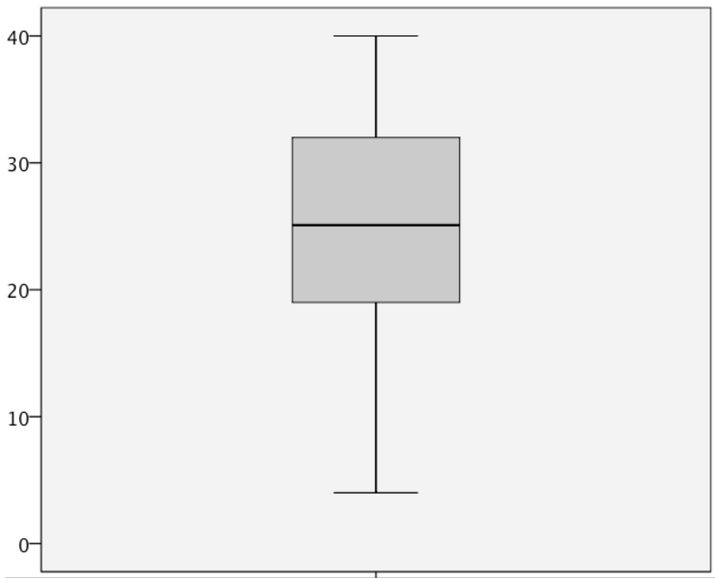


Figure 22. Boxplot, Online Interaction Preference – All student characteristics. (0 = synchronous and 40 = asynchronous).

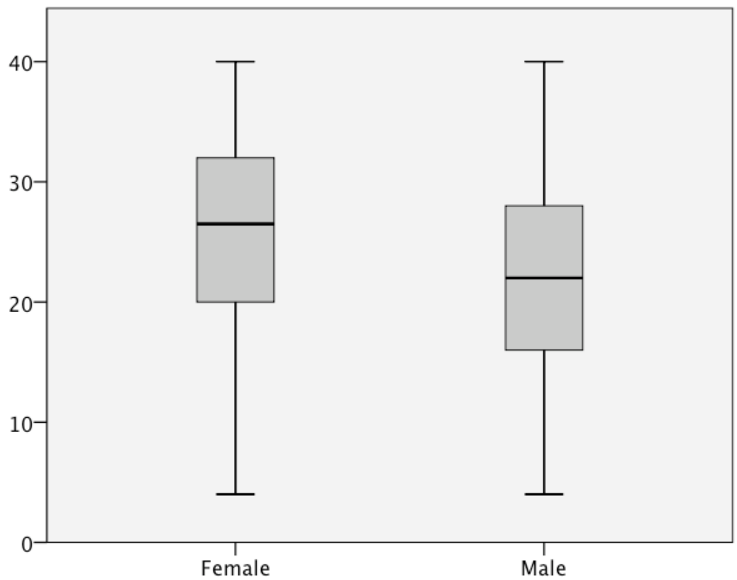


Figure 23. Boxplot, Online Interaction Preference - Gender. (0 = synchronous and 40 = asynchronous).

Qualitative analysis. The interview item asked, “Please tell me if you have a preference for synchronous (i.e., web conference) or asynchronous (i.e., discussion forums) interaction in your online classes (consider: is one type more effective for you, and why).”

Table 35 provides quick reference of student responses for gender, prior online experience, asynchronous versus synchronous preference, and primary reason for their choice.

Table 35

Student Interviews: Synchronous versus Asynchronous Preference

Gender	Prior Online Experience (number of classes)	Preference	Primary reason
Female	4+	Asynchronous	Flexible time to participate
Female	2	Asynchronous	Flexible time to participate
Female	2	Asynchronous	Flexible time to participate
Male	4+	Asynchronous	Flexible time to participate
Female	4+	Synchronous	Might prefer it, but no synchronous online experience
Female	4+	Synchronous	Efficient communication; Teacher presence: Interaction
Male	3	Synchronous	Interaction and immediate feedback

Four out of the seven students interviewed explained that their asynchronous preference was due primarily to the flexibility and convenience they expect from their online courses. Generally, they felt that asynchronous interaction was better suited to accommodating their busy lives so they could participate at their convenience, rather than having to add a web conference meeting to their already full schedules.

For example, one student explained, “So I have all these other responsibilities in life that actually have more importance in my life, such as my career, my family, all those other things.” Another student with a similar view noted the additional benefit of participating in ongoing text-based discussions:

> I can go back and view/add additional comments in addition to participating when it is best for me. When web conferencing with specific times comes into play I think of it more as starting to look like a hybrid class.

While it’s clear that all of the students interviewed had experienced asynchronous online interaction using discussion forums, it’s not clear if they had all experienced synchronous web conferences. For example, one student explained that she would prefer synchronous interaction even though she had "never had that opportunity."

Another student without online synchronous interaction experience held the opposite view (this student noted an asynchronous interaction preference):

> I would find the web conference cumbersome and would prefer not to learn that way. It would be distracting. I prefer to learn on my own and would actually rather just take a final and whatever I get on that would be my grade for the class.

Two of the three students who expressed a synchronous online interaction preference had web conferencing experience, and described why they preferred them to online discussions. One of them shared, "Synchronous courses are better since they demand attendance and allow interaction and immediate feedback. This may be dependent on the topic since some topics may be better suited for long, written responses."

The second student went into great detail to describe the motivational aspect of real-time interaction, especially with her instructor. She explained that only one out of five online courses had used synchronous web conferences (along with asynchronous discussion forums) and she described it as "by far the best online class I have had to date." She explained,

> The teacher only met with us this way for 1 hour per week, however it was enough to make it seem like a real class with a real teacher and one who cared about our learning to boot! Her personal interaction with us through the live web conference helped me feel connected and helped instill my inner drive to work to understand most of the subject matter on my own. I knew that if I didn't understand something I could ask her live countenance to clarify the following week.

These two students went on to share their thoughts on asynchronous discussion forums. One of them said that discussion forums,

> are ok for posting questions about assignments or announcements, but they are often not helpful as a discussion medium since it often takes too long for replies. This may be dependent on the topic since some topics may be better suited for long, written responses.

And the other student described that most of her online courses

> . . . involve only reading and discussion boards. The faculty have joined into the discussion boards from regularly but minimally to absolutely never. An online class that I am currently in has a faculty person who never comments on discussions and it feels like I am being gipped to be paying for a faculty person to teach me content when the faculty person is absent.

These comments show that some students need synchronous interaction in their online courses to help facilitate their learning. Some students find real-time interaction necessary, whether due to the complexity of a particular course subject, to expedite communication, or to establish teacher presence and thereby increase personal motivation.

Summary for Research Question 2. The student interviews supported the quantitative findings that the majority of students (and the majority of females) had an asynchronous online interaction preference. All of the students who expressed an asynchronous preference noted the flexibility and convenience of the discussion forum. Many students choose online courses because they have other responsibilities (i.e., family, job) and they have an expectation that their online courses should be flexible and convenient to meet their needs; they do not want to have to worry about attending scheduled synchronous web conferences.

On the other hand, there are students who prefer synchronous online interaction. Synchronous interaction allows students to have more direct access to their instructors and classmates. Some students find real-time interaction necessary for their learning, whether due to the complexity of a particular course subject, to expedite communication, or to establish teacher presence to increase personal motivation. Even though the asynchronous discussion forum may pose certain issues such as the potential lack of instructor interaction and lack of immediate feedback, the results indicated that it is still preferred by most of the online students in this study.

Research Question 3. How do student characteristics influence online college students' learning environment preference (online versus face-to-face)?

This question was added to the survey based on the observation by Ke and Chávez (2013) that the Native American students in their study described that "the 'hands-on, doing' (bodily/kinesthetic) nature of online courses [were] more natural to their learning process and point[ed] out that within an online learning context they have 'more time for reflection (intrapersonal) before responding' consistent with their own cultural norms" (p. 101). This research question was posed to investigate whether student characteristics might influence student preference for an online versus face-to-face learning environment.

The construct was measured with items that asked student to compare their online and face-to-face experiences. There were five online-focused items that addressed whether students (a) felt more comfortable online, (b) tended to have a stronger connection with their online teachers, (c) tended to engage more deeply with their subjects, and (d) tended to engage more easily with their classmates. The four face-to-face focused items addressed whether students (a) preferred the social aspect of face-to-face courses, (b) preferred face-to-face learning because it was more familiar, (c) tended to feel isolated in online courses, and (d) didn't think they could learn as well online. Table 36 illustrates the scale and item description.

Table 36

Scale and Item Description, Learning Environment Preference

# of Items	Description/questionnaire Items Scale: 0-80	*N*	Mean	*SD*	Range Min/Max	Alpha
8	In general, I feel more comfortable in my online courses that I do in my face-to-face courses. I tend to have a stronger connection with my instructors in online courses than with my instructors in face-to-face courses. I tend to engage more deeply with the subjects I take in online courses than I do in face-to-face courses. I tend to engage more easily with my online classmates than my face-to-face classmates. **I prefer the social aspect of my face-to-face courses.** **I prefer face-to-face courses because they're what I'm most used to.** **I tend to feel isolated from my instructor and classmates in my online courses.** **I just don't think I can learn as well online as I can in face-to-face courses.**	140	41.78	17.75	8-80	.88

Bolded text = Reverse coded items so high scores indicated online preference.

Quantitative analysis. Both independent samples t-tests and ANOVA statistics were used to compare mean scores for all student characteristics. Statistically significant results are presented below, and all statistical tests are provided in Appendix N.

The overall results suggested that the online students in this study had a slight online environment preference (Figure 24).

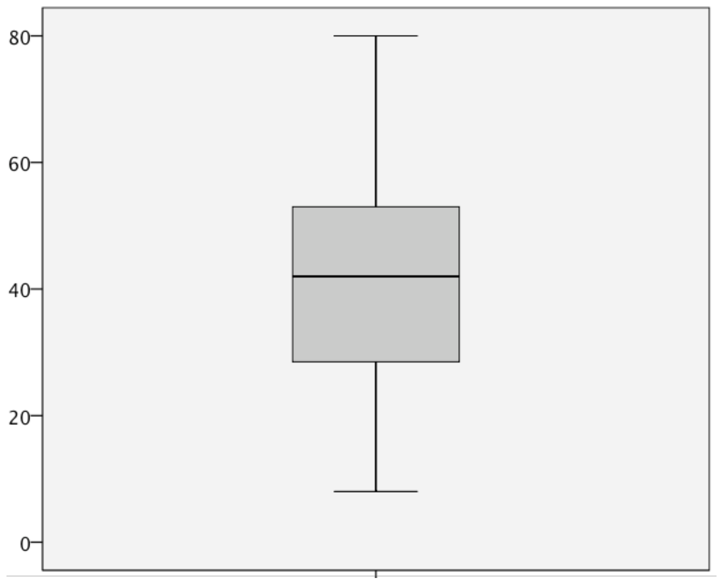


Figure 24. Boxplot, Learning Environment Preference – All student characteristics. 0 = face-to-face and 80 = online.

Prior Online Experience. Statistically significant differences were identified for prior online experience. Students who had taken four or more online courses had higher scores (M = 44.49, SD = 18.15) than those with fewer than four online courses (M = 37.88, SD = 16.72; t (137) = 2.18, p = .031, two-tailed). This finding indicated that students with more online course experience preferred the online learning environment compared to students with less experience. The magnitude of the differences in the means (mean difference = 6.60, CI: .61 to 12.6) was statistically large (eta squared = .19). Figure 25 graphically illustrates the results for prior online experience.

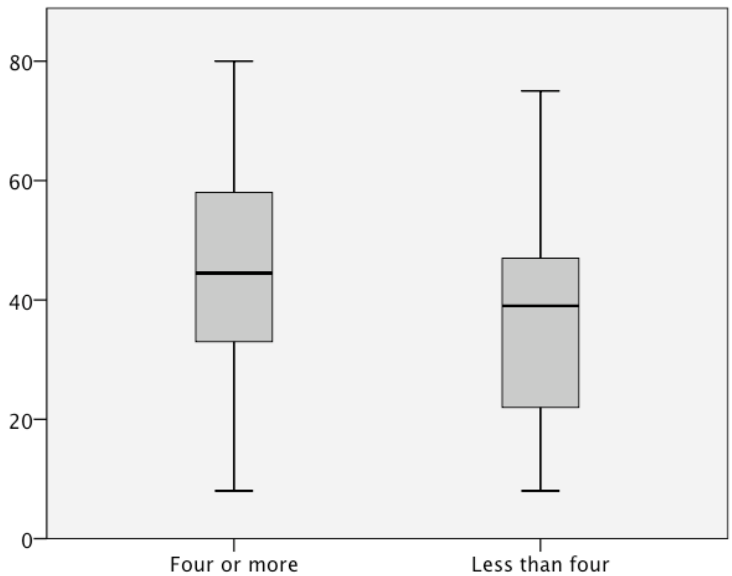


Figure 25. Boxplot, Learning Environment Preference – Prior online experience. 0 = face-to-face and 80 = online.

Qualitative analysis. The interview item asked, “Please describe whether you prefer online or face-to-face classes and why.”

The interview responses helped to provide some insight for the quantitative results. Table 37 provides quick reference of student responses for prior online experience, online versus face-to-face preference, and primary reason/s for their choice.

Table 37

Student Interviews: Online versus Face-to-Face Preference

Prior Online Experience (number of classes)	Preference	Primary reason
4+	Online	Flexibility
4+	Online	Less effort required (in the past)
4+	Face-to-Face	Older student, more familiar with f2f; Dynamic interaction; Expedient feedback, Clarity of communication; Verbal and nonverbal physical cues
4+	Face-to-Face	Older student, more familiar with f2f
3	Face-to-Face	Two-way interaction; Develop relationships; Increased learning potential; Motivation
2	Face-to-Face	Online instructors are more “facilitators” than teachers;
2	Face-to-Face	People person; Likes interaction

While only two of the seven students interviewed expressed their preference for the online learning environment, all the students acknowledged that the flexibility that online courses provide to accommodate their busy lives was particularly important. For the five students who expressed a face-to-face preference, the flexibility of online courses overrode their learning environment preference. For example, one student shared, “I would prefer the traditional face-to-face classes if I didn’t have to work full-time.”

The two students who expressed an online learning environment preference each provided insight for their choice. One student who had initially taken online courses for their flexibility and convenience, now prefers them. She described a situation of returning to face-to-face courses after attending only online courses:

> The few face-to-face classes I took last summer and fall were even more frustrating than some I took a few years ago. There were consistent technology issues in the room and/or the instructor did not know how to use the technology. Too many people talking/texting during instruction so [it was] very distracting.

The second student with an online learning environment preference had the most online course experience of all those interviewed, and was able to provide a historical account of his online learning experience. He shared, “I prefer online because it initially required less effort than a face-to-face, but that has evolved over time.” As online courses have evolved, he has found that he now needs to spend twice the amount of time to complete course work than he did previously. When the researcher asked if he thought this has to do with online courses attempting to replicate the face-to-face classroom environment, he said, “I think they are trying to match, but the problem is I think they're going overboard.” He explained,

> … in a traditional university, typically, you could sit in the classroom with the other 50 or how many students during that hour or two and maybe participate minimally. While in an online course, you have that little tracker, the thing where they say, ‘Oh you have to participate twice a week or something’ or they monitor you with how many posts you put in there and stuff. So now they have a quantitative way to measure you, while typical face-to-face is a like a kind of a qualitative. ‘Oh yeah, you rose your hand a couple times or you were trying to, you tried to discuss.’ But what will happen is during that hour during a traditional, if you got one student that dominates the conversation or they get into a good discussion with the instructor, does that distraction technique, the instructor's not gonna hold everybody accountable that didn't participate. While [in] a online course, you're gonna be held accountable because you had the opportunity.

These two student perspectives are quite different from one another, but both of them provide insight into online learning preferences. The first student response speaks to how students may become increasingly comfortable with online learning so that the face-to-face environment is less desirable. The second response speaks to the idea that online learning methods tend to overcompensate for lack of face-to-face interaction, and place substantial additional burden on online students by making them prove they are participating (i.e., required numbers of discussion forum postings).

The five students interviewed who expressed a face-to-face learning environment preference described a variety of reasons for their choice. Two students mentioned age and familiarity as possible reasons for their preference. One student explained, “My preferences are always gonna be in class, just because I'm older, that's how I've always done it.” And the other student said, “Maybe I am just too old for the online modality and I have learned over 40 years the best way for me to learn is to hear it explained to me and to then go home to read it to reinforce it.”

Additional reasons given for why students preferred face-to-face courses included the benefits of live interaction, nonverbal cues, building relationships for enhancing learning and motivation, expediency and efficiency of communication, and instructor participation. One student explained,

> I prefer face-to-face classes. Again, because I think when it's a live dynamic, the interchange can be better. And the teacher, if they're perceptive and on the ball, can see where people aren't understanding things and maybe need to supplement, or things like that.

Another student discussed how the face-to-face environment was better suited to build relationships. He said that face-to-face learning,

> allows [the] development of relationships among the students and with the instructor. These relationships are important not only in the learning of the class material, but for support in the learning experience in general. It is far easier to remain engaged and enthusiastic about a class if you are working together with other individuals and can encourage each other and work together on the material.

Most of the student comments from those with a face-to-face preference focused on what they didn't like about their online courses. Speaking about a lack of expediency and efficiency of communication that can occur in online courses, one student described that text-based discussion is "laborious" and prone to miscommunication.

The interviews brought to light the importance of instructor participation in online courses. Two students described how a lack of instructor participation in their online courses was detrimental to their learning. One student said,

> I don't view the professor as a real teacher as they are more of a facilitator. I can't envision it changing in the near future. The only times I have needed help they professors took a long time for them to respond. They are unflexible always and unhelpful mostly. I don't feel I have learned anything from the teachers online it's all been from me being self-motivated.

And the other student added,

> Teaching an entirety of my class content to myself through reading books is not only boring but also not an effective way for me to obtain a thorough understanding of content.

The student responses for those with a face-to-face learning environment preference revealed that some students might prefer face-to-face courses because they are most familiar with them. Live interaction, particularly with the instructor, was highlighted in the interview responses as highly beneficial to learning, and one student brought forth the idea that building relationships with peers and instructor were more easily made in person, and that these relationships improved learning and fostered motivation. Most students described issues they had experienced in their online courses, such as lack of nonverbal cues, lack of expediency and efficiency of communication, and lack instructor participation (i.e., feedback).

Summary for Research Question 3. Research Question 3 sought to measure the influence of student characteristics on learning environment preference, online versus face-to-face. The overall quantitative results indicated a slight online preference for the students in this study. This result was supported by the overall qualitative responses, in which all seven students explained that they chose online courses primarily for the flexibility and convenience they afford to accommodate their busy lives. In particular, flexibility and convenience refers to the ability of students to complete their assignments (i.e., meet course deadlines) in accordance with their own schedules.

The quantitative findings identified statistically significant differences in the prior online experience demographic, where students with four or more online courses had higher scores than students with less than four courses. This indicated that students with more online experience had a higher online learning environment preference than students with less experience. While the student interviews didn't directly support this finding, their perspectives on learning environments were both insightful and illuminating.

The majority of the students who were interviewed noted a face-to-face learning environment preference. One of these students discussed that building relationships with both instructor and peers was easier in person, and that these relationships enhanced his learning and fostered motivation. Others commented on various benefits of face-to-face learning which they often found lacking in their online courses: (a) live interaction, and the ability of both instructors and students to perceive both verbal (i.e., tone of voice) and nonverbal (i.e., facial expression) cues, (b) expediency and efficiency of communication (i.e., immediate feedback), and (c) instructor participation.

Two other important comments suggested that online students may become increasingly comfortable with the online learning environment so that the face-to-face environment becomes less desirable, and online learning methods tend to overcompensate for lack of face-to-face interaction, and therefore place substantial additional burden on online students by making them prove they are participating (i.e., required numbers of discussion forum postings).

Both the quantitative and qualitative results indicated that students take online courses primarily for the flexibility and convenience they provide, and even though some students might have strong dislikes about their online courses, they are willing to struggle through them to achieve their academic goals. The findings also support recent research that has identified prior online experience as a predictor of learning environment preference (Arbaugh, 2014). Contrary to recent research (Arbaugh, 2014) , however, no statistically significant differences were identified for gender in the current study.

Chapter Summary

This chapter presented the results of the two-phase mixed methods study conducted to determine the influence of student characteristics on college students' (1) preferred ways of learning on an individuated-integrated cultural constructs model as defined by Ke and Chávez (2013), (2) online interaction preference, synchronous versus asynchronous, and (3) learning environment preference, online versus face-to-face. The student characteristics in this study consisted of age, gender, ethnicity, class level, and prior online experience. Table 38 provides an overview of the results.

Table 38

Overall Results of the Influence of Student Characteristics, All Constructs

Research Question	Construct	Characteristics of Statistical Significance		All Student characteristics, Overall
		Individuated	**Integrated**	
1	Purpose of Learning	Age, Class Level* Younger and undergraduate students: more IND preference	Age, Class Level* Younger and undergraduate students: more INT preference	Individuated and Integrated Preference Students had both preferences, but more IND preference
	Ways of Taking In and Processing Knowledge		Gender Male students: more INT	Integrated Preference
	Interconnectedness of What is Being Learned	Age, Gender, Class Level* Younger, male, and undergraduate students: lower IND scores than older, female, and graduate students.	No Significance	Integrated Preference
	Responsibility for Learning	Ethnicity Hispanic students, compared to White and N. American students: more INT preference		Individuated Preference
	Student Interactions	Age, Class Level* Younger and undergraduate students: more IND preference	No Significance	Individuated and Integrated Preference Students had both preferences, but more IND preference
2	Online Interaction Preference	Gender Female students: more asynchronous preference		Asynchronous Preference
3	Learning Environment Preference	Prior Online Experience Students with 4 or more online classes: more online preference		Online Preference

IND = Individuated, INT = Integrated; Shaded scales represent constructs that were not analyzed. * Age and class level had a medium positive correlation.

The impetus for Research Question 1 was the work of Ke and Chávez (2013). From their mixed methods research, eight cultural constructs had emerged. Each of the constructs consisted of two cultural epistemologies, individuated-integrated, that were situated along a left-to-right continuum, respectively. Their results suggested that ethnicity was the primary determinant factor of students' individuated-integrated preferred ways of learning on the constructs. Ke and Chávez findings suggested that Native and Hispanic American students would have more integrated preferences and White students would have more individuated preferences. *The Preferred Ways of Learning Survey* (PWLS) was created, in part, to quantitatively measure their findings.

Of the five individuated-integrated *Cultural Constructs of Teaching and Learning* that were investigated the ethnicity learner demographic appeared to have little to no bearing for the students in this study, while age, gender, and class level figured more prominently as determinants of online students' preferences. Statistically significant differences for ethnicity were identified on only the *Responsibility for Learning* construct, however, the result only partially supported Ke and Chávez's findings. Hispanic students had the highest integrated preference scores of all ethnicity groups, but Native American students' had the lowest scores. On three of the five individuated-integrated cultural constructs, both younger and undergraduate students had stronger individuated preferences compared to older and graduate students. The similarity in findings for age and class level was partially explained by the statistically medium correlation of both groups.

The results of the *Online Interaction Preference* construct in Research Question 2 indicated that the students in this study had an overall asynchronous preference for the discussion forum tool rather than a synchronous preference using the web conference tool.

Statistically significant differences were identified for gender, and indicated that female students had a higher asynchronous preference compared to male students.

Learning Environment Preference was investigated in Research Question 3. This construct addressed whether online students preferred online or face-to-face learning environments. The overall result suggested that the online students in this study had a higher preference for the online learning environment. Statistically significant differences were identified for prior online experience, and indicated that students with more online course experience preferred the online learning environment compared to students with less experience.

With increasing numbers of younger student online enrollment (i.e., students of traditional college age) as well as ongoing female majority online enrollment, these results help to provide a snapshot of contemporary online student characteristics and some of their preferences for effective online learning. Chapter 5 will provide additional discussion of the results presented in this chapter and will note the implications for future research and for effective online teaching practices.

Chapter 5

Discussion and Conclusion

This chapter provides a summary of the study, including the research questions, methods and findings, as well as a discussion of the results, limitations, significance, and implications for future practice and research.

Study Summary

The primary impetus of this study was to quantitatively test Ke and Chávez's (2013) *Cultural Constructs in Teaching and Learning* model (Research Question 1). Their cultural analysis model included two opposing cultural epistemologies, individuated-integrated, that were situated along a left-to-right continuum, respectively. The individuated-integrated cultural constructs had emerged from Ke and Chávez's mixed methods study with results that "suggest[ed] that the integrated right side of the model contains cultural epistemologies that are more common to both Hispanic and Native American college students" while the "Northern European Caucasian American students . . . showed learning preferences and norms primarily along the individuated end of the cultural continuum" (p. 96). Ke and Chávez described the two epistemologies as follows:

> Within a culturally *integrated* worldview or epistemology, an interconnected, mutual, reflective, contextually dependent conception of the world is common, assumed, and valued. In a culturally *individuated* worldview or epistemology, a compartmentalized, private, outward, contextually independent conception of the world is common, assumed, and valued. (p. 93).

This study expanded on Ke and Chávez's original research in the following ways: (1) Quantitative investigation of whether and how ethnicity influenced online college students' preferred ways of learning on the cultural constructs; (2) Examination of additional student characteristics, including age, gender, class level, and prior experience and whether and how they influenced online college students' preferred ways of learning on the cultural constructs (Research Question 1); (3) Addition of two research questions to examine whether and how student characteristics influenced online college students' online interaction preference, synchronous versus asynchronous (Research Question 2), and learning environment preference, online versus face-to-face (Research Question 3). Using a similar postsecondary student population, the current study researched students enrolled in online courses at the University of New Mexico in Fall 2014.

Research Questions

The three research questions that guided this study were:

1. How do student characteristics influence online college students' preferred ways of learning on individuated-integrated cultural constructs?

2. How do student characteristics influence online college students' online interaction preference (synchronous versus asynchronous)?

3. How do student characteristics influence online college students' learning environment preference (online versus face-to-face)?

Methods

The two-phase explanatory sequential mixed methods design as defined by Creswell and Clark (2011) was chosen to first quantitatively measure and analyze student group differences (Phase 1) and then to provide qualitative student perspectives to gain a deeper understanding of those results (Phase 2).

The four-part *Preferred Ways of Learning Survey* (PWLS) was developed specifically to address the constructs of each research question. Part 1 collected student demographic information: age, gender, ethnicity, class level, and prior experience. Parts 2 – 4 used a 10-point Likert-type scale to determine online college students' preferences.

Research Question 1 investigated online students' preferred ways of learning using the individuated-integrated cultural epistemologies of the *Cultural Constructs of Teaching and Learning* model defined by Ke and Chávez (2013); Research Question 2 investigated students' online interaction preference (synchronous versus asynchronous), and Research Question 3 investigated students' learning environment preference (online versus face-to-face).

The PWLS was created and administered using Opinio, a secure online program for survey administration and analysis. Participant criteria for Phase 1 consisted of any student who was enrolled in any online course in Fall 2014 who had (a) completed at least one online course at UNM, and (b) completed at least one college-level face-to-face course. Participation criteria for Phase 2 (interview) consisted of any student who had participated in the survey and volunteered to take part in the interview portion. The final sample for Phase 1 (survey) consisted of 140 students, and Phase 2 (interview) consisted of seven students.

Statistical tests for comparing student groups were chosen to examine the influence of student characteristics on the constructs under investigation.. T-tests were used for all two-group comparisons, and F-tests, or ANOVAs, were used to compare more than two groups.

In order to determine the potentially high relationship between age and class level, Spearman's rank order correlation coefficient was conducted to account for the non-normal distribution of these two independent variables, as both were positively skewed. There was a medium positive correlation between age and level, $r_s = .35$, n = 140, $p < .001$.

It is important to note that the qualitative sample was not representative of the quantitative sample in the current study. While the student interviews helped to provide some insight on the quantitative findings, they were limited to the characteristics of those who responded. In particular, in the qualitative sample, there were:

- No students interviewed who were age 28 and younger or 55 and older,
- No students interviewed from Native American, Asian, or Black or African American ethnicity groups, and
- Only one student interviewed from the Hispanic ethnicity group.

Findings

Research Question 1. Five of the eight *Cultural Constructs of Teaching and Learning* from Ke and Chávez's (2013) study were investigated. Three constructs were omitted from the analysis: (1) The *Time* construct was deemed incompatible with the goals of current study – Ke and Chávez had examined this construct through a comparison of students' online and face-to-face perceptions, whereas the current study was focused on only the online aspect. The two other constructs, *Role of the Teacher/Control* and *Sequencing* were omitted due to very poor internal consistency, with alpha coefficients <.50.

Of the five cultural constructs that were investigated, three of them, *Purpose of Learning*, *Interconnectedness of What is Being Learned*, and *Student Interactions,* were analyzed using both individuated and integrated preference scales to reflect the two cultural epistemologies as defined by Ke and Chávez.

The *Ways of Taking in and Processing Knowledge* construct was analyzed with only the integrated dimension due to very poor internal consistency of the individuated scale (α = <.50). And the *Responsibility for Learning* construct was analyzed with only the individuated dimension, due to an oversight of the researcher – the final survey contained only one item to measure the integrated dimension, and was therefore omitted from further analysis.

The influence of the missing dimensions on these two constructs meant that the results reflected students' preferred ways of learning on only one side of the individuated-integrated continuum. In other words, only half of the construct was measured, and comparisons between the dimensions could not be made. Nevertheless, the results were useful to understand student perspectives for the dimensions that were analyzed. Future investigation should entail revision and the development of additional and suitable items to measure the missing dimensions.

Statistically significant differences were identified for various student characteristics on each of the cultural constructs. Age and class level mean score differences were revealed in three of the constructs, *Purpose of Learning*, *Interconnectedness of What is Being Learned*, and *Student Interactions*. Gender mean score differences were revealed in two constructs, *Ways of Taking In and Processing Knowledge* and *Interconnectedness of What is*

Being Learned. And ethnicity mean score differences were revealed in the *Responsibility for Learning* construct.

Table 39 provides an overview of the results for each of the five cultural constructs. The sections following the table discuss the findings for Research Question 1.

Table 39

Overall Results of the Influence of Student Characteristics, Research Question 1

Construct	Characteristics of Statistical Significance		Overall Preference
	Individuated	**Integrated**	
Purpose of Learning *N* = 140	*M* = 6.59, *SD* = 5.02 Range = 2-20	*M* = 10.53, *SD* = 5.82 Range = 2-20	Individuated and Integrated
	Age, Class Level* Younger and undergraduate students: more IND preference	Age, Class Level* Younger and undergraduate students: more INT preference	Students had both preferences, but more IND preference
Ways of Taking In and Processing Knowledge *N* = 140		*M* = 35.57, *SD* = 6.85 Range = 12-50	Integrated
		Gender Male students: higher INT preference	
Interconnectedness of What is Being Learned *N* = 140	*M* = 14.07, *SD* = 4.83 Range = 2-20	*M* = 29.76, *SD* = 6.81 Range = 4-40	Integrated
	Age, Gender, Class Level* Younger, female, and undergraduate students: higher INT scores	No statistically significant differences identified	
Responsibility for Learning *N* = 140	*M* = 10.71, *SD* = 5.49 Range = 2-27		Individuated
	Ethnicity Hispanic students, compared to White and N. American students: higher INT scores		
Student Interactions *N* = 139	*M* = 9.23, *SD* = 4.91 Range = 2-20	*M* = 11.27, *SD* = 5.5; Range = 2-20	Individuated and Integrated
	Age, Class Level* Younger and undergraduate students: more IND preference	No statistically significant differences identified	Students had both preferences, but stronger IND preference

* Age and class level had a medium positive correlation. Shaded cells represent dimensions that were not analyzed. IND = Individuated, INT = Integrated;

Purpose of learning. This construct addressed why students pursue a college. The individuated preference scale addressed whether students' reasons were based on goals to become self-sufficient and independent, and to support oneself. The integrated preference scale addressed whether students' reasons were related to family or community expectations. Both preference scales were investigated. Table 40 illustrates the overall results for this construct.

Table 40

Overall Results of the Influence of Student Characteristics, Purpose of Learning

Characteristics of Statistical Significance		Overall Preference
Individuated	**Integrated**	
M = 6.59, SD = 5.02; Range = 2-20	M = 10.53, SD = 5.82; Range = 2-20	Individuated and Integrated
Age, Class Level*	Age, Class Level*	Students had both preferences, but stronger IND preference
Younger and undergraduate students: more IND preference	Younger and undergraduate students: more INT preference	

* Age and class level had a medium positive correlation. Likert-type scale, 0 = Prefer not to respond, 1 = individuated preference, 10 = integrated preference. Maximum score for scale = 20. IND = Individuated, INT = Integrated.

The quantitative results indicated that the online students in this study had both individuated and integrated preferences for pursuing their college degrees, with a stronger individuated preference. Students viewed a college degree primarily as a means to become self-sufficient, independent, to support oneself. While not representative of the quantitative sample, student responses provided some insight for the quantitative result. All the students described a relationship between their education and their careers and/or income, regardless of individual characteristics. They shared that earning a college degree would enable them to (a) increase earning potential, (b) provide job advancement opportunities, (c) enable secondary career opportunities (i.e., postsecondary teaching), (d) support career-changing opportunities, and (e) improve job security.

The results of the integrated preference scale indicated a slight integrated preference (mean scores were slightly above half of total score possible) for all students. This suggested that students' reasons for pursuing their college degrees were also related to family or community expectations. Students described how their families supported their goals to earn their degrees, only when specifically prompted did most of them describe how their degrees would benefit their communities. Only one of the six students directly connected her personal academic goals with helping her community. She explained that an advanced nursing degree would allow her "to work with patients at the provider level in order to be more influential in their health and wellbeing processes." Overall responses, however, suggested that helping one's community appeared to be a secondary benefit of earning a college degree, rather than a primary motivating factor.

The statistically significant findings on both preference scales for age and class level indicated that both younger and undergraduate students had different preferences compared to older and graduate students. Interestingly, the two youngest age groups (22 and younger, 23-28) had the lowest mean scores of all age groups on the individuated scale, which suggested that they had strongest individuated reasons (i.e., means to become self-sufficient, independent, and to support oneself) for pursuing a college degree compared to older and graduate students.

The younger and undergraduate students also had the highest mean scores on the integrated preference scale, which suggested they had a stronger sense of connection between their educational goals and the expectations of their families and their communities than older and graduate students. Unfortunately, there were no students interviewed from the two youngest age groups, which curtailed a deeper examination of the findings for age.

The results of the quantitative investigation did not support Ke and Chávez's findings that ethnicity would be a primary determinant of individuated or integrated preference for the *Purpose of Learning* cultural construct. They had found that "Northern European Caucasian American students were more likely to discuss knowledge for its own sake as well as gaining knowledge in the pursuit of educational and professional goals, while Native and Hispanic American students were more likely to connect education to make a difference in their extended families, home communities, and/or tribes" (p. 97). Statistically significant differences were identified for age and class level. The results suggest the importance of continued research on age difference in online learning environments as increasing numbers of traditional college age students enroll in online courses and programs.

Ways of taking in and processing knowledge. This construct was measured with only the integrated preference. The integrated preference scale included four elements that addressed whether students (a) incorporate their emotions and other senses when they learn, (b) prefer learning with a variety materials (i.e., videos, podcasts, and visuals such as charts, diagrams, concept maps), (c) apply flexible learning approaches dependent on the task, and (d) whether they thought their learning processes were developed in informal settings through interactions with family or community. Table 41 illustrates the overall results for this construct.

Table 41

Overall Results of the Influence of Student Characteristics, Ways of Taking In and Processing Knowledge

Characteristics of Statistical Significance		Overall Preference
Individuated	**Integrated**	
	M = 35.57, SD = 6.85 Range = 12-50	Integrated Preference
	Gender Male students: higher INT preference	

Likert-type scale, 0 = Prefer not to respond, 1 = individuated preference, 10 = integrated preference. Maximum score for scale = 50. Shaded cell represents dimension that was not analyzed. IND = Individuated, INT = Integrated.

The quantitative results indicated that the online students in this study had an overall integrated preference. Statistically significant differences were identified for gender with higher scores for male students compared to female students. Overall scores for both male and female students, however, suggested both groups had a strong integrated preference (mean scores were well above half of total score possible).

Student interviews provided some insight for the quantitative integrated preference of all participants. Flexibility of learning approaches was highlighted, as the interviews revealed that students freely and fluidly use their intellect, intuition, emotions and other senses depending on the subject, topic, or task. Students described how they easily switched between using strictly cognitive processes for some course work (i.e., “science-based materials”) and incorporating their intuition, emotions and reflection to other course work (i.e., “writing responses”).

Student responses also revealed the use of reflection as a key component of their online learning processes. One student explained, “I do mostly use my mind in online learning as mostly it is information delivery. However, I do use my personal reflection in writing responses.” Other responses included, “I spend a lot of time thinking about the course material" and "I tend to use previous work experiences to draw upon to apply to the learning environment."

The overall scores for this construct indicated that students generally prefer to (a) use a variety of learning materials in their online courses (i.e., videos, podcasts, and visuals such as charts, diagrams, concept maps), (b) apply flexible learning approaches depending on the learning task, (c) use both their cognitive abilities and a combination of other senses (i.e., seeing, doing, feeling, sensing) for learning, and (d) believe that their most natural ways of learning were developed through informal interactions with family and/or community.

The quantitative results did not support Ke and Chávez's findings that suggested that ethnicity was the primary determinant of preference for each of the four elements used to measure this construct. They had found that Northern European Caucasian American students were more likely to have an individuated preference, and Hispanic and Native American students were more likely to have an integrated preference. Statistically significant differences were identified for gender, however the overall high scores for both male and female students suggested a difference in degree of integrated preference rather than two distinctly different preferences.

Interconnectedness of what is being learned. This construct addressed whether students preferred to keep what they learn in college separate from their everyday lives (individuated preference scale) or preferred to connect what they learn in college to their personal lives and the world around them (integrated preference scale). Both preference scales were investigated. Table 42 illustrates the overall results for this construct.

Table 42

Overall Results of the Influence of Student Characteristics, Interconnectedness of What is Being Learned

Characteristics of Statistical Significance		Overall Preference
Individuated	**Integrated**	
M = 14.07, *SD* = 4.83; Range = 2-20	*M* = 29.76, *SD* = 6.81; Range = 4-40	Integrated Preference
Age, Gender, Class Level* Younger, male, and undergraduate students: more IND preference	No statistically significant differences identified	

Likert-type scale, 0 = Prefer not to respond, 1 = individuated preference, 10 = integrated preference. Maximum score for IND scale = 20; Maximum score for INT scale = 50. IND = Individuated, INT = Integrated.

The overall quantitative results indicated that the online students in this study had an integrated preference on both preference scales. While there were no statistically significant differences identified for student characteristics on the integrated preference scale, statistically significant differences were revealed on the individuated preference scale for age, gender, and class level. Students from the two youngest age groups (22 and younger, 23-28), male students, and undergraduate students had lower scores on the individuated preference scale which suggested they had a stronger preference than older, female, and graduate students to keep school separate from other areas of their lives. Results on the integrated preference scale, however, indicated that all students preferred to connect what they learn in college to their everyday lives. The statistically significant results suggested that for some students both preferences can be possible at the same time.

Some students, especially the younger, male, and undergraduate students in this study might find that connecting course material to their personal lives and the world around them improves their overall ability to learn content; but at the same time they may still prefer to compartmentalize their college experience – to keep some sense of separation between their college experience and their everyday lives.

Although the qualitative sample did not reflect the quantitative sample, student interviews helped to provide some insight on the quantitative results, especially with regard to the gender differences on the individuated preference scale. The male students who were interviewed appeared to have a stronger focus on taking courses that directly supported their career goals or specific personal interests than female students. For example, one of the male students explained,

> I make a conscious effort not to have my education and work relate to my personal life. I try to keep them separate . . . However, college is very much connected to my professional life.

The female student responses all reflected a more integrated preference for connecting what they learn in college with their everyday lives. They spoke of education in terms of better understanding social issues and community involvement, “survival,” and understanding and appreciating alternative points of view. Their responses were philosophical and almost poetic, as they shared their thoughts on the overarching and far-reaching benefits of education. For example, one of the female students shared,

> I think to be well educated has everything to do with one’s (personal) life. Not only is a basic education necessary for one to be a productive member of society (understanding how to think critically is fundamental) but also university education is important in inspiring thoughts for the future, career, professionalism within one’s chosen career, volunteerism, community involvement, parenting, etc.

The quantitative results did not support Ke and Chávez's (2013) finding that ethnicity would influence preference on this construct. They found that, "Hispanic and Native American students . . . discussed benefitting most from learning processes that facilitate connection between the subject of study and the world around, history, context, and their own lives" (p. 102) while "Northern European Caucasian American students . . . described a more compartmentalized way of thinking about teaching and learning" (p. 103).

Responsibility for learning. This construct was measured with only the individuated preference. This preference addressed whether online students (a) preferred taking personal responsibility for their own learning, without relying on the support of their classmates, (b) believed they learn most naturally when they can figure things out for themselves, and (c) tended to focus more on their own work and rarely looked to see what their classmates were doing. Table 43 illustrates the overall results for this construct.

Table 43

Overall Results of the Influence of Student Characteristics, Responsibility for Learning.

Characteristics of Statistical Significance		Overall Preference
Individuated	**Integrated**	
M = 10.71, SD = 5.49; Range = 2-27		Individuated Preference
Ethnicity Hispanic students, compared to White and N. American students: more INT preference		

Likert-type scale, 0 = Prefer not to respond, 1 = individuated preference, 10 = integrated preference. Shaded cell represents dimension that was not analyzed. Maximum score for IND scale = 30. IND = Individuated, INT = Integrated.

The quantitative results indicated that all students had a preference for taking individual responsibility for their learning. Statistically significant differences were identified for ethnicity. Hispanic students' scores were the highest of all ethnicity groups, with a statistically significant difference when compared to White students (on two-group comparisons) and with Native American students (when compared to all ethnicity groups). It's important to note, however, that the mean scores of Hispanic students overall didn't indicate a particularly strong individuated preference (mean scores were less than half of total score possible). This suggested a difference in degree of individuated preference rather than a integrated preference.

Unfortunately, due to poor overall representation of all ethnicity groups in the interview phase, the ethnicity results could not be further explored. Student interviews, however, provided some insight on the quantitative findings. In addition to asking about personal responsibility, in general, the interview question specifically asked about group work to address the integrated side of the continuum, in which "Learning is a collective, shared activity, Responsible for one's own and others' learning" (Ke & Chávez, 2013, p. 103).

The majority of students interviewed said they preferred to learn on their own, primarily because of the inherent logistical problems of group work in the online environment, rather than a lack of appreciation for engaging with their classmates. Student comments suggested that they expect their online classes to be flexible to accommodate their already busy schedules, and allow them the convenience to complete their work on their own time, without having to rely on others.

Several students discussed the motivational role of the instructor in their online courses, and almost half of them described that the lack of interaction with their instructor directly affected their personal motivation to take responsibility for their own learning, For example, one student explained,

> My personal responsibility seems to mirror the commitment of the faculty who is administrating the course . . . the majority of my online classes, have had minimally involved to completely absent faculty and my level of interest deteriorates to almost zero in these classes.

This finding on the motivational role of the online instructor is supported in the literature (Lundberg & Sheridan, 2015).

The quantitative results partially supported Ke and Chávez's findings regarding Hispanic students compared with White students, but conflicted with their findings regarding Native American students. They wrote,

> Conceptions of responsibility for learning differ substantially between Native and Hispanic American and Northern European Caucasian American students. Individual self-reliance and responsibility primarily to self in a learning environment characterize Northern European Caucasian American student responses, while a deep sense of responsibility for peers and peer learning is common among Native, Hispanic, and Mestizo American students in this study. (p. 103)

Student interactions. The individuated preference for this construct addressed whether students thought the only interaction they needed in their online courses was with their instructor, and felt they learned well enough on their own in their online courses, without interacting with their classmates. The integrated preference addressed whether students felt their learning was enhanced through online interaction with their classmates, and whether this interaction helped them gain a deeper understanding of the course material. Table 44 illustrates the overall results for this construct.

Table 44

Overall Results of the Influence of Student Characteristics, Student Interactions

Characteristics of Statistical Significance		Overall Preference
Individuated	**Integrated**	
M = 9.23, SD = 4.91; Range = 2-20	M = 11.27, SD = 5.5; Range = 2-20	Individuated and Integrated Preference
Age, Class Level* Younger and undergraduate students: more IND preference	No statistically significant differences identified	Students had both preferences, but stronger IND preference

* Age and class level had a medium positive correlation. Likert-type scale, 0 = Prefer not to respond, 1 = individuated preference, 10 = integrated preference. Maximum score for IND scale = 20. Maximum score for INT scale = 20. IND = Individuated, INT = Integrated.

The overall results indicated that the online students in this study had both individuated and integrated preferences with a slightly stronger individuated preference. The quantitative results for the individuated preference scale for all student characteristics suggested a slight individuated preference (with mean scores slightly less than half of total score possible). Statistically significant differences were identified on the individuated preference scale for age and class level. Students from the youngest age group (22 and younger) had lower scores compared to age group 5 (41-45), and undergraduate students had lower scores compared to graduate students. Interestingly, the two youngest (22 and younger, 23-28) had the lowest scores of all age groups, which indicated a more individuated preference. These results suggested that both younger and undergraduate students were more inclined to feel that the only interaction they needed in their online courses was with their instructor, and that they learned well enough on their own in their online courses, without interacting with their classmates.

On the integrated preference scale, no statistically significant differences were identified. Overall scores for all learner demographic groups indicated a slight integrated preference (with mean scores slightly above half of total score possible). This finding suggests that most of the students in this study believed their learning was enhanced through online interaction with their classmates, and that this interaction helped them gain a deeper understanding of the course material.

Despite the non-representative qualitative sample, interview responses provided some insight for the quantitative result. Students were asked about the importance of interaction in their online classes. Most of their responses reflected their views of online discussion forums, which suggested this was the way they were most likely to interact with their classmates in online classes.

The general consensus of all the students interviewed was that student interaction was useful, however, the methods most often used (discussion forums) can be problematic. For example, one student replied, “I am not sure if there is peer interaction,” and noted that all too often required peer replies in discussion forums are superficial without “honest questions or information related directly to” the original post. A follow up question to another student asked, “Do you value your classmates’ responses in your online classes (would you read them if they weren’t required)?” Her response was, “Mostly no, I don’t value them, as they are mandated responses and often not offering any new idea (just regurgitation of material that I have already read).”

Three students described the beneficial aspects of peer interaction, with two who discussed the importance of learning from multiple perspectives and one student who noted a motivational aspect to online student interaction:

> Although [peer interaction] is not critical, it is certainly helpful. It is far too easy to fall behind in the class if there is no interaction. Also complicated topics are easier to

understand if they are discussed among the students, but online chat/discussion boards are not very effective in that regard.

The overall results for both scales of this construct indicated that the online students in this study generally believed the only interaction they need in their online courses is with their instructor, and that they learn well enough on their own in their online courses, without interacting with their classmates. The results also indicated, however, that students can also appreciate that interaction with their classmates enhances their learning and helps them gain a deeper understanding of the course material.

The quantitative results did not support Ke and Chávez's definition of the cultural epistemologies for this construct. They had suggested that White students would be more inclined to believe that "Others' perspectives are optional for learning" while Hispanic and Native American students' would be more inclined to believe "Others perspectives are important to learning."

The finding that the majority of online college students generally do not want to be tasked with peer interaction in their online courses is supported in the literature (Marmon, Vanscoder, & Gordesky, 2014; Moore et al., 2016; Schroeder, Baker, Terras, Mahar, & Chiasson, 2016). For example Moore, Warner, and Jones (2016) reported that the majority of the 200 graduate students in their study didn't "particularly like or want" (p. 141) peer interaction in terms of asynchronous discussion forums or group work. As with the students in the current study, Moore, Warner, and Jones found that students did not find value in the discussion forums or collaborative assignments. The students in their study reported the same issues including the meaninglessness of inauthentic interaction and the waste of time. This result encompassed student characteristics such as age, gender, work and academic status (full or part-time), prior online experience, and personality type, with no statistically significant differences identified - none of these subgroups desired peer interaction in their online courses. Moore, Warner, and Jones also point out that college students "Overwhelmingly . . . more concerned with the course content than they are with building of participating in a classroom community" (p. 152). They also suggested that "trying to coordinate meaningful student-to-student interaction may only be increasing the stress on students in the course rather than enhancing the learning" (p.152). The authors recommend optional student interaction activities to accommodate those students who prefer and need interaction to increase their learning.

Summary. The overall quantitative results of online college students' preferences on the individuated-integrated cultural constructs did not support Ke and Chávez's (2013) findings. Their findings had suggested that ethnicity would be the determining factor of students' preferred ways of learning, either individuated or integrated, on each of the cultural constructs.

Of the five cultural constructs examined in this study, there was only one instance in which ethnicity produced a statistically significant difference (*Responsibility for Learning*), however the result only partially supported Ke and Chávez's findings. They had found "substantially" different perceptions of responsibility between Hispanic and Native American students compared to White students. In particular, they found that Native and Hispanic Americans had "a deep sense of responsibility for peers and peer learning," while White students had a "responsibility primarily to self." (p. 103). In the current study Hispanic students had the highest integrated preference on this construct, and differed with statistical significance from White students scores which supported Ke and Chávez's findings.

However, the Native American students in the current study had the lowest scores of all ethnicity groups, which contradicted their findings.

Age, gender, and class level were identified as the primary student characteristics that influenced students' preferred ways of learning on the individuated-integrated cultural constructs. Statistically significant differences were identified for age and class level on three constructs, *Purpose of Learning*, *Interconnectedness of What is Being Learned*, and *Student Interactions*. Statistically significant differences were identified for gender on two constructs, *Ways of Taking In and Processing Knowledge* and *Interconnectedness of What is Being Learned*. Age differences were noted particularly for students from the youngest or two youngest age groups (22 and younger, 23-28) with students from older age groups.

The results for class level were similar to the results for age, with undergraduate preferences that were close to the youngest or two youngest age groups, and graduate preferences that were close to the older age groups. The similarity in findings for age and class level was partially explained by the statistically medium correlation of both groups.

Overall results indicated that the younger students and undergraduate students in this study had more individuated preferences compared to older and graduate students. The individuated preferences suggested that younger and undergraduate students were more likely than older and graduate students to (a) pursue a college degree to become independent, self-sufficient, and to support themselves, (b) keep what they learn in college separate from their everyday lives, and (c) learn on their own and interact with only their instructors (and not their classmates).

One exception was noted on the *Purpose of Learning* integrated scale in which the younger and undergraduate students had higher integrated preference scores than older and graduate students. This result suggested the younger and undergraduate students were more inclined to see how their college degree was related to family or community expectations.

Statistically significant differences for gender were identified on the *Ways of Taking In and Processing Knowledge* with higher integrated scores for males students compared to female students. However, scores for both groups indicated an overall integrated preference to use a variety of learning materials, apply flexible learning approaches, use both cognitive abilities and a combination of other senses, and to believe that their most natural ways of learning were developed through informal interactions with family and/or community.

Statistically significant differences for gender were also identified on the *Interconnectedness to What is Being* Learned, individuated construct. Male students had lower individuated scores compared to female students which indicated male students had a stronger preference to keep what they learn in college separate from their personal lives and the world around them. Student responses were particularly insightful for understanding the quantitative responses. Male students described a more selective approach for choosing their college courses and female students spoke broadly and philosophically about the benefits of education for individuals and society.

While the quantitative results overall did not support Ke and Chávez's (2013) finding that culture, or ethnicity, would be a primary determinate of collegiate students' individuated-integrated online learning preference, it's important to note that cultural groups are not homogenous groups. Even though both studies researched UNM online students, Ke and Chávez were able to more deeply focus on some of the unique cultural communities in the southwestern US region (i.e., Hispanic and Native American) through in-depth interview. In the current study, the researcher-developed PWLS quantitative instrument failed to identify the nuances of students' ethnicity/cultural backgrounds. It is recommended that future researchers who use the PWLS include more detailed ethnicity/cultural background items. For example, the use of a text-based response item that focuses on cultural aspects of the participants' home environment may garner more depth. Going forward the PWLS instrument may serve as a useful tool for the detailed examination of regional ethnicity/cultural online learning preferences.

Research Question 2. This research question investigated whether and how student characteristics influence online student preference for synchronous versus asynchronous interaction.

The construct addressed whether online students found either written discussions (asynchronous) or web conferences (synchronous) more engaging. The asynchronous preference sought to determine whether students enjoyed written discussions primarily for the time allowed for reflection, or web conferences, primarily for the opportunity to receive immediate feedback (with instructors and/or peers). Table 45 illustrates the overall results for this construct.

Table 45

Overall Results of the Influence of Student Characteristics, Online Interaction Preference

Mean, Standard Deviation, and Range	Characteristics of Statistical Significance	Overall Preference
M = 24.78, *SD* = 9.67 Range = 4-40	Gender Female students: Asynchronous preference	Asynchronous

Likert-type scale, 0 = Prefer not to respond, 1 = synchronous preference, 10 = asynchronous preference. Maximum score = 40.

The quantitative result for this construct suggested that all the students in this study had a higher preference for asynchronous online interaction using the discussion forum tool than synchronous interaction using the web conference tool. Statistically significant differences were identified for gender which indicated that female students had a higher asynchronous preference than male students.

Four of the seven students interviewed who expressed an asynchronous preference noted the flexibility and convenience of the discussion forum. Their comments suggested that students often choose online courses because they have other responsibilities (i.e., family, job) and they have an expectation that their online courses should be flexible and convenient to meet their needs; they do not want to have to worry about attending scheduled synchronous web conferences.

Some students shared that real-time interaction is important for their learning, whether due to the complexity of a particular course subject, to expedite communication, or to establish teacher presence and thereby increase personal motivation. Even though the asynchronous discussion forum may pose certain issues such as the potential lack of instructor interaction and lack of immediate feedback, the results indicated that it is still preferred by most of the online students in this study.

It's important to note that while it was clear that all of the students interviewed had experienced asynchronous online interaction using discussion forums, it wasn't clear if they had all experienced synchronous web conferences. Student responses revealed this missing data point, and also illuminated the possibility that many survey participants might have responded to the survey items for this construct based on preconceived ideas about synchronous interaction using a web conferencing tool. This important factor has been noted in the literature. For example, Fontenot et al. (2016) "note that students familiar with interactions in face-to-face classes may not understand the nature of the interactions in online courses" (p. 133).

The higher asynchronous preference by female students is supported in some of the literature as well (Bostock & Lizhi, 2005), while other research has found that gender has had no influence. For example, Lin And Overbaugh (2009) reported that flexibility and convenience were more influential than gender for synchronous-asynchronous preference. Ethnicity was also found to influence online interaction. Ashong and Commander (2012) identified statistically significant differences between African American and White students on the *Asynchronicity* subscale (Trinidad, Aldridge, & Fraser, 2004) which measured "the extent to which students enjoy the asynchronous nature (e.g., does it promote reflective thinking). Ashong and Commander found that White students had higher positive perceptions for asynchronous interaction compared to African American students.

Research Question 3. This research question addressed whether online students preferred online or face-to-face learning environments. The construct was measured with items that asked student to compare their online and face-to-face experiences. There were five online-focused items that addressed whether students (a) thought the online environment better matched their natural ways of learning, (b) felt more comfortable online, (c) tended to have a stronger connection with their online teachers, (d) tended to engage more deeply with their subjects, and (e) tended to engage more easily with their classmates. The four face-to-face focused items addressed whether students (a) preferred the social aspect of face-to-face courses, (b) preferred face-to-face learning because it was more familiar, (c) tended to feel isolated in online courses, and (d) didn't think they could learn as well online. Table 46 illustrates the overall results for this construct.

Table 46

Overall Results of the Influence of Student Characteristics, Learning Environment Preference

Mean, Standard Deviation, and Range	Characteristics of Statistical Significance	Overall Preference
M = 47.47, SD = 16.76 Range = 13-85	Prior Online Experience Four or more online classes: Online preference	Online

Likert-type scale, 0 = Prefer not to respond, 1 = face-to-face preference, 10 =online preference. Maximum score = 90.

The quantitative results for this construct suggested that the online students in this study had a higher preference for the online learning environment (mean scores were above half of total score possible). Statistically significant differences were identified for prior online experience. Students who had taken four or more online courses had higher scores than those with fewer than four online courses. This finding indicated that students with more online course experience preferred the online learning environment compared to students with less experience.

All seven of the students who were interviewed explained that they chose online courses primarily for the flexibility and convenience they afford. Flexibility and convenience refers to the ability of students to complete their assignments (i.e., meet course deadlines) in accordance with their own schedules. Even though the majority of students interviewed noted a face-to-face preference, the flexibility and convenience of online courses took precedence.

Several students described why they preferred face-to-face courses. One student shared that building relationships with both instructor and peers was easier in person, and that these relationships enhanced his learning and fostered motivation. Others commented on various benefits of face-to-face learning which they often found lacking in their online courses, including (a) live interaction, and the ability of both instructors and students to perceive both verbal (i.e., tone of voice) and nonverbal (i.e., facial expression) cues, (b) expediency and efficiency of communication (i.e., immediate feedback), and (c) instructor participation.

There were two students who noted an asynchronous preference, and both provided unique perspectives. One student had initially taken online courses for their flexibility and convenience, and now prefers them. The second student explained he had originally taken online courses because they “required less effort than face-to-face, but that has evolved over time.” When the researcher asked if he thought this has to do with online courses attempting to replicate the face-to-face classroom environment, he said, “I think they are trying to match, but the problem is I think they're going overboard.” He provided examples of the difference of participation requirements in online and face-to-face environments, and noted how the online environment forces everyone to participate.

The results for the Learning Environment Preference construct provided important insight especially with regard to student preference for the online environment. The quantitative results indicated an overall online learning environment preference for the students in this study. Statistically significant differences were identified for prior experience, and revealed that students with more online experience (four or more online courses) had a higher online preference compared to those with less online experience (fewer than four online courses).

Student responses indicated that students take online courses primarily for the flexibility and convenience they provide, and even though some students might have strong dislikes about their online courses, they are willing to struggle through them to achieve their academic goals. The benefit of flexibility and convenience that online courses provide, and why students often enroll in them, are well documented in the literature (Bolliger & Wasilik, 2009; Buxton, 2014; Fontenot et al., 2015; Hill, 2006; Jaggers, 2013; Watts, 2016), although typically with the assumption that such students are nontraditional in terms of age (25 and older) and who have work and family responsibilities. As more students of traditional college age enroll in online courses the idea of online students having *social* commitments has been suggested (Watts, 2016). It is important to investigate why younger students are choosing to take online courses.

Student perspectives also suggested that online students may become increasingly comfortable with the online learning environment so that the face-to-face environment becomes less desirable, and online learning methods may tend to overcompensate for lack of face-to-face interaction, and therefore place substantial additional burden on online students by making them prove they are participating (i.e., required numbers of discussion forum postings). This result is supported in Clinefelter and Aslanian's (2015) most recent report. They found that the majority of online students had experience with studying online, and said that "one indication of students' increased familiarity and comfort with online education is the increased use of the modality at the high school level" (p. 8). As online learning continues in both popularity and scope, it's vital that educators understand the needs of online learners so that they can develop effective courses to meet their diverse needs.

Limitations of the Study

While this study was designed and conducted to adhere to both ethical and procedural research standards, it is important to note the various limitations that were encountered.

Research design. The explanatory sequential mixed methods design consists of two phases. Phase 1 calls for quantitative data collection and analysis, and based on these results follows with qualitative data collection and analysis in Phase 2. Creswell and Clark (2011) described the importance of selecting interview participants for the second phase who can help explain the quantitative results, and thereby build a stronger connection between the phases. In the current study, volunteers were requested from those who had completed the survey, however, out of the seven students who responded, there was no representation for particular student groups of interest (e.g., student groups with statistically significant differences, such as younger age groups and ethnicity groups). Incentivizing interview participation might have helped increase the number of volunteers.

Instrument. The *Preferred Ways of Learning Survey* (PWLS) was created by the researcher, and was therefore subject to validity issues. The following steps were taken to ensure the highest possible validity for the instrument: (a) research was conducted to locate existing items and scales with existing validity for the constructs used in this study, (b) verification of constructs and items was reviewed by subject experts, and (c) the instrument was informally pilot tested. Reliability for each of the scales used to measure the three research questions was assessed using Cronbach's alpha with the aim to achieve a high correlation of the items within each scale. Scales with α = <.50 were omitted from analyses. To ensure qualitative validity, member-checking was used after the data findings were summarized, and participants were contacted and provided with transcripts to verify accuracy of meaning.

Sample. In Fall 2014 when students were recruited for this study, online enrollment at the main campus of the University of New Mexico was over 7500 students. The online student population represented a diversity of learner characteristics, especially in terms of age and ethnicity (refer to Table 2 above). The researcher did not have direct access to all online students, but instead went through the online faculty to invite students to participate. Expectations of receiving a roughly five percent response rate (i.e., 375 students) for the online survey were curtailed, which also affected the number of student volunteers for the qualitative interviews.

The homogeneous purposive sampling method used in this study posed selection biases, including voluntary, volunteer, and nonresponse biases. The PWLS elicited voluntary responses for both phases of data collection, which may have produced an overrepresentation of participants who had strong opinions. Volunteer bias was particularly problematic for Phase 2, as no volunteers came forward from some of the students groups that had statistically significant differences.

Nonresponse bias was also a possible issue with the sample. Nonresponse bias in the current study included students who received the invitation to participate but declined and students who may have experienced communication barriers (i.e., language, psychological, physical, technological). Despite the intention to appeal to all students about the benefits of the study, it is possible that some students elected not to participate due to the nature of study, particularly the use of student demographics to define preferred ways of learning (i.e., some students may find the use of ethnicity labels too limiting).

Analysis. Several strategies were used to minimize validity threats for connecting data as described by Creswell and Clark (2011). The strategies for data collection included (a) the same population was used for both phases of the study, (b) a larger sample was collected for the quantitative phase and a smaller sample for the qualitative phase, and (c) the researcher attempted to use “rigorous procedures for developing and validating the new instrument” (Creswell & Clark, 2011, p. 242). The strategy for data analysis entailed the use of the quantitative results to inform the creation of appropriate interview questions. And the strategies used for interpretation consisted of following the sequential explanatory design method which required merging the data, and following the collection procedures prescribed for this design (i.e., quantitative first, qualitative second).

Significance of the Study

The results of this study are important to both theoretical and practical studies of postsecondary online education. Postsecondary online enrollment data reveal a trend of increasing student diversity. In addition to an ongoing female majority, the number of younger students of traditional college age (18-24) and the number of minority students taking online courses are steadily growing. The prevailing theoretical assumptions, particularly andragogy, that guide the pedagogical practices for online instruction typically cater to the needs of adult learners without much regard to other student characteristics.

This study offers a snapshot of contemporary online student enrollment – who they are, and how they prefer to learn. This increased awareness of the diversity of online students along with the results of this study will provide instructors and designers additional insight for developing more inclusive (i.e., intergenerational, gender, ethnicity, prior experience) instructional design models for practical application. The results will also help to inform online course and program evaluators, managers, and administrators as they continually seek to improve the quality of online courses and programs for all students.

Implications for Practice

Postsecondary online education is a growing and evolving field. Contemporary online enrollment reflects growing numbers of younger students of traditional college age – and therefore undergraduates, nontraditional students (i.e., age and minority-status), and an ongoing female majority. The findings of the current study reveal some important considerations for designing effective online learning for today's online college students. The sections below are based on the results of this study and provide some practical suggestions for online course design and practice.

Student goals. The majority of online students in this study demonstrated that they believe a college degree would improve their ability to seek careers that would enable them to become self-sufficient, independent, and to support themselves. In this respect they are no different from face-to-face students. Online faculty can play a pivotal role by inspiring online students to develop a passion for learning. Every attempt should be made to make the online learning environment as engaging as the face-to-face classroom. Instructors need to participate and interact with their students on an ongoing and consistent basis and play an active role in their online students' success.

Processing knowledge. The results of the study indicated that the majority of online students believed they have the ability to use a variety of learning approaches depending on the subject, topic, or task. They described how they freely and fluidly use their intellect, intuition, emotions and other senses depending on the subject, topic, or task. Students explained how they easily switched between using strictly cognitive processes for some course work (i.e., learning facts and formulas as in "science-based materials") and incorporating their intuition, emotions and reflection to other course work (i.e., brainstorming and “writing responses”). The majority of students also appreciated being provided with a variety of online learning materials, such as videos, podcasts, and visuals like charts, diagrams, concept maps. Based on these results, online instructors should attempt to vary their course objectives and their materials to allow students to use the full scope of their abilities.

Interconnections. The majority of students in this study had a preference for making connections with what they learn in their online courses to other courses in their major and to their personal lives and the world around them. The online environment is especially well suited to engaging students in this way. Personal journals and/or public blog spaces provide ample opportunities for students to reflect on how what they learn in class connects to them personally and how it connects to the larger society. These connections should be encouraged, and use of current, relevant topics would likely increase student interest and engagement as they explore a variety of subjects.

Personal responsibility. The quantitative results of the study indicated that the majority of online students preferred to take individual responsibility for completing online course requirements, rather than relying on their classmates. Interview responses suggested that for many students, group work in the online environment is both unwanted and unnecessary. The primary reason given was the inherent logistical problems of group work in the online environment, rather than a lack of appreciation for engaging with their classmates. Student comments suggested that they expect their online classes to be flexible to accommodate their already busy schedules, and allow them the convenience to complete their work on their own time, without having to rely on others. A couple of students who were interviewed described a preference to work within groups. In order to accommodate student diversity in this regard, it would be beneficial to provide students with an option to work individually or within groups. Another option is to create assignments that require ongoing engagement, but that can still be done at times that work best for each student. There are a number of online collaborative applications that allow students to engage with each other to brainstorm, build concept maps, and solve problems, etc. Online instructors should actively search for and experiment with these collaborative tools to inspire more authentic engagement.

Instructor interaction. Another key finding that emerged from the student interviews on the *Responsibility for Learning* construct was the motivating effect of instructor participation in online courses. Some students explained that a lack of instructor feedback had a major influence on their level of interest and their level of engagement in online courses. It would be helpful for online instructors to understand their motivational role, and to consider that their consistent participation and interaction with their students is a vital component for student success. Some suggestions for improving online instructor participation include providing timely responses to student questions, prompt feedback on assignments, and deadline reminders.

Student interaction. Both the quantitative and qualitative results of the study suggested that most of the online students preferred working independently. The quantitative results indicated that younger students (28 and younger) were more likely to prefer no interaction with their classmates than older students. Online discussions are often the primary way students are expected to interact in online courses, and while the student interviews revealed that most online students believed their learning was enhanced through online interaction with their classmates, and that this interaction helped them gain a deeper understanding of the course material, the manner in which the discussion forums are most typically used is largely ineffective.

Online students are often asked to respond to the same question or prompt made by the instructor, and then required to read and respond to some number of peer posts. One student described the online discussion requirement as “busy-work” and others cited issues of having too many posts to read and that discussions were largely superficial. In order to foster more engaging and authentic interaction, online instructors would benefit from determining activities that *require* student interaction. For example, students could be paired with one another to investigate and post a particular problem of personal (topic-related) interest, and work both independently and together to identify possible solutions. There are a number of free online collaborative tools (e.g., whiteboards, concept maps, etc.) that could be used to inspire student collaboration and that break away from the typical linear online discussion forum format. Other interaction formats, such as student created videos or other visual tools, could be tried as well (i.e., VoiceThread).

Online interaction. The quantitative results indicated that most online student prefer asynchronous online interaction. The student interview responses suggested that the primary reason students prefer asynchronous interaction has to do with the very reason students enroll in online courses – for the flexibility to complete course requirements without having to attend a set schedule of class meetings. The quantitative findings revealed that female students had a more asynchronous preference than males. Interestingly, most of the students who were interviewed had never participated in a synchronous web conference.

In order to accommodate diverse student needs in the online environment, it is suggested that online instructors provide an optional weekly, bi-weekly, or monthly synchronous web conference. Students can be polled at the beginning of the term to determine those who are interested in synchronous meetings, how often they should be scheduled, and best meeting times. Online instructors should also be willing to add meeting times as the term proceeds as students require. Web conferences should be recorded and available for all students to access as their schedules permit.

Learning environment. The overall quantitative results indicated that most online students had a preference for online versus face-to-face learning, particularly for students who had experience with four or more online courses. Again, student interviews suggested that students primarily take online courses because of the flexibility they provide, and this need for flexibility may override some students' preferences for face-to-face instruction.

In order to accommodate diverse learner needs in the online environment, it would be helpful to schedule optional synchronous class meetings throughout the term. Another possibility would be to arrange synchronous student-instructor conferences for real-time interaction. There are a wide variety of tools available for web and/or video conferencing, both within many school administered learning management systems (e.g., Blackboard Learn) and via the Internet (e.g., Skype, Google Hangouts).

Keep online learning flexible. The qualitative results of this study suggest that no matter what age, gender, ethnicity, class level, or prior experience, college students enroll in online classes primarily for the flexibility they provide. Postsecondary online students are driven to accomplish their academic goals and have the expectation of completing their online course requirements in accordance with their other life responsibilities. It is therefore important to structure online courses to accommodate students' busy schedules. For example, if students cannot attend required synchronous meetings, an instructor might require them to access recordings and submit an outline of the topics covered.

Reflections on Modifying the Preferred Ways of Learning Survey (PWLS) Instrument

The self-reporting PWLS instrument was developed to address student preferences in collegiate online learning. Because the main impetus of the study was to quantitatively test Ke and Chávez's (2013) finding that ethnicity, or culture, was the determining factor for student individuated-integrated learning preference, the survey collected ethnicity information in three ways: 1) Self-selection into any of the seven racial/ethnic categories in accordance with those used by the US Census, IPEDS, and UNM, 2) A type-in ethnic self-identification textbox, and 3) three ethnic identity questions that were drawn from the "affective component" of Phinney's (1992) *Multigroup Ethnic Identity Measure* (MEIM) which were meant to "address students' sense of affirmation, belonging, and commitment" (p. 156). Together, the three survey items were included to allow students greater flexibility in describing their perceived ethnic identity and to provide deeper insight on these perceptions. The results of the comparisons between the three items were not statistically significant.

In contrast Ke and Chávez (2013) were able to focus on some of the unique cultural differences of online UNM student population (e.g., Hispanic, Native, and Anglo American) through in-depth interview. The attempt made to collect similar, and nuanced, student information with the PWLS quantitative instrument was unsuccessful. It is recommended that future researchers who would like to focus more deeply on regional ethnicity/cultural online learning preferences should reevaluate the ethnicity portion. It may be the case that a focus on cultural learning backgrounds can only be collected via interview. Incentivizing participation for both phases is also recommended to improve response rates.

A second PWLS modification recommendation is to review the cultural constructs that had to be dropped due to very poor alpha scores (α = <.50). These constructs include 1) *Role of the Teacher/Control* – both preferences, 2) *Sequencing*– both preferences, 3) *Ways of Taking in and Processing Knowledge* – individuated preference, and *Responsibility for Learning* – integrated preference. It is suggested that future researchers review these constructs as described in Ke and Chávez's study to develop appropriate survey items, and to allot an appropriate amount of time for pilot-testing and revision.

The course major section on the PWLS could also be improved. The survey used a dropdown box which listed all possible UNM programs which numbered over 200. A better solution may be to use academic disciplines and/or a few specific programs. Finally, the scope of the PWLS is quite large. Future researchers may choose to focus on fewer constructs. The results of the current study can serve as the impetus for deeper explorations.

Future Research

The *Preferred Ways of Learning Survey* (PWLS) was developed by the researcher to measure the constructs for the three research questions. The results of the survey identified significant findings on all of the constructs that were measured, and produced useful findings for the consideration of administrators, instructors, and course designers for the development of effective online instruction for diverse online students. The constructs that were developed from Ke and Chávez's (2013) individuated-integrated *Cultural Constructs of Teaching and*

Learning for Research Question 1 proved to be useful for investigating online students preferred ways of learning. Two of their cultural constructs, however, *Role of the Teacher/Control* and *Sequencing*, and two scales*, Ways of Taking In and Processing Knowledge*, individuated and *Responsibility for Learning*, integrated, were omitted from the analysis due primarily to poor internal consistency. Future researchers will need to reevaluate and revise the items for these constructs to further the investigation on online college students' preferred ways of learning.

Future researchers may use the findings of this study as an impetus to delve more deeply into each of the constructs and the student characteristics that produced statistically significant differences – age, gender, ethnicity, class level, and prior experience. The continued growth of online courses and programs, and the continued diversity of the students who take them, both warrant ongoing research to ensure student preferences are noted and understood to ensure that effective instruction meets their needs.

The mixed methods design was very useful for this investigation, particularly for the student insight it provided to better understand the quantitative results. The implementation of the study, however, could be improved. Suggestions for future researchers include the following: (a) attempt to directly contact the student body of interest, (b) allow sufficient time for validity testing of items and scales, and (c) consider providing incentives for Phase 2 participation (interview) to recruit a larger sample so that purposive selection can be used in relation to the quantitative findings.

Conclusion

Postsecondary online enrollment data reveal a trend of increasing student diversity. In addition to an ongoing female majority, the number of younger students of traditional college age (18-24) and the number of minority students taking online courses are steadily growing. It is vital for educators to be aware of their changing student populations and understand who they are and how they prefer to learn in the online environment to ensure that pedagogical and instructional practices are in tune with their needs.

This study illuminated online college student preferences in terms of (1) Ke and Chávez's (2013) individuated-integrated *Cultural Constructs of Teaching and Learning,* (2) Online Interaction Preference, and (3) Learning Environment Preference. The investigation of the cultural constructs provided insight on online college students and (a) why they pursue a college degree, (b) their approaches to online learning, (c) the role college plays in their lives, (d) how they take personal responsibility in online courses, and (e) their view of online interaction with their classmates. The investigation also provided insight on why they prefer asynchronous online interaction and the online learning environment.

Although the overall quantitative results of this examination did not support Ke and Chávez's (2013) findings that ethnicity would be a determining factor of individuated-integrated preference, the current study found that age, gender, and class level emerged as the primary student characteristics that influenced student preferences on the cultural constructs. The key findings of the study revealed that online college students (a) pursue their degrees to enable themselves to become independent, self-sufficient, and to support themselves by improving their job opportunities, (b) use flexible learning approaches dependent on the task, topic, or subject at hand, (c) prefer to relate what they are learning to their other courses, their personal lives, and the world around them, (d) prefer to work independently, even though they appreciate the value of engaging with their classmates, and (e) believe that instructor input is vital, and can improve their personal motivation in terms of interest and engagement.

The most important finding overall is that online college students take online courses for the flexibility they provide, regardless of their individual characteristics. They want to accomplish their academic goals and have the expectation of completing their online course requirements in accordance with their other life responsibilities.

This study illustrates the importance of building an awareness of the changing student characteristics in postsecondary online education. Further, it provides insight into some intriguing student preferences, and notes some beneficial ways to improve online instructional design. It is hoped that these results adds to both the theoretical and practical literature on creating equitable learning environments that meets the needs of diverse learners, ultimately, to foster student satisfaction, success, and retention.

Appendixes

Appendix A

Request to Online Faculty to Forward PLWS Invitation to Students

From: Linda Barril
Sent: Monday, October 20, 2014 3:42 PM
To:
Subject: Please help UNM PhD student with dissertation research!

Hello! My name is Linda Barril, and I'm an OI&LS doc student conducting my dissertation research on online UNM students enrolled this semester (see detail provided below). Please help me by notifying your students of their opportunity to participate.

I will contact you 2 more times (Nov. 3, and Nov 17) with reminders asking you send the message out and/or for you to remind your students to take the secure and anonymous Opinio survey.

Please support this research by notifying your students of this invitation to participate:
1. Copy/Paste the following invitation as an Announcement in Learn, **and/or**
2. Copy/Paste the following invitation in an email and send to all of the students enrolled in your online classes this semester.

COPY THE TEXT IN BETWEEN THE SOLID LINES:

INVITATION TO PARTICIPATE IN SURVEY FOR UNM ONLINE STUDENTS
https://esurvey.unm.edu/opinio/s?s=30306
Survey will be open from October 20 (12 AM) - November 17 (11:59 PM)

Dear Online UNM Student,

Your participation is respectfully requested to take the online Preferred Ways of Learning Survey (PWLS). This is a completely anonymous survey, and has no influence on your course grades.

I am a doctoral student in the Organization, Information and Learning Sciences (OI&LS) program, and I am investigating online students' preferred ways of learning at UNM, based upon a variety of characteristics, such as ethnicity/culture, age, gender, online class experience, grade level, and program.

To participate you must meet the following criteria:

1) Completed one fully online UNM course (all (or most) of the class is conducted online and does not require physical classroom meetings on campus).
2) Completed one face-to-face college level course (class that meets regularly in a designated campus space, at UNM or other college).

The secure online survey delivered via Opinio involves answering basic, non-identifying, demographic questions, as well as answering a series of questions about learning in college. The survey should take about 15-30 minutes to complete.

Your involvement in the study is voluntary, and you may choose not to participate. There are no names or identifying information associated with this survey. The survey includes questions such as 1) I learn best when I connect the course material to my personal experiences, and 2) In my online classes, I prefer written discussions because they allow me time for reflection. You can refuse to answer any of the questions at any time (all questions have a "prefer not to respond" option), however, I hope that you will answer them all to help make this study worthwhile.

The findings from this project will provide information on better understanding the needs of diverse learners in order to create equitable learning environments that help foster student success and retention. It is hoped that the findings will provide valuable information for faculty and school administrators so that they will develop curriculum and courses that truly engages all students.

If you have any questions about this research project, please feel free to call Linda Barril at (505) 883-8877. If you have questions regarding your legal rights as a research subject, you may call the UNM Office of the IRB (OIRB) at (505) 277-2644.

Link to survey: https://esurvey.unm.edu/opinio/s?s=30306

Thank you for your consideration.

Sincerely,

Linda Barril
Doctoral Candidate
Organization, Information and Learning Sciences (OI&LS)
University of New Mexico

END OF COPIED TEXT ....

Dear Online Faculty,

I'm working on my dissertation, and I could really use your help. I need to invite all UNM's online students to take my research survey which investigates The influence of learner characteristics on preferred ways of learning of online college students: An examination of cultural constructs.

I am in the Organization, Information and Learning Sciences (OI&LS) program, and my focus is on the cultural aspects of online learning in higher education. Under the guidance of Professor Lani Gunawardena, I am conducting what I hope is a large-scale study to investigate how online students prefer to learn on an individuated-integrated continuum in the online environment. The continuum denotes the degree to which students prefer to purposely and actively incorporate their collegiate learning experiences into their everyday lives. Based on the recently published qualitative study by Ke and Chávez (2013), I plan to test their findings which indicated that students of Native and Hispanic American ethnic/cultural backgrounds tend to prefer learning in an integrated way, while students of Northern European Caucasian decent tend to prefer learning in an individuated way. Using the explanatory sequential mixed methods (Creswell & Clark, 2010) approach, I will also investigate online interaction preference (synchronous versus asynchronous), and learning environment preference (face-to-face versus online).

The primary goal of this research is to report results that inform faculty and academic administrators on creating equitable learning environments that are based upon the needs of diverse learners with the aim to foster student success and retention. As university student populations continue to change in terms of demographic diversity, educators must understand how best to reach all learners.

With sincerest gratitude,

Linda Barril
Doctoral Candidate
Organization, Information and Learning Sciences (OI&LS)

Creswell, J. W., & Clark, V. L. P. (2010). Designing and Conducting Mixed Methods Research (Second Edition.). SAGE Publications, Inc.

Ke, F., & Chávez, A. F. (2013). Web-Based Teaching and Learning across Culture and Age. New York, NY: Springer.

Appendix B

Consent Protocol, Phase 2

The University of New Mexico Consent to Participate in Research
Version Date 62914

Follow-up interview for Preferred Ways of Learning Survey (PWLS) for Dissertation Study: The influence of learner characteristics on preferred ways of learning of online college students: An examination of cultural constructs

Introduction

You are being asked to participate in a research study that is being done by student investigator, Linda Barril, under the guidance of Principle Investigator (PI) Charlotte N. Gunawardena from the Organization, Information and Learning Sciences (OILS) program. This research is studying online students' preferred ways of learning at UNM, based upon a variety of characteristics, such as ethnicity/culture, age, gender, online class experience, grade level, program, and location.

You are being asked to participate in this study because you have contacted the student investigator expressing your interest to take part in a follow-up interview for the online survey (PWLS) taken a few weeks ago. You have identified yourself as a student who has completed at least one online class at UNM and completed one face-to-face college class. Up to 14 people may take part in the interview portion of this study at the University of New Mexico.

This form will explain the research study, and will also explain the possible risks as well as the possible benefits to you. We encourage you to talk with your family and friends before you decide to take part in this research study. If you have any questions, please ask one of the study investigators.

What will happen if I decide to participate?

If you agree to participate, the following things will happen: you will be contacted by the student investigator to schedule a telephone or Skype interview to discuss your preferred ways of learning as a follow-up to the online survey. Interviews will be scheduled according to your availability and will last 30 to 60 minutes.

How long will I be in this study?

Participation in this study will take up to 2 hours over a period of eight weeks. Your initial 30 to 60 minute interview, may be followed by two brief interviews, an optional one (as the student investigator requires, and at your discretion) for elaboration on your original responses, and a required one, done to verify the accuracy of your statements as interpreted by student investigator. These two additional meetings will take 15 to 30 minutes each. After statements are verified, student participation is complete.

What are the risks or side effects of being in this study?

Minimal risks are involved in this study, however you may find some questions make you uncomfortable to answer. But you may refuse to answer any question, or stop at any time. There are no risks associated with this study, and your participation will not affect your grades.

What are the benefits to being in this study?

There will be no benefit to you from participating in this study. However, it is hoped that information gained from this study will help faculty, course designers, and university administration, to develop courses that better accommodate diverse learners.

What other choices do I have if I do not want to be in this study?

You have the option not to take part in this study. There will be no penalties involved if you choose not to take part in this study.

How will my information be kept confidential?

Your interview responses will be securely stored on a laptop with encryption and be accessible only to the student investigator and PI. Once you have been contacted to verify the accuracy of your statement (within 8 weeks of your initial interview), all information will be de-identified.

We will take measures to protect the security of all your personal information, but we cannot guarantee confidentiality of all study data.

Information contained in your study records is used by study staff. The University of New Mexico Institutional Review Board (IRB) that oversees human subject research and/or other entities may be permitted to access your records. There may be times when we are required by law to share your information. Your name will not be used in any published reports about this study.

What are the costs of taking part in this study?

There are no direct costs involved, but please note that your usual telephone or Skype charges may apply (Skype is a free service).

Will I be paid for taking part in this study?

There is no compensation for this part of the study.

How will I know if you learn something new that may change my mind about participating?

You will be informed of any significant new findings that become available during the course of the study, such as changes in the risks or benefits resulting from participating in the research or new alternatives to participation that might change your mind about participating Can I stop being in the study once I begin?
Your participation is completely voluntary and you may decide which questions to answer as you prefer. If you decide not to participate at all, or decide not to continue to participate, just inform the student investigator (no reason is required). You can also request that your data not be included any longer up until the student investigator contacts your to verify your statements for accuracy (8-12 weeks). Alternatively, the student investigator will have to drop you from the study if 1) you fail to schedule an interview appointment, or 2) miss your appointment on the second attempt.

Whom can I call with questions or complaints about this study?

If you have any questions, concerns or complaints at any time about the research study, contact the Linda Barril at lbarril@unm.edu.

If you would like to speak with someone other than the research team, you may call the UNM Office of the IRB at (505) 277-2644.

Whom can I call with questions about my rights as a research participant?

If you have questions regarding your rights as a research participant, you may call the UNM Office of the IRB (OIRB) at (505) 277-2644. The IRB is a group of people from UNM and the community who provide independent oversight of safety and ethical issues related to research involving human participants. For more information, you may also access the OIRB website at http://irb.unm.edu

CONSENT

You are making a decision whether to participate in this study. Your signature below indicates that you have read the information provided. By signing this consent form, you are not waiving any of your legal rights as a research participant.

I have had an opportunity to ask questions and all questions have been answered to my satisfaction. By signing this consent form, I agree to participate in this study. A copy of this consent form will be provided to you.

____

Name of Adult Subject (print)

____ ____________________

Signature of Adult Subject Date

INVESTIGATOR SIGNATURE

I have explained the research to the participant and answered all of his/her questions. I believe that he/she understands the information described in this consent form and freely consents to participate.

Linda Barril

Name of Investigator/ Study Team Member (print)

____ ____________________

Signature of Investigator/Study Team Member Date

Appendix C

Ethnicity Self-ID Results

Race/Ethnicity Selection	Type-in Identification Responses	Student Count
American Indian/Alaska Native	Native American, Navajo, N/A	6
Asian	Asian, Asian/White, East Indian, Filipino, Indian, Japanese, Vietnamese	7
Black or African American	African American, Black, NA, White	6
Hispanic or Latino	Anglo/Spanish, Caucasian, Chicana, Chicana/Mexican-American, European, Hispanic, Latina, Mexican, Mixed, NA, Native American, Spanish/Anglo, White	39
Two or More	Asian/American, Mixed, NA, White, White & Native American	8
White	American, Anglo, Black, Caucasian, Caucasian American, Chicana, Hispanic, Irish/Polish/American, Italian, Mediterranean, NA, Polish, Polynesian, Veteran, White, White/Native American/Hispanic	71
Various	No response	3
Total		140

Part I – Comparison of Race/Ethnicity Categories with Self Identification Type-in (N=137)

Part 2

ANOVA Statistics for Race/Ethnicity Categories and Self Identification Questions

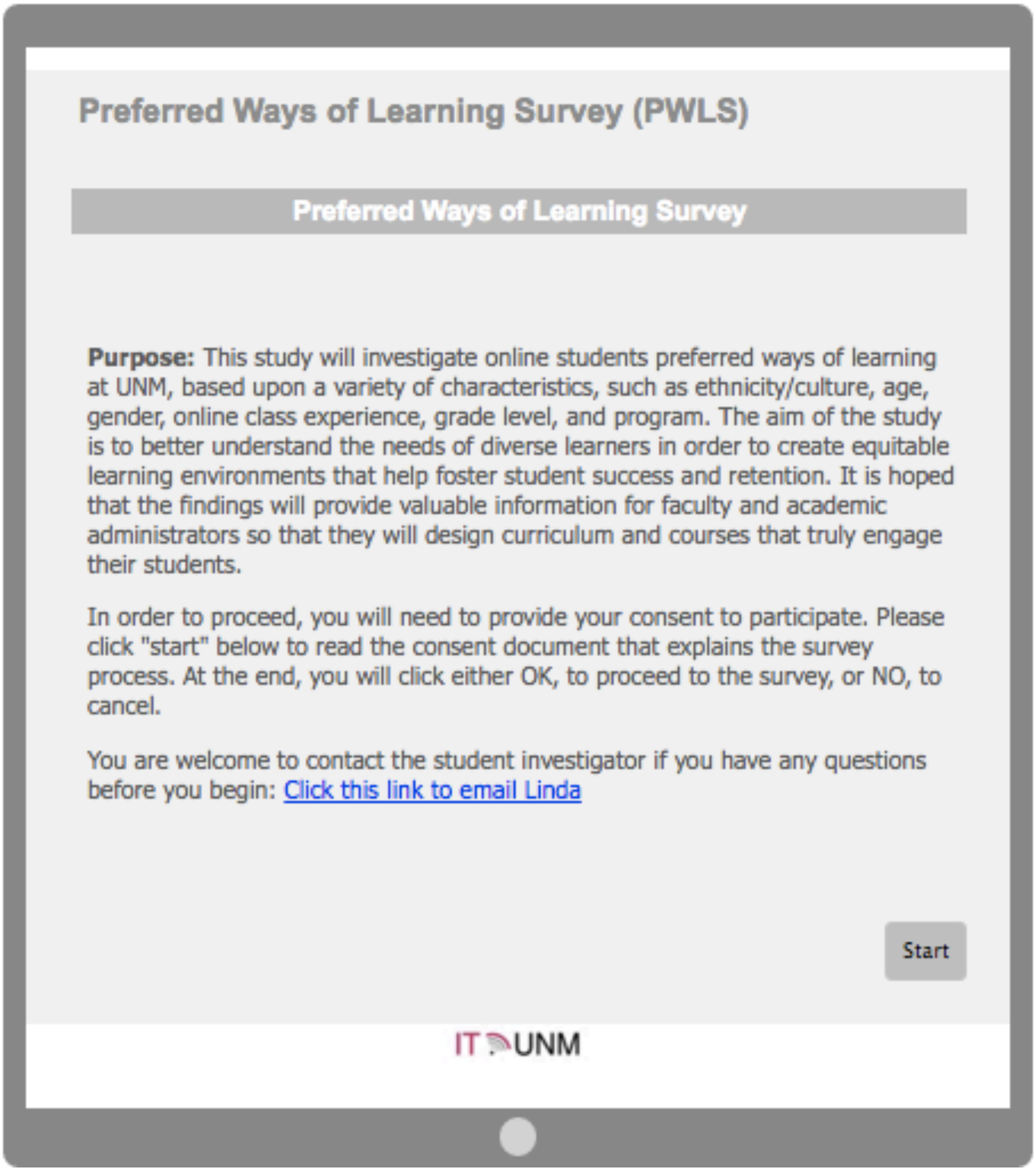
	N	Mean	SD	SE	Levene's Test	df	f	Sig (2-tailed)	Mean Diff (Tukey HSD)	CI-L	CI-U	ES/ Eta^2
Ethnic ID item 1: I have spent time trying to find out more about my ethnic group(s), such as its history, traditions, and customs. *M* = 4.42, *SD* = 1.8, Min = 1 (strongly disagree), Max = 7 (strongly agree).												
1) N. Am	6	5.50	1.87	.764						4	7	
2) Asian	7	4.00	2.08	.787						2	6	
3) Black	6	6.17	.408	.167						6	7	
4) Hispanic	39	4.45	1.96	.313						4	5	
5) Two or more	8	4.50	1.69	.598						3	6	
6) White	71	4.21	1.72	.204						4	5	
Total	137	4.43	1.81	.155	.072	5	1.87	.105		4	5	
Ethnic ID item 2: I have a strong sense of belonging to my own ethnic group(s). *M* = 4.84, *SD* = 1.7, Min = 1 (strongly disagree), Max = 7 (strongly agree).												
1) N. Am	6	6.33	1.21	.494						5	8	
2) Asian	7	5.28	1.39	.524						4	7	
3) Black	6	6.00	.632	.258						5	7	
4) Hispanic	39	4.89	1.89	.302						4	6	
5) Two or More	8	4.25	1.39	.491						3	5	
6) White	71	4.58	1.71	.203						4	5	
Total	137	4.83	1.73	.147	.089	5	2.13	.066		5	5	
Ethnic ID item 3: I understand pretty well what my ethnic group(s) membership means to me. *M* = 5.11, *SD* = 1.7, Min = 1 (strongly disagree), Max = 7 (strongly agree).												
1) N. Am	6	6.03	1.03	.421						5	7	
2) Asian	7	5.14	1.22	.459						4	6	
3) Black	6	6.00	.894	.365						5	7	
4) Hispanic	39	4.98	2.06	.330						4	6	
5) Two or More	8	4.13	1.55	.549						3	5	
6) White	71	5.12	1.55	.184						5	5	

Total	137	5.10	1.68	.143	.029+*	5	1.31	.262		5	5
							2.30+	.085+			
							1.90+	.110+			

+ Due to violation of Levene's test (unequal variance), the Welch (second row) and Brown-Forsythe (third row) Robust Test of Equality of Means values are provided; * Statistical significance at <.05; + Likert-type scales, 1 = Strongly Disagree, 7 = Strongly Agree. Maximum score for each item = 7. These items were drawn from the "affective component" of Phinney's (1992) Multigroup Ethnic Identity Measure (MEIM), to "address students' sense of affirmation, belonging, and commitment" (p. 156).

Appendix D

Preferred Ways of Learning Survey (PWLS)



Preferred Ways of Learning Survey (PWLS)

Preferred Ways of Learning Survey

Purpose: This study will investigate online students preferred ways of learning at UNM, based upon a variety of characteristics, such as ethnicity/culture, age, gender, online class experience, grade level, and program. The aim of the study is to better understand the needs of diverse learners in order to create equitable learning environments that help foster student success and retention. It is hoped that the findings will provide valuable information for faculty and academic administrators so that they will design curriculum and courses that truly engage their students.

In order to proceed, you will need to provide your consent to participate. Please click "start" below to read the consent document that explains the survey process. At the end, you will click either OK, to proceed to the survey, or NO, to cancel.

You are welcome to contact the student investigator if you have any questions before you begin: Click this link to email Linda

Start

IT UNM

Preferred Ways of Learning Survey (PWLS)

Consent to Participate

The University of New Mexico

Informed Consent for Surveys

Version 062914

Preferred Ways of Learning Survey (PWLS) for Dissertation Study:

The impact of learner characteristics on preferred ways of learning of online college students: An examination of cultural constructs

Linda Barril, under the guidance of Charlotte N. Gunawardena from the Organization, Information and Learning Sciences program, is conducting a research study. This research is studying online students' preferred ways of learning at UNM, based upon a variety of characteristics, such as ethnicity/culture, age, gender, online class experience, grade level, program, and location. You are being asked to participate in this study because you have been identified as a student who is enrolled in an online course during the Fall 2014 semester. In order to participate you must have completed at least one fully online at UNM and one face-to-face college level course (at any university or college). A fully online course is one in which all (or most) of the class is conducted online and does not require classroom meetings; a face-to-face class is conducted in a classroom on campus.

Your participation will involve completing the online Preferred Ways of Learning Survey (PWLS) which involves answering basic, non-identifying, demographic questions, as well as answering a series of questions about learning in college. The survey should take about 15-30 minutes to complete.

Your involvement in the study is voluntary, and you may choose not to participate. There are no names or identifying information associated with your responses to this survey. The survey includes questions such as 1) I learn best when I connect the course material to my personal experiences, and 2) In my online classes, I prefer written discussions because they allow me time for reflection. You can refuse to answer any of the questions at any time (all questions have a "prefer not to respond" option), however, I hope that you will answer them all to help make this study worthwhile.

At the end of the survey you will be asked if you would like to be contacted to participate in a follow-up interview related to this study. If you are interested, you may click on the link provided on the thank you page, which opens a new compose email window addressed to the student investigator; within the email message you will share your preferred contact information (name and email address, and/or telephone number) with only the student investigator. This email is entirely separate from your survey responses and has no effect at all on your course grades. Interview responses will be non-identifiable, and any quotations used in the dissertation thesis will be anonymous, and used to support the results of the study and illustrate key findings.

There are no known risks in this study, but some individuals may experience discomfort when answering questions.

The findings from this project will provide information on better understanding the needs of diverse learners in order to create equitable learning environments that help foster student success and retention. It is hoped that the findings will provide valuable information for school administrators, course designers, and teachers so that they may develop curriculum and courses that truly engage all students.

If you have any questions about this research project, please feel free to call Linda Barril at (505) 883-8877. If you have questions regarding your legal rights as a research subject, you may call the UNM Office of the IRB (OIRB) at (505) 277-2644.

By clicking "OK" you will be agreeing to participate in the above described research study.

Thank you for your consideration.

Sincerely,

Linda Barril
Doctoral Candidate
Organization, Information and Learning Sciences

THE UNIVERSITY OF NEW MEXICO · 1889 ·

Number: 11514
Version: 7/5/2014
Approved: 8/25/2014
Expires: 8/24/2015

Institutional Review Board

OK - clicking here allows access to begin survey
NO - clicking here takes you to a thank-you screen

1%

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Preferred Ways of Learning Survey (PWLS)

Part A ~ Demographic Information

1. Age:
   - 22 and younger
   - 23-28
   - 29-34
   - 35-40
   - 41-45
   - 46-49
   - 50-54
   - 55 and older
   - Prefer not to respond

2. Gender:
   - Female
   - Male
   - Prefer not to respond

3. Level:
   - Undergraduate
   - Graduate, master's degree
   - Graduate, doctor's degree
   - Non-degree – Undergraduate
   - Non-degree - Graduate
   - Prefer not to respond

4. Major: Please choose your major from the dropdown list below.

   You may also choose "Undecided," "Prefer not to respond," or "Other" where you can type in a major

   that isn't listed.

   Undecided
   Prefer not to respond

   Other - if you selected other, please type in your major

5. Number of ***fully online**** classes **completed** at college level:

   *class in which all (or most) of the class is conducted online and does not require physical classroom meetings on campus.
   - 1
   - 2
   - 3
   - 4+
   - Prefer not to respond

6. Number of ***face-to-face*** classes taken at college level* (class meets regularly in a designated campus space):

* any university or college

- 1
- 2
- 3
- 4+
- Prefer not to respond

7. ***US Census Categories:*** ***You may choose all that apply to you.***

- American Indian or Alaska Native (origins in any of the original peoples of the North and South America (inc. Central America) who maintains cultural identification through tribal affiliation or community attachment)
- Asian (origins in any of the original peoples of the Far East, Southeast Asia, or the Indian Subcontinent, inc. for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, Philippine Islands, Thailand, & Vietnam)
- Black or African American (origins in any of the black racial groups of Africa)
- Hispanic or Latino (origins of Cuban, Mexican, Puerto Rican, South or Central American, or Spanish culture or origin, regardless of race)
- Native Hawaiian or Other Pacific Islander (origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Island)
- White (origins in any of the original peoples of Europe, the Middle East, or North Africa)
- Prefer not to respond

8. ***Self-identification:***

In terms of ethnic group(s), I consider myself to be (please type in):

Otherwise, please enter "N/A" if you prefer not to respond.

9. The next three statements are about your ***ethnic identity*** - Click on the button that indicates **how much** you agree or disagree with each statement.

	Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree	**Prefer not to respond**
I have spent time trying to find out more about my ethnic group(s), such as its history, traditions, and customs								
I have a strong sense of belonging to my own ethnic group(s)								
I understand pretty well what my ethnic group(s) membership means to me								

13%

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Preferred Ways of Learning Survey (PWLS)

Part B - Preferred Ways of Learning

The first eight statements ask about your primary reasons for choosing to pursue a college degree.

Consider each of the statements carefully, and rate them in terms of **how much** you agree or disagree.-- (click only 1 circle for each statement) --

10. I'm in college because it's necessary for my chosen career.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

11. I'm pursuing my college degree to prove to myself what I can do.

	1	2	3	4	5	6	7	8	9	10		Prefer not To Respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

12. I'm in college to become self-sufficient and independent.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

13. My community is counting on me to get my college degree.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

14. My family is counting on me to get my college degree.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

15. My college degree will enable me to support myself.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

16. I'm pursuing my college degree to benefit both myself and my community.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

17. I view my college studies as an opportunity to develop deep wisdom.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

24%

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Preferred Ways of Learning Survey (PWLS)

The following 43 statements seek to understand your views on learning as a college student enrolled in online classes.

For statements that address your **natural ways of learning** we mean the ways you typically learn on your own when you really want to learn something in-depth.

Consider each of the statements carefully, and rate them in terms of **how much** you agree or disagree. -- (click only 1 circle for each question) --

18. I like to participate in online discussions even when they aren't required.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

19. When I learn something new, I prefer to start with activities (labs, case studies, story-telling).

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

20. My online instructors often encourage us to relate what we learn in class to our personal experiences and/or the world around us.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

21. I often try to figure out how what I learn in school connects with my everyday life and/or the world around me.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

22. I only participate in online discussions when they're required.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

23. The only interaction I really need in my online courses is with my instructor.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

24. I think my primary and secondary school experiences have shaped the ways I learn most naturally.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

25. I don't allow my emotions to get in the way when I'm trying to learn something.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

26. I learn best when I keep what I'm learning in college separate from my everyday life.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

27. I like instructors who are flexible, and tailor the course to meet student needs and interests.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

28. I wish my online instructors would encourage me to connect what I'm learning with the other courses in my major.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

29. I tend to learn just the amount required to get good grades.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

30. I find that I can use my most natural ways of learning more easily in my online college courses than in my face-to-face courses.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

31. I prefer college courses that provide a variety of learning materials, like videos, podcasts, visuals (i.e., charts, diagrams, mind maps, etc.), and etc.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

32. I prefer learning step-by-step, from the smaller parts of a subject first, in order to better understand the whole.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

33. The courses in my major are structured so that I can easily understand their relation to one another.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

34. My learning is enhanced when I can interact with others in my online courses.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

35. I like instructors who follow a fixed structure with very specific goals that every student must meet.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

36. I often use my intuition and emotions to help me learn.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

37. I prefer instructors who lead us to make our own new discoveries.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

38. I primarily use the power of my mind (intellect) to learn.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

39. Interacting with my online classmates helps me gain a deeper understanding of the course material.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

40. I prefer learning about the "big picture" of a subject first in order to better understand how the separate parts fit.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

41. I find that I often approach learning for my college courses differently from learning for my own personal interests.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

42. My online instructors often encourage us to find connections between the other courses we're taking within our major.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

43. I think my online classmates' ideas and interpretations can be distracting.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

44. I use different learning approaches depending on the learning task, regardless of whether it's for my college courses or my personal interests.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

45. I learn best when I can compare and contrast my views with those of my online classmates.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

46. I prefer college courses that are mostly made up of lectures and readings.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

47. I prefer to take personal responsibility for my learning, and do not rely on the support of my online classmates.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

48. I learn most naturally when I can figure things out on my own.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

49. I think what I learn in college is separate from my everyday life.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

50. I tend to use my intellect and some combination of my other senses when I learn (seeing, doing, feeling, sensing).

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

51. I wish my online instructors would encourage me to relate what I'm learning to my personal experiences and/or the world around me.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

52. I learn well enough on my own in my online courses, without any interaction with my classmates.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

53. I tend to focus more on my own work, and rarely look at what my online classmates are doing.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

54. In general, I find that my online college courses are structured so that I can learn in ways that feel the most natural to me.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

55. I rarely read more than what the instructor says I have to.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

56. I prefer instructors who provide only specific expert information that I need to learn so I can do well on my tests.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

57. I think my most natural ways of learning were developed through interactions with my family and/or community.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

58. When I learn something new, I prefer to start with abstract theories and concepts.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

59. I learn best when I can connect the course material to my personal experiences and/or the world around me.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

60. I try to learn above and beyond what my instructors focus on so I can really understand a topic.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

82%

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Preferred Ways of Learning Survey (PWLS)

Part C – Online Interaction Preference

These statements address your online interaction preference, either **synchronous (real-time interaction)**, like Collaborate, Google Hangouts, and Skype, or **asynchronous (delayed-time)**, such as discussion forums, wikis, and blogs.

Consider each of the statements carefully, and rate them in terms of **how much** you agree or disagree. -- (click only 1 circle for each statement) --

61. In general, I think live web conferences are more engaging than written discussions in my online courses.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

62. I prefer real-time web conferences in my online courses because I can receive immediate feedback from my instructor and classmates.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

63. In general, I find written discussions more engaging than live web conferences in my online courses.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

64. I prefer written discussions in my online courses because they allow me time for reflection.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

87%

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Preferred Ways of Learning Survey (PWLS)

Part D – Learning Environment Preference

These statements seek to understand your learning environment preference, face-to-face (*course that meets regularly in a designated campus space*) or online (*course in which all - or most - is conducted online and does not require physical classroom meetings on campus*).

Consider which environment is a better match with your **natural preferred ways of learning** (the ways you typically learn on your own when you really want to learn something in-depth).

Consider each of the statements carefully, and rate them in terms of **how much** you agree or disagree. -- (click only 1 circle for each question) --

65. I prefer blended learning classes that have some face-to-face and some online components.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

66. I general, I feel more comfortable in my online courses that I do in my face-to-face courses.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

67. I tend to have a stronger connection with my instructors in online courses than with my instructors in face-to-face courses.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

68. I tend to engage more deeply with the subjects I take in online courses than I do in face-to-face courses.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

69. I tend to engage more easily with my online classmates than my face-to-face classmates.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

70. I prefer the social aspect of my face-to-face courses.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

71. I prefer face-to-face courses because they're what I'm most used to.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

72. I tend to feel isolated from my instructor and classmates in my online courses.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

73. I just don't think I can learn as well online as I can in face-to-face courses.

	1	2	3	4	5	6	7	8	9	10		Prefer not to respond
Strongly Disagree	○	○	○	○	○	○	○	○	○	○	Strongly Agree	○

100%

Back Save Finish

Preferred Ways of Learning Survey (PWLS)

Thank you very much for taking the time to respond to this survey!

Email Researcher - **Click this link** if you're interested in being contacted for a **follow-up interview** related to this study; please include your preferred contact information (email address and/or telephone number).

Follow-up interviews will be used to strengthen the findings of the survey but are not linked to your survey response, and in no way affects your grades. Interview responses will not be shared with anyone (other than the PI), and will be held secure. Interviews, conducted by telephone or Skype will be scheduled at your convenience, and will take between 30 and 60 minutes. Additional information about the interview will be provided on the consent form should you volunteer to participate.

NOTE: When the link is clicked, a new compose email window addressed to the student investigator will open.

If you're not interested in an interview, just close the window to exit the survey.

Appendix E

Factor Analysis, Principle Components, Pattern & Structure Matrixes

Scale/Item	Pattern coefficients		Structure coefficients		Communalities
	Comp 1	Comp 2	Comp 1	Comp 2	
Purpose of Learning; KMO Measure of Sampling Adequacy .757					
q15r	**-.890**		-.838		**.720**
q12r	**-.736**		-.783	-.397	**.628**
q14	**.709**		.766	.415	**.609**
q10r	-.707		-.672		.459
q13	**.519**	.417	.670	.605	**.601**
q17		.855		,843	.711
q16		.758		.764	.583
q11r		-.710		-.710	.505
Variance	44%	17%			
Ways of Taking In and Processing Knowledge; KMO Measure of Sampling Adequacy .587					
q57	**.688**		.681		**.472**
q50	**.624**		.617		**.389**
q44	**.614**		.629		**.434**
q36	**.529**		.509		**.324**
q31	**.496**		.499		**.251**
q41r	-.362		-.377		.176
q25r		.753		.742	.568
q38r	-.368	.648	-.419	.677	.593
q46r		.613		.595	.409
q24r		.308		.320	.124
Variance	22%	16%			
Interconnectedness of What is Being Learned KMO Measure of Sampling Adequacy .711					
q59	**.747**		.768	.301	**.645**
q21	**.719**	.318	.747	.380	**.658**
q51	**.687**		.667		**.503**
q20	**.638**		.650		**.443**
q28	.600		.580		.389
q42	.582		.579		.336
q33	.362		.363		.132
q49r		**.858**		.858	**.736**
q26r		**.812**		.815	**.666**
Variance	33%	18%			
Responsibility for Learning KMO Measure of Sampling Adequacy .674					
q55r	.855		.844		.738
q29r	.768		.773		.604
q60	.767		.775		.615
q47r		**.810**		.818	**.685**
q48r		**.757**		.770	**.633**
q53r	.324	**.749**		.728	**.634**
Variance	36%	29%			
Role of the Teacher/Control KMO Measure of Sampling Adequacy .437*					
q27	.764	-.337	.828		.697
q37	.632	.439	.489	.566	.591
q35r	.516		.523		.275
q56r		.886		.874	.786
Variance	31%	28%			
Student Interaction KMO Measure of Sampling Adequacy .779					
q39	**.790**		.849	.434	**.757**
q34	**.766**		.828	.437	**.725**
q45	.729		.785	.405	.648
q52r	**.715**		.676		**.470**
q43r	.656		.672		.392
q23r	**.636**		.600	.322	**.472**
q18		.898	.353	.923	.858
q22r		.882		.884	.781
Variance	48%	16%			
Sequencing KMO Measure of Sampling Adequacy .464*					
q19	.806		.751		.650

q32	.661	.576	.816	-.333	.768
q58r	-.581	.494		.827	.747
q40r		.860	-.381	.680	.582
Variance	36%	33%			

* KMO failed to reach minimum required (>.5); Items used for analyses in bold.

Appendix F

Interview Questions

1. Purpose of Learning:

Please share the reasons why you decided to get a college degree…

2. Ways of Taking In and Processing Knowledge

Describe how you learn best in your college courses (consider: your personal processes of learning; what things work best on the part of your teacher, on your own part; does your process differ when you learn other, non-college, things)…

3. Interconnectedness of What is Being Learned

Do you think what you learn in college is connected to your personal life and/or the world around you (consider: do you make connections on your own; if so, how do you make these connections; do these connections matter to you)…

4. Responsibility for Learning

Please share your thoughts on how you take personal responsibility for learning in your online classes (consider: do you prefer to learn on your own; do you prefer to learn in groups)…

5. Role of the Teacher/Control

Please describe how teachers can be the most effective for you in your online classes (consider: also ineffective online teachers)…

6. Online Student Interactions

Please describe why peer interaction is important to you or not in your online classes…

7. Online Interaction Preference

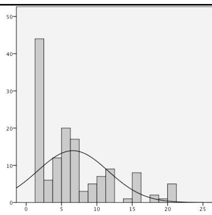
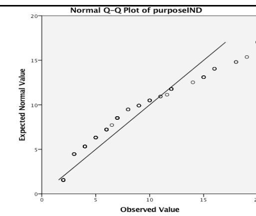
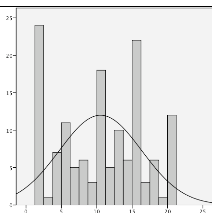
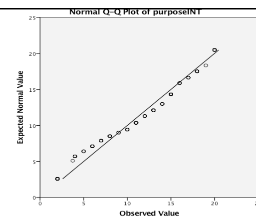
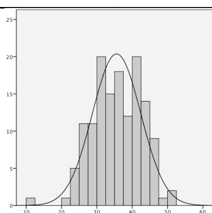
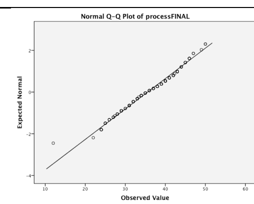
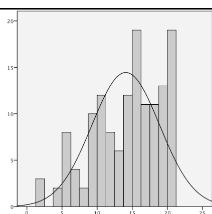
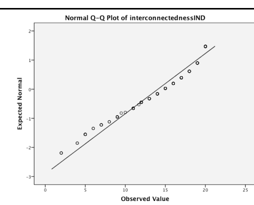
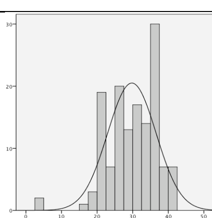
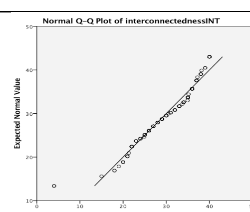
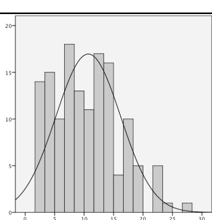
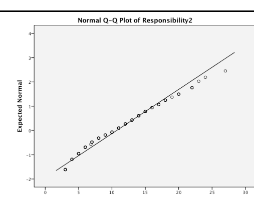
Please tell me if you have a preference for synchronous (i.e., web conference) or asynchronous (i.e., discussion forums) interaction in your online classes (consider: is one type more effective for you, and why)…

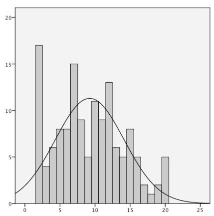
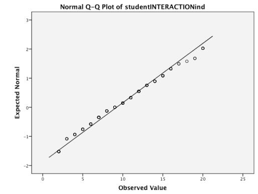
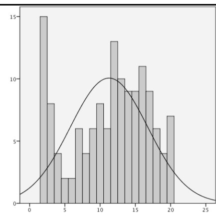
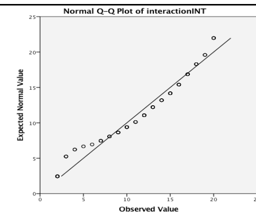
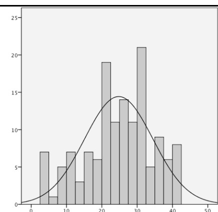
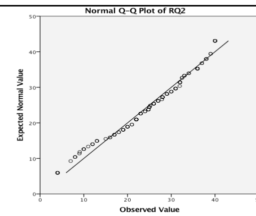
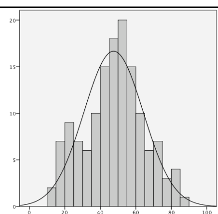
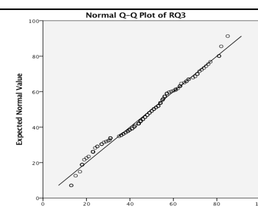
8. Learning Environment Preference

Please describe if and why online or face-to-face classes are better for you…

Appendix G

Histograms and Q-Q Plots for All Retained Scales

Variable	Histogram	Normal Q-Q Plot	Mean/Skewness/Kurtosis
Purpose of Learning, Individuated (n=140)			Mean = 6.59 *SD* = 5.02 *SE* = .424 Skewness = 1.15, SE = .205 Kurtosis = .507, SE = .407
Purpose of Learning, Integrated (n=140)			Mean = 10.53 *SD* = 5.82 *SE* = .492 Skewness = -.065, SE = .205 Kurtosis = -1.18, SE = .407
Ways of Taking In and Processing Knowledge, Integrated (n=140)			Mean = 35.57 *SD* = 6.85 *SE* = .579 Skewness = -.218, SE = .205 Kurtosis = -.130, SE = .407
Interconnectedness of What is Being Learned, Individuated (n=140)			Mean = 14.07 *SD* = 4.83 *SE* = .408 Skewness = -.642, SE = .205 Kurtosis = -.466, SE = .407
Interconnectedness of What is Being Learned, Integrated (n=140)			Mean = 29.76 *SD* = 6.81 *SE* = .576 Skewness = -.828, SE = .205 Kurtosis = 1.31, SE = .407
Responsibility for What is Being Learned, Individuated (n=140)			Mean = 10.71 *SD* = 5.49 *SE* = .464 Skewness = .509, SE = .205 Kurtosis = -.342, SE = .407

Student Interactions, Individuated (n=139)			Mean = 9.23 *SD* = 4.91 *SE* = .416 Skewness = .293, SE = .206 Kurtosis = -.668, SE = .408
Student Interactions, Integrated (n=139)			Mean = 11.27 *SD* = 5.51 *SE* = .468 Skewness = -.331, SE = .206 Kurtosis = -1.01, SE = .408
Online Interaction Preference, Synchronous/Asynchronous (*n*=140)			Mean = 24.78 *SD* = 9.68 *SE* = .818 Skewness = -.428, SE = .205 Kurtosis = -.501, SE = .407
Learning Environment Preference, Online/Face-to-Face (*n*=140)			Mean = 47.47 *SD* = 17.76 *SE* = 1.42 Skewness = -.070, SE = .205 Kurtosis = -.495, SE = 407

Appendix H

Statistics Tables, Purpose of Learning

Purpose of Learning, Independent Samples T-tests

Learner Characteristic	N	Mean	SD	SE Mean	Levene's Test	df	t	Sig (2-tailed)	Mean Diff	CI-L	CI-U	Effect Size
Individuated												
1) Female	98	6.42	4.78	.483	.231	138	-.63	.532	-.581	-2.4	1.3	
2) Male	42	7.00	5.58	.857								
1) Undergrad	99	5.92	4.50	.453	.014^{+}*	138	-2.3^{+}	.028^{+}*	-2.3	-4.3^{+}	-.25^{+}	
2) Grad	41	8.21	5.82	.909								.21
1) Exp OL <4	82	6.44	4.8	.534	.643	137	-.503	.616	-.437	-2.2	1.3	
2) Exp OL 4+	57	6.88	5.3	.704								
1) Exp F2F <4	123	6.47	4.98	.449	.583	137	-.957	.340	-1.3	-3.9	1.4	
2) Exp F2F 4+	16	7.75	5.41	1.35								
1) Native Am	6	4.67	2.16	.882	.126	75	-.955	.343	-1.9	-6.1	2.1	
2) White	71	6.64	4.99	.592								
1) Asian	7	5.71	6.6	2.5	.627	76	-.453	.652	-.921	-4.9	3.1	
2) White	71	6.64	4.99	.592								
1) African Am	6	7.33	5.9	2.4	.374	75	.325	.746	.698	-3.6	4.9	
2) White	71	6.64	4.99	.592								
1) Hispanic	39	6.59	5.24	.838	.528	108	-.045	.964	-.046	-2.1	1.9	
2) White	71	6.64	4.99	.592								
1) Two or more	8	8.88	4.67	1.65	.933	77	1.21	.229	2.24	-1.4	5.9	
2) White	71	6.64	4.99	.592								
Integrated												
1) Female	98	10.26	5.92	.598	.184	138	-.819	.414	-.880	-3.0	1.2	
2) Male	42	11.14	5.60	.865								
1) Undergrad	99	11.28	5.64	.567	.572	138	2.43	.016*	2.58	.481	4.7	
2) Grad	41	8.70	5.91	.922								.22

1) Exp OL <4	82	10.41	5.97	.659	.749	137	-.201	.841	-.203	-2.2	1.8
2) Exp OL 4+	57	10.61	5.67	.751							
1) Exp F2F <4	123	10.47	5.81	.524	.919	137	-.140	.889	-.218	-3.3	2.9
2) Exp F2F 4+	16	10.69	6.17	1.54							
1) Native Am	6	13.83	5.64	2.3	.519	75	.1.52	.132	3.85	-1.2	8.9
2) White	71	9.98	5.97	.709							
1) Asian	7	11.29	5.06	1.91	.237	76	.557	.579	1.30	-3.4	6.0
2) White	71	9.98	5.97	.709							
1) African Am	6	12.00	4.24	1.73	.057	75	.808	.422	2.0	-3.0	7.0
2) White	71	9.98	5.97	.709							
1) Hispanic	39	11.36	6.12	.979	.747	108	1.15	.254	1.38	-1.0	3.8
2) White	71	9.98	5.97	.709							
1) Two or more	8	8.63	4.44	1.57	.083	77	-.622	.536	-1.36	-5.7	3.0
2) White	71	9.98	5.97	.709							

$^{+}$ Because Levene's test was statistically significant, equal variances not assumed figures are reported. * Statistical significance at <.05. Likert-type scales, 0 = Prefer not to respond, 1 = individuated preference, 10 = integrated preference. Maximum score for each revised scale = 20.

Purpose of Learning, ANOVA Statistics

	N	Mean	SD	SE	Levene's Test	df	f	Sig (2-tailed)	Mean Diff (Tukey HSD)	CI-L	CI-U	ES/ Eta^2
Individuated												
Age												
1) 22 & <	36	4.83	3.05	.508					6.77*	4	6	.6
2) 23-28	25	4.36	2.56	.513					7.24*	3	5	.6
3) 29-34	20	8.35	6.54	1.46						5	11	
4) 35-40	17	5.53	4.02	.974					6.07*	3	8	.5
5) 41-45	10	11.60	5.58	1.77					-6.77*	8	16	
									-7.24*			
									-6.07			
6) 46-49	11	8.41	5.75	1.73						5	12	
7) 50-54	13	8.89	5.78	1.60						5	12	
8) 55 & >	8	6.88	6.06	2.14						2	12	
Total	140	6.59	5.02	.424	<.001^{+}*	7	3.9	<.001*		6	7	.19
						7^{+}	3.89^{+}	.003^{+}*				
						7^{+}	3.59^{+}	,002^{+}*				
Experience – Online (number of classes)												
1) 1	23	8.04	6.5	1.35						5	11	
2) 2	19	7.26	4.59	1.05						5	9	
3) 3	15	4.60	3.50	.904						3	7	
4) 4	82	6.44	4.84	.534						5	8	
Total	139	6.62	5.02	.426	.048^{+}*	3	1.58	.196		6	7	
						3	1.97^{+}	.134^{+}				
						3	1.61^{+}	.196^{+}				
Experience – Face-to-Face (number of classes)												
1) 1	6	9.33	4.89	1.99						4	14	
2) 2	3	6.67	4.51	2.6						-5	18	
3) 3	6	7.00	7.13	2.91						-.5	14	

4) 4	123	6.47	4.98	.449						6	7	
Total	138	6.62	5.04	.429	.683	3	.621	.603		6	7	
Ethnicity												
1) N. Am	6	4.67	2.16	.882						2	7	
2) Asian	7	5.71	6.60	2.50						-.4	12	
3) Black	6	7.33	5.92	2.42						1	14	
4) Hispanic	39	6.59	5.24	.838						5	8	
5) Two or more	8	8.88	4.67	1.65						5	13	
6) White	71	6.64	4.99	.592						5	8	
Total	137	6.65	5.05	.431	.515	5	.558	.732		6	8	
Integrated												
Age												
1) 22 & <	36	12.64	4.68	.780					6.54*	11	14	.6
									7.1*			.6
2) 23-28	25	13.64	5.02	1.00					7.5**	12	16	.6
									8.1*			.6
3) 29-34	20	9.75	6.70	1.50						7	13	
4) 35-40	17	9.94	6.01	1.46						7	13	
5) 41-45	10	6.10	4.73	1.49					-6.54*	3	9	
									-7.5*			
6) 46-49	11	9.09	4.35	1.31						6	12	
7) 50-54	13	5.52	4.64	1.29					-7.1*	3	8	
									-8.1*			
8) 55 & >	8	10.13	6.49	2.30						5	16	
Total	140	10.53	5.82	.492	145	7	4.9	<.001*		10	12	.21
						7	5.5^{+}	$<.001^{+}$*				
						7	4.7^{+}	$<.001^{+}$*				
Experience – Online (number of classes)												
1) 1	23	9.65	6.80	1.42						7	13	
2) 2	19	10.84	4.30	.986						9	13	
3) 3	15	11.80	5.40	.1.40						9	15	
4) 4	82	10.41	5.97	.659						9	12	

Total	139	10.49	5.83	.494	.054	3	.433	.729	10	12
Experience – Face-to-Face (number of classes)										
1) 1	6	8.50	5.43	2.22					3	14
2) 2	3	12.33	7.51	4.33					-6	31
3) 3	6	12.67	6.89	2.81					5	20
4) 4	123	10.47	5.81	.524					9	12
Total	138	10.52	5.84	.497	.967	3	.621	.603	10	12
Ethnicity										
1) N. Am	6	13.83	5.64	2.30					8	20
2) Asian	7	11.29	5.06	1.91					7	16
3) Black	6	12.00	4.24	1.73					8	16
4) Hispanic	39	11.36	6.12	.979					9	13
5) Two or more	8	8.63	4.44	1.57					5	12
6) White	71	9.98	5.97	.709					9	11
Total	137	10.62	5.83	.5.83	.264	5	.932	.463	10	12

+ Due to violation of Levene's test (unequal variance), the Welch (second row) and Brown-Forsythe (third row) Robust Test of Equality of Means values are provided; * Statistical significance at <.05; Games-Howell post hoc mean differences matched the Tukey HSD figures. + Likert-type scales, 0 = Prefer not to respond, 1 = individuated preference, 10 = integrated preference. Maximum score for each revised scale = 20.

Appendix I

Statistics Tables, Ways of Taking In and Processing Knowledge

Ways of Taking In and Processing Knowledge, Independent Samples T-tests

Learner Characteristic	N	Mean	SD	SE Mean	Levene's Test	df	t	Sig (2-tailed)	Mean Diff	CI-L	CI-U	Effect Size
1) Female	98	34.81	6.90	.697	.719	138	-2.02	.045*	-2.5	-5.0	-.06	.19
2) Male	42	37.34	6.47	.999								
1) Undergrad	98	36.16	6.64	.671	.927	138	-.146	.121	1.96	-.53	4.45	
2) Grad	42	34.20	7.23	.1.12								
1) Exp OL <4	82	36.03	6.71	.741	.929	137	.895	.372	1.06	-1.3	3.41	
3) Exp OL 4+	57	35.00	7.12	.942								
1) Exp F2F <4	123	35.63	6.94	.337	.818	137	.137	.891	.251	-3.4	3.9	
2) Exp F2F 4+	16	35.38	6.57	1.64								
1) Native Am	6	38.5	8.24	3.36	.349	75	.958	.341	2.85	-3.1	8.8	
2) White	71	35.65	6.91	.820								
1) Asian	7	31.43	8.22	3.11	.458	76	-1.52	.133	-4.2	-9.8	1.3	
2) White	71	35.65	6.91	.820								
1) African Am	6	38.00	5.33	2.18	.446	75	.812	.419	2.35	-3.4	8.1	
2) White	71	35.65	6.91	.820								
1) Hispanic	39	36.18	6.25	1.00	.638	108	.399	.691	.531	-2.1	3.2	
2) White	71	35.65	6.91	.820								
1) Mixed	8	33.13	5.54	1.96	.412	77	-.996	.322	-2.52	-7.6	2.5	
2) White	71	35.65	6.91	.820								

*Statistical significance at <.05.

Ways of Taking In and Processing Knowledge, ANOVA Statistics

	N	Mean	SD	SE	Levene's Test	df	f	Sig (2-tailed)	Mean Diff (Tukey HSD)	CI-L	CI-U	Eta^2
Age												
1) 22 & <	36	36.76	6.60	1.10						35	39	
2) 23-28	25	35.33	7.62	1.52						32	38	
3) 29-34	20	34.60	7.94	1.78						31	38	
4) 35-40	17	36.18	6.76	1.63						33	40	
5) 41-45	10	30.60	2.99	.945						28	33	
6) 46-49	11	35.82	6.23	1.88						32	40	
7) 50-54	13	34.95	5.88	1.63						31	39	
8) 55 & >	8	39.00	7.33	2.59						33	45	
Total	140	35.57	6.86	.579	.387	7	1.31	.251		34	37	
Experience – Online (number of classes)												
1) 1	36	36.76	6.60	1.10						32	39	
2) 2	25	35.33	7.62	1.52						32	38	
3) 3	20	34.60	7.94	1.78						31	39	
4) 4	17	36.18	6.76	1.64						35	38	
Total	10	30.60	2.99	.945	.744	3	.293	.830		34	37	
Experience – Face-to-Face (number of classes)												
1) 1	6	34.83	5.49	2.24						29	41	
2) 2	3	38.67	11.50	6.64						10	67	
3) 3	6	33.00	4.60	1.88						28	38	
4) 4	123	35.63	6.94	.625						34	37	
Total	138	35.54	6.87	.585	.220	3	.503	.681		34	37	
Ethnicity												
1) Native Am	6	38.50	8.24	3.36						30	47	
2) Asian	7	31.43	8.22	3.11						24	39	
3) African Am	6	38.00	5.33	2.18						32	44	
4) Hispanic	39	36.18	6.25	1.00						34	38	

5) Two or more	8	33.13	5.54	1.96					28	38
6) White	71	35.65	6.91	.820					34	37
Total	137	35.66	6.75	.577	.591	5	1.19	.319	35	37

Likert-type scales, 0 = Prefer not to respond, 1 = individuated preference, 10 = integrated preference. Maximum score for each revised scale = 50 (integrated only).

Appendix J

Statistics Tables, Interconnectedness of What is Being Learned

Interconnectedness of What is Being Learned, Independent Samples T-tests

Learner Characteristic	N	Mean	SD	SE Mean	Levene's Test	df	t	Sig (2-tailed)	Mean Diff	CI-L	CI-U	Effect Size
Individuated												
1) Female	98	15.27	3.83	.387	<.001^{+}	138	4.14^{+}	<.001^{+*}	4.00^{+}	2^{+}	6^{+}	.38
2) Male	42	11.27	5.74	.886								
1) Undergrad	98	12.94	4.99	.504	.001^{+}	138	-5.4^{+}	<.001^{+}*	-3.77^{+}	-5^{+}	-2^{+}	.41
2) Grad	42	16.71	3.16	.487								
1) Exp OL <4	82	14.39	4.55	.503	.248	137	.809	.420	.673	-1	2	
2) Exp OL 4+	57	13.72	5.20	.689								
1) Exp F2F <4	123	14.21	4.68	.422	.221	137	.652	.515	.838	-2	3	
2) Exp F2F 4+	16	13.38	5.90	1.47								
1) Native Am	6	11.00	5.93	2.42	.353	75	-1.67	.099	-3.24	-7	.63	
2) White	71	14.24	4.46	.529								
1) Asian	7	10.43	6.45	2.44	.097	76	-2.07	.042*	-3.81	-7	-.15	.32
2) White	71	14.24	4.46	.529								
1) African Am	6	13.83	6.88	2.81	.039^{+}	75	-.143^{+}	.892^{+}	-.409^{+}	-8^{+}	7^{+}	
2) White	71	14.24	4.46	.529								
1) Hispanic	39	15.15	4.81	.770	.457	108	.998	.320	.912	-90	3	
2) White	71	14.24	4.46	.529								
1) Two or more	8	14.25	2.96	1.05	099	77	.005	.996	.008	-3	3	
2) White	71	14.24	4.46	.529								
Integrated												
1) Female	98	29.07	6.72	.678	.588	138	-1.84	.067	-2.30	-5	.17	
2) Male	42	31.37	6.84	1.06								
1) Undergrad	98	29.22	7.22	.729	.169	138	-1.45	.148	-1.82	-4	.66	
2) Grad	42	31.04	5.61	.866								

1) Exp OL <4	82	29.77	6.93	.766	.422	137	-.021	.983	-.025	-2	2
2) Exp OL 4+	57	29.80	6.74	.893							
1) Exp F2F <4	123	29.88	6.97	.628	.334	137	.451	.653	.821	-3	4
2) Exp F2F 4+	16	29.06	5.81	1.45							
1) Native Am	6	29.17	8.33	3.40	.291	75	-.170	.866	-.497	-6	5
2) White	71	29.66	6.77	.804							
1) Asian	7	30.43	8.28	3.13	.241	76	.280	.780	.765	-5	6
2) White	71	29.66	6.77	.804							
1) African Am	6	34.83	3.66	1.49	.107	75	1.84	.070	5.17	-.43	11
2) White	71	29.66	6.77	.804							
1) Hispanic	39	29.53	6.90	1.10	.876	108	-.095	.924	-.129	-3	3
2) White	71	29.66	6.77	.804							
1) Two or more	8	29.38	6.05	2.14	.608	77	-.115	.909	-.288	-5	5
2) White	71	29.66	6.77	.804							

[+] Due to violation of Levene's test, the Welch Robust Test of Equality of Means significance values are provided. * Statistical significance at <.05. Maximum score, individuated = 20, integrated = 40.

Interconnectedness of What is Being Learned ANOVA Statistics

	N	Mean	SD	SE	Levene's Test	df	f	Sig (2-tailed)	Mean Diff (Tukey HSD)	CI-L	CI-U	ES - Eta^2
Individuated												
Age												
1) 22 & <	36	12.35	4.77	.794					-6.52	11	14	.68
2) 23-28	25	12.04	4.70	.941					-6.84	10	14	.70
3) 29-34	20	14.90	5.73	1.28						12	18	
4) 35-40	17	15.88	3.59	.870						14	18	
5) 41-45	10	16.00	2.63	.830						14	18	
6) 46-49	11	14.41	4.56	1.37						11	17	
7) 50-54	13	14.38	4.99	1.39						11	17	
8) 55 & >	8	18.88	1.64	.581					6.52	18	20	
									6.84			
Total	140	14.07	4.83	.408	.039^{+}*	7	3.46	.002*		13	15	.05
						7	8.53^{+}	<.001^{+}*				
						7	4.02^{+}	.001^{+}*				
Exp – Online (4 groups)												
1) 1 class	23	14.04	5.84	1.22						12	17	
2) 2 classes	19	13.68	4.66	1.07						11	16	
3) 3 classes	15	13.27	5.12	1.32						10	16	
4) 4+ classes	82	14.39	4.55	.503						13	15	
Total	139	14.12	4.82	.409	.568	3	.293	.830		13	15	
Exp – F2F (4 groups)												
1) 1 class	6	16.50	3.73	1.52						13	20	
2) 2 classes	3	8.00	7.96	4.58						-12	28	
3) 3 classes	6	13.17	5.98	2.44						7	19	
4) 4+ classes	123	14.21	4.68	.422						13	15	
Total	138	14.13	4.84	.412	.428	3	2.24	.087		13	15	
Ethnicity (6 groups)++												

1) Native Am	6	11.00	5.93	2.42					5	17
2) Asian	7	10.43	6.45	2.44					4	16
3) African Am	6	13.83	6.88	2.81					7	21
4) Hispanic	39	15.15	4.81	.770					14	17
5) Mixed	8	14.25	2.96	1.05					12	17
6) White	71	14.24	4.46	.529					13	15
Total	137	14.15	4.84	.414	.052	5	1.73	.133	13	15
Integrated										
Age										
1) 22 & <	36	29.89	6.83	1.14					28	32
2) 23-28	25	29.94	7.50	1.50					27	33
3) 29-34	20	30.60	5.42	1.21					28	33
4) 35-40	17	31.63	6.43	1.56					28	35
5) 41-45	10	27.00	5.29	1.67					23	31
6) 46-49	11	27.29	9.35	2.82					21	34
7) 50-54	13	28.09	6.63	1.84					24	32
8) 55 & >	8	32.14	6.46	2.28					27	38
Total	140	29.76	6.81	.576	.753	7	.921	.493	29	31
Exp – Online (4 groups)										
1) 1 class	23	28.83	7.43	1.55					26	32
2) 2 classes	19	29.13	6.11	1.40					26	32
3) 3 classes	15	32.13	6.26	1.6					29	36
4) 4+ classes	82	29.77	6.93	.766					28	31
Total	139	29.78	6.83	.579	.548	3	.796	.498	29	31
Exp – F2F (4 groups)										
1) 1 class	6	26.99	5.34	2.18					21	33
2) 2 classes	3	30.33	8.74	5.04					9	52
3) 3 classes	6	30.33	5.82	2.38					24	36
4) 4+ classes	123	29.88	6.97	.628					29	31
Total	138	29.78	6.86	.584	.637	3	.355	.786	29	31
Ethnicity (6 groups)										
1) Native Am	6	29.17	8.33	3.40					20	38

2) Asian	7	30.43	8.28	3.13						23	38
3) African Am	6	34.83	3.66	1.49						31	39
4) Hispanic	39	29.53	6.90	1.10						27	32
5) Two or more	8	29.38	6.05	2.14						24	34
6) White	71	29.66	6.77	.804						28	31
Total	137	29.85	6.79	.580	.290	5	.697	.626		29	31

[+] Due to violation of Levene's test (unequal variance), the Welch (second row) and Brown-Forsythe (third row) Robust Test of Equality of Means values are provided; * Statistical significance at <.05; Games-Howell post hoc mean differences matched the Tukey HSD figures. [+] Likert-type scales, 0 = Prefer not to respond, 1 = individuated preference, 10 = integrated preference. Maximum score, individuated = 20, integrated scale = 40.

Appendix K

Statistics Tables, Responsibility For Learning

Responsibility For Learning, Individuated, Independent Samples T-tests

Learner Characteristic	N	Mean	SD	SE Mean	Levene's Test	df	t	Sig (2-tailed)	Mean Diff	CI-L	CI-U	Effect Size
1) Female	98	10.89	5.60	.565	.592	138	.591	.555	.600	-1	3	
2) Male	42	10.29	5.28	.815								
1) Undergrad	98	10.19	5.23	.528	.433	138	-1.7	.091	-1.7	-4	.28	
2) Grad	42	11.90	5.95	.919								
1) Exp OL <4	82	10.71	5.43	.600	.452	137	.096	.924	.091	-2	2	
2) Exp OL 4+	57	10.61	5.62	.745								
1) Exp F2F <4	123	10.53	5.48	.494	.823	137	-.837	.404	-1.2	-4	2	
2) Exp F2F 4+	16	11.75	5.64	1.41								
1) Native Am	6	6.50	2.59	1.06	.052	75	-1.69	.095	-3.6	-8	.64	
2) White	71	10.10	5.13	.609								
1) Asian	7	9.14	2.73	1.03	.052	76	-.483	.631	-.953	-5	3	
2) White	71	10.10	5.13	.609								
1) African Am	6	10.17	5.23	2.14	.710	75	.032	.974	.070	-4	4	
2) White	71	10.10	5.13	.609								
1) Hispanic	39	12.54	6.54	1.05	.134	108	2.16	.033*	2.44	.2	5	.20
2) White	71	10.10	5.13	.609								
1) Two or more	8	11.13	3.44	1.22	.176	7	.552	.583	1.03	-3	5	
2) White	71	10.10	5.13	.609								

Likert-type scales, 0 = Prefer not to respond, 1 = individuated preference, 10 = integrated preference. * Statistical significance at <.05. Maximum score, individuated only = 30.

Responsibility For Learning, Individuated, ANOVA Statistics

	N	Mean	SD	SE	Levene's Test	df	f	Sig (2-tailed)	Mean Diff (Tukey HSD)	CI-L	CI-U	Eta^2
Age												
1) 22 & <	36	9.83	5.45	.908						8	12	
2) 23-28	25	10.60	5.06	1.01						9	13	
3) 29-34	20	10.55	5.66	1.27						8	13	
4) 35-40	17	10.18	5.41	1.31						7	13	
5) 41-45	10	12.80	4.98	1.58						9	16	
6) 46-49	11	10.55	5.61	1.69						7	14	
7) 50-54	13	12.85	6.48	1.80						9	17	
8) 55 & >	8	10.63	6.35	2.24						5	16	
Total	140	10.71	5.49	.464	.960	7	.637	.724		10	12	
Experience – Online (number of classes)												
1) 1	23	11.91	6.40	1.33						9	15	
2) 2	19	11.00	4.89	1.12						9	13	
3) 3	15	8.13	4.69	1.21						6	11	
4) 4	82	10.71	5.43	.600						10	12	
Total	139	10.67	5.49	.466	.629	:	1.50	.218		10	12	
Experience – Face-to-Face (number of classes)												
1) 1	6	10.33	4.76	1.94						5	15	
2) 2	3	9.67	6.11	3.53						-6	25	
3) 3	6	14.83	6.21	2.54						8	21	
4) 4	123	10.53	5.48	.494						10	12	
Total	138	10.69	5.51	.469	.987	:	1.22	.306		10	12	
Ethnicity												
1) N. Am	6	6.50	2.59	1.06					-6.04	4	9	.52
2) Asian	7	9.14	2.73	1.03						7	12	
3) Black	6	10.17	5.23	2.14						5	16	
4) Hispanic	39	12.54	6.54	1.05					6.04	10	15	

5) Two +	8	11.13	3.44	1.22					8	14	
6) White	71	10.10	5.13	.609					9	11	
Total	137	10.65	5.46	.466	.032^{+}*	5	1.97	.087	10	12	.07
						5	3.24^{+}	.027^{+}*			
						5	3.01	.020^{+}*			

$^{+}$ Due to violation of Levene's test (unequal variance), the Welch (second row) and Brown-Forsythe (third row) Robust Test of Equality of Means values are provided; * Statistical significance at <.05; Games-Howell post hoc mean differences were used to determine group differences. $^{+}$ Likert-type scales, 0 = Prefer not to respond, 1 = individuated preference, 10 = integrated preference. Maximum score, individuated only = 30.

Appendix L

Statistics Tables, Student Interactions

Student Interactions, Independent Samples T-tests

Learner Characteristic	N	Mean	SD	SE Mean	Levene's Test	df	t	Sig (2-tailed)	Mean Diff	CI-L	CI-U	Effect Size
Individuated												
1) Female	97	9.42	4.93	.501	.656	137	.702	.484	.637	-1	2	
2) Male	42	8.79	4.87	.752								
1) Undergrad	97	8.51	4.74	.481	.770	137	-2.71	<.008*	-2.4	-4	$-.65^{+}$	.24
2) Grad	42	10.90	4.94	.762								
1) Exp OL <4	81	9.44	4.90	.545	.890	136	.666	.507	.852	-1	2	
2) Exp OL 4+	57	8.88	4.96	.658								
1) Exp F2F <4	122	9.24	4.85	.439	.308	136	.181	.857	.238	-2	3	
2) Exp F2F 4+	16	9.00	5.56	1.39								
1) Native Am	6	7.33	4.72	1.93	.994	74	-.907	.367	-1.72	-6	2	
2) White	70	9.06	4.45	.532								
1) Asian	7	8.14	3.39	1.28	.342	75	-.527	.600	-.914	-4	3	
2) White	70	9.06	4.45	.532								
1) African Am	6	5.83	3.49	1.42	.274	74	-1.73	.089	-3.22	-7	.50	
2) White	70	9.06	4.45	.532								
1) Hispanic	39	10.69	5.78	.926	$.018^{+}$*	107	1.53	.131	1.07	-.50	4	
2) White	70	9.06	4.45	.532								
1) Two or more	8	7.75	4.06	1.44	.808	76	-.793	.430	1.31	-5	2	
2) White	70	9.06	4.45	.532								
Integrated												
1) Female	97	10.80	5.38	.547	.757	137	-1.51	.134	-1.53	-4	.48	
2) Male	42	12.33	5.72	.883								
1) Undergrad	97	11.11	5.66	.574	.436	137	-.495	.621	-.506	-3	2	
2) Grad	42	11.62	5.21	.804								

1) Exp OL <4	81	11.51	5.55	.617	.911	136	.676	.500	.647	-1	3
2) Exp OL 4+	57	10.86	5.51	.730							
1) Exp F2F <4	122	11.41	5.44	.493	.621	136	1.00	.318	1.47	-1	4
2) Exp F2F 4+	16	9.94	6.15	1.54							
1) Native Am	6	13.67	4.46	1.82	.663	74	.983	.329	2.11	-2	6
2) White	70	11.56	5.08	.608							
1) Asian	7	9.71	6.58	2.49	.429	75	-.891	.376	-1.84	-6	2
2) White	70	11.56	5.08	.608							
1) African Am	6	9.83	6.49	2.65	.276	74	-.781	.438	-1.72	-6	3
2) White	70	11.56	5.08	.608							
1) Hispanic	39	10.79	6.26	1.00	.046^{+}*	107	-.650^{+}	.518^{+}	-.762^{+}	-3^{+}	2^{+}
2) White	70	11.56	5.08	.608							
1) Two or more	8	11.38	4.98	1.76	.602	76	-.096	.924	-.182	-4	4
2) White	70	11.56	5.08	.608							

$^{+}$ Because Levene's test was statistically significant, equal variances not assumed figures are reported. * Statistical significance at <.05.

Student Interactions, ANOVA Statistics

	N	Mean	SD	SE	Levene's Test	df	f	Sig (2-tailed)	Mean Diff (Tukey HSD)	CI-L	CI-U	Eta^2
Individuated												
Age												
1) 22 & <	35	7.43	4.35	.736					-4.97$^+$	6	9	-.52
2) 23-28	25	7.88	4.21	.841						6	10	
3) 29-34	20	8.20	5.09	1.14						6	11	
4) 35-40	17	10.59	5.05	1.23						8	13	
5) 41-45	10	12.40	3.86	1.22					4.97$^+$	10	15	.52
6) 46-49	11	9.73	5.06	1.53						6	13	
7) 50-54	13	12.08	4.84	1.34						9	15	
8) 55 & >	8	11.75	5.47	1.93						7	16	
Total	139	9.23	4.91	.416	.869	7	3.09	.005*		8	10	.14
Experience – Online (number of classes)												
1) 1	23	9.96	5.56	1.16						8	12	
2) 2	19	9.11	4.62	1.06						7	11	
3) 3	15	6.93	4.06	1.05						5	9	
4) 4	81	9.44	4.90	.545						8	11	
Total	138	9.21	4.92	.419	.535	3	1.32	.270		8	10	
Experience – Face-to-Face (number of classes)												
1) 1	6	7.17	6.18	2.52						.68	14	
2) 2	3	6.00	3.61	2.08						-3	15	
3) 3	6	13.50	2.43	.992						11	16	
4) 4	122	9.24	4.85	.439						8	10	
Total	137	9.26	4.90	.418	.238	3	2.38	.073		8	10	
Ethnicity												
1) N. Am	6	7.33	4.72	1.93						2	12	
2) Asian	7	8.14	3.39	1.28						5	11	
3) Black	6	5.83	3.49	1.42						2	9	

4) Hispanic	39	10.69	5.78	.926					9	13
5) Two or more	8	7.75	4.06	1.44					4.	11
6) White	70	9.06	4.45	.532					8	10
Total	136	9.18	4.86	.417	.067	5	1.75	.127	8	10
Integrated										
Age										
1) 22 & <	35	10.69	5.40	.913					9	13
2) 23-28	25	11.88	5.37	1.07					10	14
3) 29-34	20	9.45	5.98	1.34					7	12
4) 35-40	17	12.76	5.69	1.38					10	16
5) 41-45	10	10.10	5.74	1.82					6	14
6) 46-49	11	10.73	6.48	1.95					6	15
7) 50-54	13	12.85	4.08	1.13					10	15
8) 55 & >	8	12.88	5.36	1.89					8	17
Total	139	11.27	5.51	.468	.591	7	.914	.498	10	12
Experience – Online (number of classes)										
1) 1	23	11.17	5.96	1.24					9	14
2) 2	19	10.58	4.34	.995					8	13
3) 3	15	10.73	6.41	1.66					7	14
4) 4	81	11.51	5.55	.617					10	13
Total	138	11.24	5.52	.470	.120	3	.193	.901	10	12
Experience – Face-to-Face (number of classes)										
1) 1	6	7.17	6.46	2.64					.38	14
2) 2	3	15.33	7.23	4.18					-3	33
3) 3	6	11.17	3.55	1.45					7	15
4) 4	122	11.41	5.44	.493					10	12
Total	137	11.30	5.50	.470	.327	3	1.71	.167	10	12
Ethnicity										
1) N. Am	6	13.67	4.46	1.82					9	18
2) Asian	7	9.71	6.58	2.49					4	16
3) Black	6	9.83	6.494	2.65					3	17
4) Hispanic	39	10.79	6.26	1.00					9	13

5) Two or more	8	11.38	4.98	1.76					7	16
6) White	70	11.56	5.08	.608					10	13
Total	136	11.25	5.51	.472	.280	5	.508	.770	10	12

+ Games-Howell post hoc mean differences were used to determine group differences (none were indicated in Tukey HSD comparisons. + Likert-type scales, 0 = Prefer not to respond, 1 = individuated preference, 10 = integrated preference. Maximum score, individuated = 20, integrated = 20. * Statistical significance at <.05.

Appendix M

Statistics Tables, Online Interaction Preference

Online Interaction Preference, Independent Samples T-tests

Learner Characteristic	N	Mean	SD	SE Mean	Levene's Test	df	t	Sig (2-tailed)	Mean Diff	CI-L	CI-U	Effect Size
Synchronous Preference												
1) Female	98	25.88	9.40	.950	.947	138	2.08	.039*	3.7	.18	7.2	.19
2) Male	42	22.21	9.94	1.53								
1) Undergrad	98	25.50	9.26	.936	.211	138	1.34	.181	2.39	-1.1	6	
2) Grad	42	23.11	10.50	1.62								
1) Exp OL <4	82	24.94	9.71	1.07	.836	137	.202	.840	.340	-3	3.7	
2) Exp OL 4+	57	24.60	9.80	1.30								
1) Exp F2F <4	123	25.07	9.73	.878	.727	137	.923	.358	2.38	-2.7	7	
2) Exp F2F 4+	16	22.69	9.57	2.39								
1) Native Am	6	22.83	7.36	3.00	.335	75	-.757	.452	-2.92	-10.6	4.8	
2) White	71	25.76	9.20	1.09								
1) Asian	7	24.71	10.58	4.00	.924	76	-.282	.778	-1.04	-8	6	
2) White	71	25.76	9.20	1.09								
1) African Am	6	27.50	3.73	1.52	.023+*	11.25	.931	.371	1.74	-2.4	5.9	
2) White	71	25.76	9.20	1.09								
1) Hispanic	39	23.17	11.18	1.79	.185	108	-1.31	.194	-2.60	-6.5	1.3	
2) White	71	25.76	9.20	1.09								
1) Two or more	8	21.62	8.68	3.07	.947	77	-1.21	.229	-4.14	-10.9	2.7	
2) White	71	25.76	9.20	1.09								

+ Due to violation of Levene's test, the Welch Robust Test of Equality of Means significance values are provided*; * Statistical significance at <.05; Likert-type scale: 0 = Prefer not to respond, 1 = Synchronous preference, 10 = Asynchronous preference; Maximum score = 40.

Online Interaction Preference, ANOVA Statistics

	N	Mean	SD	SE	Levene's Test	df	f	Sig (2-tailed)	Mean Diff (Tukey HSD)	CI-L	CI-U	Eta^2
Age												
1) 22 & <	36	25.16	8.57	1.43						22	28	
2) 23-28	25	25.38	8.44	1.69						22	29	
3) 29-34	20	24.94	11.70	2.62						19	30	
4) 35-40	17	22.78	10.87	2.64						17	28	
5) 41-45	10	22.70	8.59	2.72						17	29	
6) 46-49	11	30.75	7.734	2.33						26	36	
7) 50-54	13	21.15	10.22	2.83						15	27	
8) 55 & >	8	25.31	12.166	4.30						15	35	
Total	140	24.78	9.68	.818	.142	7	1.06	.394		23	26	
Experience – Online (number of classes)												
1) 1	23	25.88	9.071	1.89						22	30	
2) 2	19	21.04	11.23	2.58						16	26	
3) 3	15	27.13	8.11	2.09						23	32	
4) 4	82	24.94	9.71	1.07						23	27	
Total	139	24.80	9.71	.824	.290	3	1.35	.262		23	26	
Experience – Face-to-Face (number of classes)												
1) 1	6	21.01	9.85	4.02						11	31	
2) 2	3	23.00	2.65	1.53						16	30	
3) 3	6	25.00	12.68	5.18						12	38	
4) 4	123	25.07	9.73	.878						23	27	
Total	138	24.85	9.73	.828	.291	3	.365	.778		23	26	
Ethnicity												
1) N. Am	6	22.83	7.36	3.00						15	31	
2) Asian	7	24.71	10.58	4.00						15	34	
3) Black	6	27.50	3.73	1.52						24	31	

4) Hispanic	39	23.17	11.18	1.79						20	27
5) Two or more	8	21.62	8.68	3.07						14	29
6) White	71	25.76	9.20	1.09						24	28
Total	137	24.67	9.60	.820	.129	5	.676	.643		23	26

Likert-type scale: 0 = Prefer not to respond, 1 = Synchronous Preference, 10 = Asynchronous Preference; Maximum score = .

Appendix N

Statistics Tables, Learning Environment Preference

Learning Environment Preference, Independent Samples T-tests

Learner Characteristic	N	Mean	SD	SE Mean	Levene's Test	df	t	Sig (2-tailed)	Mean Diff	CI-L	CI-U	Effect Size
1) Female	98	42.69	17.38	1.76	.809	138	.925	.357	3.03	-3.4	9.5	
2) Male	42	39.66	18.63	2.87								
1) Undergrad	98	43.07	16.75	1.69	.101	138	1.32	.188	4.32	-2.1	10.8	
2) Grad	42	38.76	19.79	3.05								
1) Exp OL ≥4	82	44.49	18.15	2.00	.668	137	2.18	.031*	6.60	.61	12.6	.19
2) Exp OL <4	57	37.88	16.72	2.21								
1) Exp F2F ≥4	123	42.42	17.77	1.60	.698	137	1.19	.237	5.61	-3.7	15	
2) Exp F2F <4	16	36.81	17.98	4.50								
1) Native Am	6	39.67	10.71	4.37	.179	75	-.364	.717	-2.77	-18	12	
2) White	71	42.44	18.34	2.18								
1) Asian	7	40.00	10.46	3.95	.158	76	-.345	.731	-2.44	-16.5	11.64	
2) White	71	42.44	18.34	2.18								
1) African Am	6	48.33	6.92	2.82	.053	75	.770	.439	5.89	-9.2	21	
2) White	71	42.44	18.34	2.18								
1) Hispanic	39	39.64	20.08	3.22	.355	108	-.740	.461	-2.80	-10	4.70	
2) White	71	42.44	18.34	2.18								
1) Two or more	8	39.25	17.52	6.20	.837	77	-.468	.641	-3.19	-16.8	10.4	
2) White	71	42.44	18.34	2.18								

* Statistical significance at <.05; Likert-type scale: 0 = Prefer not to respond, 1 = Face-to-Face preference, 10 = Online preference. Maximum score = 90.

Learning Environment Preference (Online versus Face-to-Face), ANOVA Statistics

	N	Mean	SD	SE	Levene's Test	df	f	Sig (2-tailed)	Mean Diff (Tukey HSD)	CI-L	CI-U	Eta^2
Age												
1) 22 & <	36	40.10	13.75	2.29						35	45	
2) 23-28	25	45.05	17.50	3.50						38	52	
3) 29-34	20	38.35	20.41	4.56						29	48	
4) 35-40	17	43.06	17.75	4.31						34	52	
5) 41-45	10	35.80	16.70	5.28						24	48	
6) 46-49	11	47.39	19.44	5.86						34	60	
7) 50-54	13	40.00	23.32	6.47						256	54	
8) 55 & >	8	47.63	18.59	6.57						32	63	
Total	140	41.78	17.75	1.500	.201	7	.738	.640		39	45	
Experience – Online (number of classes)												
1) 1	23	41.77	18.40	3.84						34	50	
2) 2	19	33.61	16.26	3.73						26	41	
3) 3	15	37.33	14.02	3.62						30	45	
4) 4	82	44.49	18.15	2.00						40	48	
Total	139	41.78	17.82	1.51	.577	3	2.34	.076		39	45	
Experience – Face-to-Face (number of classes)												
1) 1	6	34.67	24.21	9.88						9	60	
2) 2	3	39.67	5.13	2.97						27	52	
3) 3	6	35.67	18.34	7.49						16	55	
4) 4	123	42.42	17.77	1.60						39	46	
Total	138	41.73	17.87	1.52	.408	3	.612	.608	39	39	45	
Ethnicity												
1) N. Am	6	39.67	10.71	4.37						28	51	
2) Asian	7	40.00	10.46	3.95						30	50	
3) Black	6	48.33	6.92	2.82						41	56	
4) Hispanic	39	39.64	20.08	3.22						33	46	

5) Two or more	8	39.25	17.52	6.20					25	54
6) White	71	42.44	18.34	2.18					38	47
Total	137	41.47	17.79	1.52	.076	5	.342	.887	38	44

Likert-type scale: 0 = Prefer not to respond, 1 = Face-to-Face preference, 10 = Online preference; Maximum score = 90.

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