A SOCIAL NETWORK ANALYSIS OF RACE, CLASS, AND GENDER DIFFERENCES IN THE ONLINE COLLEGE CLASSROOM

by

HYUNGJOO YOON

(Under the Direction of JUANITA JOHNSON-BAILEY)

ABSTRACT

The purpose of this study is to examine the dynamic of online classroom interaction networks and to determine how such virtual relations are connected to the power relationships along the lines of race, class, and gender. This study analyzes both observed and perceived online classroom interaction networks while answering three major research questions, which are:

1. In what specific ways, if any, does asynchronous classroom discussion contribute to a higher level of online student integration?
2. How does the observed classroom network differ from the perceived classroom network?
3. How is the virtual classroom interaction associated with the power relationships along the lines of race, class, and gender?

Qualitative content analysis and social network analysis are employed to analyze the virtual interactions of 21 graduate students at a southeast U.S. university. Three major findings have been drawn from this analysis of the multilayered classroom interaction network data. First, casual interactions, consisting of short social postings, formed the lion's share of the virtual

classroom network, and explain how the students both connected with and disconnected from each other in the virtual environment. Second, women students' interactions exhibited more reciprocity than did men's. Third, a significant level of race-based homophily among the majority of White students lurked at the core of the virtual classroom network. Theoretical and practical implications were derived by revisiting feminist and critical theories, with the aim of extending the learning theory-driven approaches dominating current studies of online education. In conclusion, this study argued that power relationships along the lines of race, class, and gender were deeply reflected in the virtual classroom network: white male students were more likely to be respected than other students without substantial course participation, students of color with lower socioeconomic status were the most silent student group, and women's undervalued reproductive labor sustained the online learning environment.

INDEX WORDS: e-learning, online learning, diversity, digital divides, adult education, human resource development

A SOCIAL NETWORK ANALYSIS OF RACE, CLASS, AND GENDER DIFFERENCES IN THE ONLINE COLLEGE CLASSROOM

by

HYUNGJOO YOON

B.A., Yonsei University, South Korea, 2008

M.A., Yonsei University, South Korea, 2010

A Dissertation Submitted to the Graduate Faculty of The University of Georgia in Partial Fulfillment of the Requirements for the Degree

DOCTOR OF PHILOSOPHY

ATHENS, GEORGIA

2020

A SOCIAL NETWORK ANALYSIS OF RACE, CLASS, AND GENDER DIFFERENCES IN THE ONLINE COLLEGE CLASSROOM

by

HYUNGJOO YOON

Major Professor:	Juanita Johnson-Bailey
Committee:	Laura. L. Bierema
	Aliki Nicolaides
	Dawn T. Robinson

Electronic Version Approved:

Ron Walcott
Interim Dean of the Graduate School
The University of Georgia
August 2020

ACKNOWLEDGEMENTS

My greatest appreciation and gratitude to my major professor, Dr. Johnson-Bailey, for her wholehearted support at every stage of my doctoral journey. Her firm guidance always kept me safe. Her dedication and professionalism will serve as a model throughout my career. I owe a debt of thanks to my committee members, Drs. Dawn Robinson, Laura Bierema, and Aliki Nicolaides, for their guidance and critiques of my work. I am deeply indebted to many faculty members in the Institute for Women's Studies and the Qualitative Research Program since this manuscript would never have come into being without the insights that I gained from them in my coursework. My grateful thanks are also extended to Dr. Diann Jones for her help in collecting data. To the research participants, thank you very much for sharing your information. Special thanks to the Fulbright Foreign Student Program and the Korean-American Educational Commission for their generous support of my study. Finally, words are not enough to express my appreciation to my partner, Sihyun. This special season in my life would not have been possible without her presence across 11,460km. Thanks for being with me every day and night.

TABLE OF CONTENTS

Page

LIST OF TABLES

Page

LIST OF FIGURES

Page

CHAPTER 1

INTRODUCTION

In recent years, the emergence of a new economy shaped by the digital revolution has in turn produced digital divides. While over half of the global population has access to the Internet, a strong correlation between country wealth and internet access still exists (International Telecommunication Union, 2019; Poushter, 2016). In the U.S., Whites (82%) are more likely to own a personal computer than are African Americans (58%) and Hispanics (57%), and the pattern could also be found in the unequal distribution of the home broadband (Perrin & Turner, 2019). In a study based on the U.S. data extracted from a study of 68 Massive Open Online Courses (MOOCs) conducted between 2012 and 2014, Hansen and Reich (2015) found that affluent and better-educated neighborhoods were more likely to access MOOCs, and high socioeconomic background influenced the course completion rate significantly.

There is no doubt that emerging technologies have improved access to higher education over the past two decades; however, this improved access to digital education of course could not fix persisting education inequality automatically (Hill & Lawton, 2018). Accordingly, the focus of academic attention has moved from digital access to digital literacy, and the readiness to address persisting digital divides across countries (Horrigan, 2016; van Deursen & Helsper, 2015). Emerging technologies and the MOOCs spurred disruptive innovation, which led a growing number of postsecondary institutions to launch online courses and degree programs (Christensen & Eyring, 2011; Hoxby, 2014). As the poster child of online college education, MOOCs challenged the unequal distribution of academic resources. Most institutions were far

less acknowledging of the multiple barriers to education before to the rise of the MOOCs; only a few colleges and universities accommodated nontraditional students with special programs such as night/weekend classes and distance courses (Cross, 1981; Kasworm & Pike, 1994). Only two decades ago, about 753,640 students were enrolled in distance education courses, representing only 5.5% of the 14.3 million total students in the U.S. (Lewis, Alexander, & Farris, 1997). Now, the most recent data reveals that more than one in four students, or approximately 6 million, are involved in online college education (McFarland et al., 2018). The percentage of distance education students rose from 8% in 1999 to 16% in 2003, and then increased to was 20% by 2007 (Radford, 2011). By 2016, this percentage had risen to 30% (Seaman, Allen, & Seaman, 2018). While some critiques have expressed concerns over whether online education is a game-changer for the American higher education system because of its extremely high student attrition rates (Carr, 2000), the number of online college courses has continued to grow across the nation.

Online College Classroom

A significant distinction between online and face-to-face courses lies in the utilization of bulletin boards. While the term bulletin board traditionally refers to a unidirectional message board for notices and announcements that exists at a fixed physical place, today's online bulletin board plays a crucial role as a multidirectional communication space where all participants can post, read, and reply to each other's messages from anywhere and at any time. An online classroom is not an anonymous or a public cyberspace. All the postings on a given course's online bulletin board are made by "a select number of students who have met the administering college's admissions requirements and have paid for the course in exchange for college credit" (Sullivan, Fulcher-Rood, Kruger, Sipley, & van Putten, 2019, p. 320). In this sense, they differ from most large-scale MOOCs. Each online posting is accompanied by each student's real name,

which exposes her personal identity, especially characteristics such as gender, ethnicity, and nationality. Students are encouraged or even required to post a profile photo, to link to their social network accounts, and to introduce themselves at the beginning of the semester, which may expose their skin color, racial identity, and age. Although cyberspace could have limitless potential to connect women and underprivileged students to both instructors and course content, the fundamental question remains of how the online classroom can be disconnected from the endemic sexism, racism, and multiple other forms of violence and oppression that characterize society at large.

Unlike previous distance education platforms (e.g., correspondence, radio, television), the enhanced interactivity of the online bulletin board has been celebrated by numerous online learning theorists (Bernard et al., 2009; Bernard et al., 2004; Garrison, Anderson, & Archer, 1999; Harasim, 1996, 2000, 2011; Robert & Jason, 2004; Thurmond & Wambach, 2004), and buttressed by empirical research (Bouhnik & Marcus, 2006; Dennen, 2005; Mazzolini & Maddison, 2003; Nandi, Hamilton, & Harland, 2012; Swan, 2001; Tiene, 2000; Vrasidas & McIsaac, 1999). The dominant perspective in the current online education literature has framed virtual interactions as being "particularly suited to the implementation of collaborative learning strategies or approaches" (Hiltz, 1994, p. 23). Although the general effectiveness of virtual interactions should be a topic of serious examination, unfortunately, we have surprisingly little systematically collected empirical data on the differential impact of virtual interactions on diverse students' online learning experiences. Instead, most education researchers have been preoccupied by a theoretical raceless, classless, and genderless student subject who might post, reply, and learn freely from their own bodies, as Boler (2007) pointed out:

> While marketing hypes and cyber-enthusiast hopes actively mythologize the potentials of disembodied computer-mediated communication with promises of anonymity and fluid identities, the actualities of the way in which users interpret and derive meaning from text-based communication often involve reductive bodily markers that re-invoke stereotypical notions of racialized, sexualized and gendered bodies. (p. 140)

Major online education research literature has primarily focused on how to develop the educational effectiveness of virtual interactions; however, it has commonly lacked a critical perspective on the differential impacts of online college classroom interactions across race, class, and gender. This study, resting on the two academic giants of both online education research literature and critical and feminist education studies, seeks to understand how students connect with and disconnect from their classmates online.

Race, Class, and Gender in the College Classroom

A critical analysis of face-to-face college classroom interactions and the ways in which they are entangled in interlocking systems of oppression, such as sexism, racism, heteronormativity, ageism, ableism, has long been the main subject of feminist and critical education studies. Since the publication of the groundbreaking report *The Classroom Climate: A Chilly One for Women* (Hall & Sandler, 1982), numerous sexism-related issues in college classrooms have been identified as producing a chilly climate that "puts women students at a significant educational disadvantage" (p.3). This important study enabled feminist scholars and activists to identify subtle ways gender-based discrimination surfaces in college classroom interactions, such as instructors making eye contact more often with men, or nodding and gesturing more often in response to men's questions and comments. Follow-up studies have reported that this chilly climate discourages women's participation in classroom discussions and

devalues their academic accomplishments and professional success, for faculty as well as for students (Britton, 2017).

A large body of critical race theory-driven research (Attinasi, 1989; Brown, Cervero, & Johnson-Bailey, 2000; Gurin, Dey, Hurtado, & Gurin, 2002; Hurtado, 2007; Hurtado, Milem, Clayton-Pedersen, & Allen, 1998; Johnson-Bailey & Cervero, 1996, 1998; Johnson-Bailey & Lee, 2005; Solórzano, 1998; Solórzano, Ceja, & Yosso, 2000; Sue, Bucceri, Lin, Nadal, & Torino, 2007; Sue, Capodilupo, et al., 2007; Yosso, Smith, Ceja, & Solórzano, 2009) has reported that underrepresented minority students face a variety of discriminatory practices, especially microaggression in colleges and universities, and the everyday practices of the dominant group force minority students to struggle with negative feelings of self-doubt, frustration, and isolation, and this situation exists at the intersection of racism, sexism, and other power politics. Furthermore, a growing body of higher education research (Ishitani, 2006; Jack, 2019; Kishimoto & Mwangi, 2009; Pascarella, Pierson, Wolniak, & Terenzini, 2004; Stephens, Fryberg, Markus, Johnson, & Covarrubias, 2012; Terenzini, Springer, Yaeger, Pascarella, & Nora, 1996; Warburton, Bugarin, & Nunez, 2001) has examined the unique experiences of first-generation college students with respect to social class and social mobility issues in the U.S.

In terms of online classroom interactions, feminist scholars have paved the way towards the application of a critical lens for examining the new territory since the beginning of the Internet (Herring, 1993). Feminist researchers Ross and Powell (1990), Burge (1998), Wolfe (1999), Kramarae (2001), and Sullivan (2001), to name a few, have argued that the emerging technology might not produce a chilly climate for women's active participation, due to virtual space's less-discriminatory circumstances (Caspi, Chajut, & Saporta, 2008). Research has suggested that in such spaces women exhibit a variety of participatory behaviors: they contribute

to online discussions more frequently (Rovai & Baker, 2005) and collaboratively (Arbaugh, 2000; Bostock & Lizhi, 2005) than do men; they favor online learning environments over face-to-face environments (González-Gómez, Guardiola, Martín Rodríguez, & Montero Alonso, 2012; Johnson, 2011); they experience more deep learning (Anderson & Haddad, 2005) and receive more support from their instructors in online environments (Lim & Kim, 2003); and they perceive a stronger sense of community (Rovai & Baker, 2005). While a few studies have argued that no gender differences were identified in the measurable outcomes of online learning (see Lee & Choi, 2011), most feminist scholars agree that online classrooms might not reproduce the chilly climate for women that exists in traditional classrooms.

While a substantial body of feminist literature has explored the relationship between gender and the online classroom, the question of race and class differences in such classrooms has only begun to be raised recently (Kuo & Belland, 2016; Yeboah & Smith, 2016). Several articles have discussed the online learning experiences of racial/ethnic minority and underprivileged students separately from gender issues (Kang & Yang, 2016; Rovai & Gallien, 2005; Rovai & Ponton, 2005), and a few dissertations have addressed the topic, mostly from the perspective of personal experience (see Salvo, Shelton, & Welch, 2017). Only a small number of scholars have called attention to the ways race, class, and gender interact in online education (Humiston, Marshall, Hacker, & Cantu, 2020; Johnson-Bailey, 2016). It was notable to find that while Daniels (Daniels, 2009, 2013, 2015; Hughey & Daniels, 2013) has studied digital racism consistently, her approach to public cyberspace has limitations with regards to examining college classroom interactions. In sum, the extant literature supports the following propositions: 1) American online education has democratized access to education for women and underprivileged students, 2) online formats encourage women's active classroom participation, and 3) digital

divides and digital racism still exist. A central question remains unanswered with regard to student-student interaction in classroom: What is the association between virtual interactions and power relationships along the lines of race, class, and gender, and how does this association operate? This study employs a social network approach to understanding the systems of interlocking oppressions based on race, class, and gender, and begins with a series of social network questions as stated succinctly by Collins (1993):

> If you want to see how much you have been affected by this whole thing [intersecting systems of oppressions of race, class, and gender], I ask you one simple question-who are your close friends? Who are the people with whom you can share your hopes, dreams, vulnerabilities, fears and victories? Do they look like you? If they are all the same, circumstance may be the cause. (p. 35)

Our social relations are not only our fundamental life conditions, but also the crucial cause of marginalization and structural inequality. This study of a virtual social network follows the critical feminist education research tradition in order to understand multi-layered classroom interactions and their impact on diverse student integration processes (González Canché & Rios-Aguilar, 2015). Thus, by adopting a sequential exploratory mixed method research design (Creswell & Clark, 2018), this research examines both observed classroom interactions on the online bulletin board and the perceived classroom network.

Statement of the Problem

Despite a substantial body of research on the effectiveness of online education at the post-secondary level, little is known about the differential impact of online classroom interaction on the student' learning experience across race, class, and gender. Given the rapid growth of online education, it is essential that attention is given to assessing online students in the online

learning environment, particularly women and underrepresented minority students. This study seeks to contribute to the academic discussion of online education by investigating the differential impact of virtual interaction of diverse students varying by race, class, and gender.

Statement of Purpose and Research Questions

The purpose of this study is to examine the dynamic of online classroom interaction networks and to determine how such virtual relations are connected to the power relationships along the lines of race, class, and gender. This study analyzes both observed and perceived online classroom interaction network. Three major research questions for this study are:

1. In what specific ways, if any, does the asynchronous classroom discussion contribute to a higher level of online student integration?
2. How does the observed classroom network differ from the perceived classroom network?
3. How is the virtual classroom interaction associated with the power relationships along the lines of race, class, and gender?

Significance of the Study

Since online education has grown rapidly over the past two decades, studies that explored differences between traditional and nontraditional students and between face-to-face and online settings have burgeoned (Bell & Federman, 2013). However, few studies have concentrated on race, class, and gender disparity in terms of the student integration process with regard to online college education. In this respect, the question remains whether online education is the great equalizer, as Mann (1848/1957) stated that “education, then, beyond all other divides of human origin, is a great equalizer of conditions of men—the balance wheel of the social machinery” (p. 85).

Race, class, and gender inequality in education has a long history in the United States. After the implementation of open admissions and affirmative action policies in the late 1960s and 1970s in colleges and universities, access to higher education was expanded; however, the college achievement gap widened (Garibaldi, 2014). In terms of the college achievement gap within the context of institutional stratification, access without support should not be considered as a full opportunity for underprivileged non-traditional students (Engstrom & Tinto, 2008).

Students who do not feel like they fit in are more likely to have a low sense of belonging, feel isolated, and are at risk of becoming dropouts (Tinto, 1993). The rapid growth of college minority students and nontraditional students in online classrooms brings about the need for colleges and universities to develop an entirely new way of understanding the meaning of classroom interaction with a focus on diversity. The heterogeneous composition of the postsecondary student body requires that the American higher education system transform the way it has operated from methods that were originally established for White elite male students until the middle of the twentieth century. One of the most important parts of academic reform should be the positive recognition of diverse students' potential as learners. Postsecondary education research should embrace diversity and support their success by maximizing their capabilities.

The impact of online classroom interaction is not only an academic concern but also a practical issue for improving the completion rate of nontraditional students, especially that of social minority students. Therefore, the research findings of this study contribute to enhancing the effectiveness of online education and to improving the online degree completion rates of diverse students. Academic administrators and policymakers can find the results of this study useful for the evaluation of their current online courses and degree programs. The methods in

this research are applicable as a diagnostic tool to find the strengths and weaknesses of an online degree program instruction design with a focus on diversity, inclusion, and equity.

CHAPTER 2

REVIEW OF THE LITERATURE

The purpose of this study is to examine the dynamic of online classroom interaction networks and to determine how such virtual relations are connected to the power relationships along the lines of race, class, and gender. This study analyzes both observed and perceived online classroom interaction network. Three major research questions for this study are:

1. In what specific ways, if any, does the asynchronous classroom discussion contribute to a higher level of online student integration?
2. How does the observed classroom network differ from the perceived classroom network?
3. How is the virtual classroom interaction associated with the power relationships along the lines of race, class, and gender?

This literature review chapter is composed of four parts: 1) a critical overview of online college education, 2) a profile of students, institutions, and their motives for participating in online college education, 3) gender in online classroom interaction, and 4) race, class, and gender in online college classroom interaction.

The Overview of Online College Education

Online education has been considered as being rooted within the broader category of distance education by multiple scholars (Archer & Garrison, 2010; Holmberg, 1989, 1995; Keegan, 1996; Moore, 1993; Moore & Kearsley, 2011; Verduin Jr. & Clark, 1991). From the middle of the nineteenth century, the establishment of railway systems and national postal

systems enabled the distribution of educational materials to large numbers of learners beyond traditional geographical boundaries. The history of distance education traces back as far as the first record of a correspondence course that Caleb Phillips advertised in the Boston Gazette, newspaper in Boston, Massachusetts in the U.S. in 1728 (Bower & Hardy, 2004; Holmberg, 1989). Anna Eliot Ticknor's Society to Encourage Studies at Home in 1873 is regarded as a pioneer of American distance education (Bergmann, 2001; Casey, 2008).

The first record of a college level correspondence courses was found in a Swedish university in 1833 (Bower & Hardy, 2004; Holmberg, 1989). At the postsecondary level, the Chautauqua Literary and Scientific Circle in Chautauqua, New York, offered four-year correspondence courses as a supplement to its summer adult education programs in 1878, which contributed the historical establishment of the Chautauqua University in 1883 (J. C. Scott, 1999). By adopting the Chautauqua model, the University of Chicago Extension Division became the first American college that offered formal correspondence courses, which was in 1892 (Kentnor, 2015). Since the late 1800s, a few universities in the U.S. developed correspondence courses and programs as a part of their university extension programs which widened access to postsecondary education among women and underprivileged rural workers (Lee, 2017).

Although mail-delivery of text materials was the primary method of distance instruction until the middle of the 20th century, a variety of communication channels, such as radio, telephone, and TV had been utilized to overcome limitations of postal systems; such as time delays, lost mail, and cost of delivery (Bower & Hardy, 2004; Mayadas, Bourne, & Bacsich, 2009). In 1919, the University of Wisconsin-Extension launched the first federally licensed educational radio broadcasting station in the U.S. (Kentnor, 2015). In 1953, the University of Houston established KIUHT, the first educational television station which offered college-level

course credit for televised correspondence courses (Levin & Hines, 2017). The first statewide telephone correspondence course was offered for non-credit continuing education program for physicians by the University of Wisconsin in 1965 (Meyer, 1983). The establishment of the British Open University in the United Kingdom in 1969 is regarded as a remarkable event in the history of distance education and higher education because it was the first institution that offered distance education as its primary mode of teaching, and its model was replicated in many other countries (Lee, 2017; Tresman, 2002).

The invention of the World Wide Web and the rapid expansion of the Internet shifted the distance education paradigm radically (Harasim, 2000). Online education shared some similarities with conventional distance education models, but the Internet revolutionized distance education by allowing unprecedented communication opportunities. The newly developed information and communications technology enabled two-way communication in various forms (text, graphics, sound, moving pictures) either synchronous ('at the same time' as in video conference) or asynchronous ('not at the same time' as in electronic mail, discussion thread), which were unimaginable in the previous distance education models.

Online education is still on the rise, and the rise is occurring at a rapid pace. A drastic increase of online college education participation in terms of both the number of institutions and student enrollment can be found in the National Center for Education Statistics (NCES) reports (Greene & Meek, 1998; Lewis et al., 1997; Lewis, Snow, Farris, & Levin, 1999; Parsad & Lewis, 2008; Radford, 2011; Waits, Lewis, & Greene, 2003), and the annual reports were supported by the Online Learning Consortium (Allen & Seaman, 2007, 2010, 2012, 2013, 2014, 2015, 2016, 2017; Seaman et al., 2018), which was formerly known as the Sloan Consortium until 2014.

According to the NCES's first national-scale survey on postsecondary level distance education courses in 1995, about only 33% institutions offered distance education courses, and 42% did not offer nor plan to offer any distance courses in the next 3 years (Greene & Meek, 1998). According to the latest Integrated Postsecondary Education Data System data, between 2017 and 2018, about 77% of 4,298 U.S. degree granting institutions which participated in Title IV federal financial aid programs offered distance courses, and about 52% of the institutions provided online degree programs. Now almost everywhere high school graduates and working adults who wanted a college degree or certificate could find online courses in community colleges, technical colleges, 4-year institutions, and Ivy League colleges or research institutions (Kidd, 2010).

The United States has seen an exponential growth in the number of college and university students taking online courses. In 1995, about 758,640 students were enrolled in distance education courses, which represented 5.5% of total 14.3 million students in 1995 (Greene & Meek, 1998). The percentage of online college students was 8% in 1999 but increased to 16% in 2003 and was 20% in 2007 (Radford, 2011) and reached 30% in 2016 (Seaman et al., 2018). About 20 million American students (17 million undergraduates and 3 million graduates) are involved in online education: 6 million students took more than one online course and approximately 3 million students (2.2 million undergraduates and 0.8 million graduates) are exclusively online learners (McFarland et al., 2018). While overall college enrollments have decreased in recent years, the growth of online college enrollments continues (Seaman et al., 2018).

Despite of the gradual growth of online college education, it has been neglected or misunderstood easily by traditional education scholars for decades:

> Academic leaders are not sure how to deal with for-profit universities, especially those that offer degrees online. One perspective is that they may disappear, victims of criticism, fraud, and abuse. However, thoughtful analysts believe that an Internet revolution is transforming higher education worldwide. If that is true, educators had better understand the larger forces reshaping higher education. (Cronin & Bachorz, 2005, p. 11)

A common misconception regarding online college students is that they attend private for-profit online-only institutions that lack any brick-and-mortar campus. For-profit colleges expanded dramatically over the last two decades, and the enrollment rocketed from around 230,000 in the early 1990s to approximately 2 million at their peak in 2010 (Arbeit & Horn, 2017). The University of Phoenix was the most well-known symbol of the rapid growth of online college education in the 1990s (Arenson, 1998a, 1998b; Olsen, 2002). The reputation of online education came under siege due to fraud in student recruitment and marketing strategies, resulting in enormous accrued student debt at a few for-profit colleges specializing in online education (Wessel, 2015). The Century Foundation analyzed all 98,868 allegations of fraud submitted to the U.S. Department of Education by students and found that for-profit colleges generated almost 99% of the allegations; the most-accused institution, Corinthian Colleges, accounted for approximately three-fourths (75,343) of the claims and closed after a series of legal challenges by the government in April 2015 (Cao & Habash, 2017).

In a critical study of for-profit colleges, Cottom (2017) criticized the problematic quality of online college education as lower education instead of higher education. According to her analysis, the recent rapid expansion of the for-profit college was driven by shareholder organization's neoliberal logics accompanied with financialization of college education in the new economy. Indeed, making profit became the priority of education instead of making quality

education. Interestingly, the fact that the president of the University of Phoenix, the pioneer of online college education which offered its first online course in 1989, earned almost 5 million dollars as an annual salary in 2013, which was more than five times of the annual salary of the president of Harvard, raises a doubt about the quality education (Cottom, 2017).

In fact, however, only 7% of all online students are enrolled in a private for-profit institution in 2016, and the total number of online-only schools (140) accounted for a much smaller proportion of online students than did public schools (Seaman et al., 2018). Unfortunately, the recent instances of fraud at the for-profit private sector did not cease but were instead mirrored in public and private non-profit colleges and universities. For instance, graduate students at George Washington University filed a lawsuit against their college because of the relatively inferior quality of the online master's program compared to the on-campus degree program (McMurtrie, 2017). Since most non-for-profit private and public institutions have been under pressure to cut costs and secure revenue for decades while struggling with shrinking enrollment and tighter budgets (Mettler, 2014), they have been increasingly adopting the student recruiting strategies that have been used by private for-profit institutions (Coulter & Mandell, 2010; Hanover Research, 2014, 2015; Ross, 2012). In fact, about 97% of community colleges offer online courses or online degree programs, and the percentage of online community college students is more than double of the average number of online college students (Wladis, Hachey, & Conway, 2015). Most second-tier colleges rely on enrollment for revenue, these colleges tend to be client seekers, rather than status seekers. In other words, the question remains of who really gains or benefits from online college education with regard to the commercialization of higher education (Bok, 2003). Critics such as Noble (1998) attacked online students as a mass-product

of digital diploma mills destroying the academic tradition of higher education, not full of intellectual spirit but of commercial interests.

Although the rapid growth of online education can be seen promising, the educational equity via the Internet might be realized only if the diverse students get their degrees successfully and equally. In fact, most scholars have been more concerned about the productivity of the digital diploma mills which are grinding students' time into nothing. Numerous researchers (Bettinger, Fox, Loeb, & Taylor, 2017; Lee & Choi, 2011; Patterson & McFadden, 2009; Xu & Jaggars, 2011) generally accepted that concern over the quality of online education is growing especially regarding student attrition because the average attrition rates of online college students have been at least 10 percent higher than those in conventional classrooms. The relatively high attrition rate of online education is unsurprising given the nontraditional characteristics of online learners and their institutions (Bettinger et al., 2017; Wladis, Hachey, et al., 2015). Their attrition rates follow a highly predictable pattern because they are associated with most of the risk factors widely discussed in higher education research literature, such as nontraditional student characteristics (Bean & Metzner, 1985), loss of face-to-face interaction (Astin, 1984; Chickering & Reisser, 1993), and institutional types (Pascarella, 1991; Pascarella & Chapman, 1983; Pascarella & Terenzini, 1998).

Among many factors of the problematic quality of online college education, institutional differences matter significantly in terms of achievement gaps because they directly influence the likelihood of college degree completion and the overall quality of the education (Hoxby, 2014). The unequal distribution of quality education is at the core of the American higher education system. At the macro level, the American higher education system is regarded as a pyramid of institutions (Schudde & Goldrick-Rab, 2016) in which the top tier consists of a few selective and

prestigious colleges. The system consists of a mix of institutions that are stratified by prestige, resources, and selectivity of both the faculty and students and has the most highly decentralized and demand-sensitive market structure over than that of any other country (Shavit, Arum, Gamoran, & Menachem, 2007). The diversified, marketized, and hierarchically stratified U.S. higher education system causes postsecondary institutions to be largely funded by private sources (Shavit et al., 2007). As Engstrom and Tinto (2008) addressed, for many underprivileged students, the open-door policy at the bottom of the college pyramid turns out to be more of a revolving door since it does not guarantee degree completion, which might be useful for explaining the higher attrition rate of most online students. Although the majority of online education participant tend to seek a cost-efficient way of college education, online format might be a realistic option only for both well-prepared learners and qualified program providers (Dynarsky, 2018; Goodman, Melkers, & Pallais, 2019). Thus, regarding the high attrition rate of online education within the social context of institutional stratification process, educational expansion via the Internet might be understood as a process of diversion in higher education, instead of inclusion, because online education is channeling underrepresented groups to lower-status colleges and maintaining higher-status opportunities exclusively for the majority.

The Profile of Online College Education Participants

Table 1, as a summary of online students' individual characteristics, provides each percentage of online students among the different groups by three different academic years across gender, race, age, attendance status, and field of study.

Table 1

Percentages of online students among the total undergraduate by year, gender, race, age, attendance status, and field of study

Year	2003-04	2007-08	2011-2012
Total	15.6	20.6	32.0
Male	13.6	18.8	28.5
Female	17.0	21.9	34.5
White	16.2	21.9	33.5
African American	14.9	19.9	32.7
Hispanic	13.4	16.5	27.9
Asian	14.0	18.1	26.0
Pacific Islanders	19.1	17.0	29.9
American Indian/Alaska Native	15.5	21.9	32.6
Two or more races	16.5	20.4	30.6
15-23	11.7	15.2	26.5
24-29	18.4	25.7	36.5
30-	22.4	30.0	40.9
Full-time	12.7	16.7	28.8
Part-time	18.7	24.8	35.3
Mixed	17.4	22.5	35.0
Business/management	18.7	24.2	39.3
Computer/information science	19.5	26.9	40.8
Education	17.1	22.8	33.8
Engineering	12.1	16.1	23.2
Health	17.4	21.9	33.3

Table 1

Percentages of online students among the total undergraduate by year, gender, race, age, attendance status, and field of study

Year	2003-04	2007-08	2011-2012
Humanities	14.0	19.7	30.8
Life sciences	11.0	15.8	26.7
Mathematics	12.8	15.1	20.4
Physical sciences	9.8	12.8	22.1
Social/behavioral sciences	12.5	17.1	31.8
Vocational/technical	13.1	18.5	22.3

Note: Data from National Center for Education Statistics. (2017). Digest of education statistics, 2016 (NCES 2017-094), Table 311.22. Washington, DC: U.S. Department of Education. Retrieved from https://nces.ed.gov/programs/digest/d16/tables/dt16_311.22.asp

Through the three academic years, women were more likely to take online courses than men, and their online education participation rates were consistently higher than the average. There might be several reasons for the gender difference in online college education participation. First, women outnumber men in both college access and degree completion at all levels of postsecondary education. In 1947, only about 29 percent of college students were women, but the female proportion of enrollment has reached 57 percent since 2003 (Carnevale, Smith, & Gulish, 2018). The number of associate degrees awarded to women began outnumbering those awarded to men in the 1970s, bachelor's degrees and master's degrees in the 1980s, and doctoral degrees in the 2000s.

However, the institutional stratification process expands in the distribution of academic majors with white males disproportionately enrolled in fields with the highest labor market value relative to African Americans, Hispanics, and women (Carnevale et al., 2018; Chamberlain, 2017; Chamberlain & Jayaraman, 2017). Although more women graduate from college than men, and they are entering into many traditionally male-dominated majors, gendered major

choice pattern is a characteristic of student enrollment resulting in the gender pay gap. Thus, as a compounding effect of gender and major choice, a large portion of the major online degree programs such as education, nursing, and social work would be women.

White students took online courses slightly more than any other racial and ethnic groups; however, the racial and ethnic differences across the groups were inconsistent through the academic years. The percentages of online students increased with age, and the oldest group's percentage was the highest for a decade. Full-time students were less likely to take online courses than the students with part-time or mixed enrollment status. In terms of academic major, business/management, computer/information science, and education were preferred over other majors. Overall, across all the factors, continuous and gradual increase of the proportions of online students are identifiable.

Table 2

Number and percentage of online students by institutional type

Level, Control, and Type	Online Students					
	Overall		At least one, but not all, of student's courses		Exclusively distance education courses	
	N	%	N	%	N	%
Total	5,954,121	29.8	3,082,333	15.4	2,871,788	14.4
Undergraduate	4,942,257	29.0	2,839,348	16.7	2,102,909	12.3
4-year	3,074,183	29.2	1,698,960	16.1	1,375,223	13.0
2-year	1,868,074	28.8	1,140,388	17.6	727,686	11.2
Public	3,675,905	28.0	2,485,110	18.9	1,190,795	9.1
4-year	1,850,183	26.7	1,376,078	19.9	474,105	6.8
2-year	1,825,722	29.4	1,109,032	17.8	716,690	11.5
Private	1,266,352	32.5	354,238	9.1	912,114	23.4
Nonprofit	639,375	22.7	250,525	8.9	388,850	13.8

Table 2

Number and percentage of online students by institutional type

Level, Control, and Type		Online Students					
		Overall		At least one, but not all, of student's courses		Exclusively distance education courses	
		N	%	N	%	N	%
4-year		623,337	22.5	235,690	8.5	387,647	14.0
2-year		16,038	32.0	14,835	29.6	1,203	2.4
For-profit		626,977	58.5	103,713	9.7	523,264	48.8
4-year		600,663	70.9	87,192	10.3	513,471	60.6
2-year		26,314	11.7	16,521	7.3	9,793	4.3
Post baccalaureate		1,011,864	34.4	242,985	8.3	768,879	26.1
Public		400,047	28.1	134,770	9.5	265,277	18.7
Private	Non profit	375,596	30.2	95,806	7.7	279,790	22.5
	For-profit	236,221	86.2	12,409	4.5	223,812	81.7

Note: Data from National Center for Education Statistics. (2017). Digest of education statistics, 2016 (NCES 2017-094), Table 311.15. Washington, DC: U.S. Department of Education. Retrieved from https://nces.ed.gov/programs/digest/d16/tables/dt16_311.15.asp

Table 2, as a summary of student participation in online college education across different types of institutions, shows how many students took online classes and which type of institution they attended in fall 2015. There were total 19,977,270 students in Fall 2015 at all levels across all degree granting institution which granted associate or higher degrees and participated in Title IV federal financial aid programs. The U.S. Senate decided the reauthorization of the Higher Education Opportunity Act (HEA) of 1965 on August 14th, 2008, which enabled colleges and universities to offer 100% online education programs (Mayadas et al., 2009). In the history of distance education, unlike the misconception of online education, not-for-profit public and private colleges and profit-oriented schools have always coexisted

(Edelson & Pittman, 2008). Recently, however, the line between the two sectors is becoming blurred. According to a postsecondary education marketing trend report (Hanover Research, 2015), not-for-profit public and private institutions have been increasingly adopting the student recruiting strategies that have been used historically by private for-profit institutions. Approximately a hundred of not-for-profit colleges had partnered with several companies specializing in online service management (Ross, 2012).

In terms of the number of students, most online students were undergraduates at public schools; 4,942,257 public college students account for 83% of total online students. While public schools constituted the largest share of the post baccalaureate level of online education, the differences in the number of online graduate students among public, private, and for-profit are much smaller than that of undergraduate students. In terms of percentage, college students who attended private 2-year and for-profit 4-year schools were more likely to choose the online learning environment, and most students at for-profit 4-year schools were online learners.

One of the common misconceptions regarding online college students is that most of them attend private for-profit distance-only institutions without any campus buildings, which can be understood through TV commercials and websites only. As table 2 shows, however, a small number of online students were enrolled in for-profit institutions, and undergraduate and graduate online students who attended for-profit institutions accounted for only 15% of all online students. However, the highly concentrated pattern of enrollment in for-profit institutions is remarkable. The top 25 distance-only schools in terms of student enrollment constituted almost 90% of students at distance-only institutions which is a highly concentrated pattern (Seaman et al., 2018).

Online education promises flexibility, convenience, and affordability, which are especially preferred by nontraditional students (Yoon, 2019). Levine (2001) stated that the nontraditional college students' attitudes toward college are like those of consumers:

> older, part-time, and working students, especially those with children, often said in a national study I conducted (1998) that they wanted a very different type of relationship with their college than students have historically had. They preferred relationships like those they already had with their bank, the electric company, and the grocery. Today's older adult students are bringing precisely the same consumer attitudes to higher education. They are looking for just four things from their colleges—convenience, service, quality, and low cost. (p. 256)

In recent surveys of online students (Aslanian, Clinefelter, & Magda, 2019; Best Colleges, 2017, 2018, 2019; Clinefelter & Aslanian, 2016, 2017; Magda & Aslanian, 2018), when they were asked to select the three most important factors for college choice, cost, convenience, and flexibility were the top factors. While cost of attendance was the primary factor in selecting a school, about 25 percent of students surveyed reported that they were willing to pay more for a higher quality program. Also, many online students agreed that fast degree completion was an important factor when comparing different online programs. In terms of motivation, career-related reasons were the primary drivers for taking online courses and pursuing online degrees. Most online students mentioned the importance of skill/degree requirement, salary and promotion, transition, and getting a new job in their choice of online college education. Although educational motives are important in students' online education participation, career-related reasons are the primary personal motives.

In terms of student attrition, many studies gathered information about non-completers by asking questions regarding their reasons of withdrawing from an online course (Aragon & Johnson, 2008; Doherty, 2006; Muse, 2003; Rovai, 2003; Willging & Johnson, 2004). Willging and Johnson (2004) identified four broad categories: personal reasons, job-related reasons, program-related reasons, and technology-related reasons. Personal reasons included financial difficulties, lack of time, schedule conflict, and family problems; job-related reasons included role change, insufficient support from the workplace, and difficulty in time management as a full-time worker; program-related reasons included difficult individual assignments, burdensome group projects, lack of social interaction, and lack of academic interest; and technology-related reasons included insufficient support from technical staff, overly de-personalized learning space, and lack of technological preparation. Similarly, Aragon and Johnson (2008) suggested five categories: personal/time complaints, course design/communication issues, lack of technology/WebCT tutorial, institutional issues, and learning preference. In a survey of 65 online course non-completers from a rural midwestern community college, Aragon and Johnson (2008) addressed that personal reasons and program-related reasons are the two major reasons, accounting for 34% and 28% of stated reasons of withdrawal, respectively. Similarly, in a survey of 52 non-completers (Doherty, 2006), the largest percentage of students (21%) reported that they did not have enough time for the course. However, in a mixed method study on online course attrition (Muse, 2003), 22 interview participants indicate that technological issues, especially difficulty in accessing course materials at the beginning of the semester, is the single most significant reason for dropping out.

Until the late 1990s, the quality of online education was not regarded as a major deterring factor of institutional participation; higher education administrators reported that program

development costs, limited technological infrastructure, and costs of maintaining equipment were the most significant barriers to participation (Greene & Meek, 1998; Matthews, 1999). Online education was regarded as a capital-intensive business at that time, instead of as cost-saving packages or a new revenue market, because institutions had to invest in technological infrastructures components such as servers, data networks, and computers, as well as online service and education program development.

As online education has grown in a consistent manner, the perceived low quality of online education has been regarded as the most significant deterring factor at institutional level participation. In 2011, only 36% of private not-for-profit college presidents believed online courses had the same value as face-to-face courses, and only 50% of four-year public university presidents did (Taylor, Parker, Lenhart, & Patten, 2011). Thierry and Deborah (2000) categorized institutional motivations of online education participation as follows: expanding access, alleviating capacity constraints, capitalizing emerging market opportunities, and institutional transformation. First, many institutions tend to expand access by adopting online course delivery to respond to adult learning needs, local/regional stakeholders' claims, and educational needs in the workplace. Next, some institutions might need to embrace online education due to a physical and financial limitation in accommodative capacity. Third, the new lifelong learning student segments, such as nontraditional students, working adults, and organization executives and professionals, could be more lucrative than traditional-aged student markets; online education might be the best approach to reach this emerging student revenue market for many institutions. Last, online education is expected to generate a turning point because the increasingly competitive environment requires a more flexible strategy of institutional adaptation.

The multiple institutional motives might be understood more clearly with regard to the uneven distribution of student enrollment across different types of institutions. As Table 2 shows, the percentages of online student enrollment vary by institutional type. Private not-for-profit 4-year institutions, with the smallest percentage of online students, might be more cautious about the problematic nature of online education due to social downgrading than public or private not-for-profit 2-year institutions. In addition, public institutions may be more responsive to the social needs of nontraditional students than any other type of institution, which might explain the larger number of online students. For-profit colleges, which are relatively unconstrained by social reputation or social responsibility, might be driven by their client-seeking economic motives, and get advantage by maximizing the student enrollment revenue market and minimizing their budgets on physical facilities such as traditional classrooms and face-to-face service offices.

Gender in the Online College Classroom

The information technology revolution has allowed people to interact via social media without face-to-face connections (Turkle, 2011), and the online classroom has become a major site of academic and social interaction in education. Online students seldom meet one another in a regular on-campus course. Most course delivery is composed of asynchronous text-based communication, and discussion forums serve as the primary space for academic and social interaction. Within the online classrooms, the poster's name is typically the main source of personal information especially about students' gender, race, and ethnicity, as compared to in-person classes where participants have access to many visual clues. In this respect, early researchers addressed that an online learning environment might create a more equally accessible space—especially for women. Sullivan (2001) argued:

> The online learning environment can be configured in ways to offer a more welcoming and less ‘‘chilly’’ environment for female students than the traditional classroom, which may privilege a ‘‘masculine style’’ of discourse, with such characteristics as highly assertive speech, impersonal and abstract styles, and competitive. (pp. 811-812)

As Sullivan (2001) argued, many researchers addressed that an online learning environment might create a truly equally accessible space for social minority groups in comparison to a face-to-face environment, especially for women (Anderson & Haddad, 2005; Kramarae, 2001; Rovai & Baker, 2005; Sullivan, 2001). Studies agreed that the disembodied asynchronous text-based interaction in current online learning environments would produce greater social equalizing effects or promote a more radical democratization of society than the face-to-face interaction of a traditional classroom (Harasim, 1996, 2000). Also, asynchronous communication may promote quality discussion because online learners get more time for reflection and to search for extra information before discussion compared to students in a conventional classroom (Meyer, 2003). The asynchronous discussion and anonymity might be more welcoming for women than the traditional classroom and might not be easily dominated by extroverted students compared to the time-bound condition of the conventional college classroom (Caspi et al., 2008; Flanagin, Tiyaamornwong, O'Connor, & Seibold, 2002; Sullivan, 2002).

On the other hand, Herring (1993) reported male dominance in online environments in her pioneering research on gendered interaction patterns in online environments. She collected primary data from the observation of academic discussions in two online discussion forums that were shared by students and faculty members in 1992. In her study, men’s dominance in online communication was distinctively identifiable:

> A small male minority dominates the discourse both in terms of amount of talk, and rhetorically, through self- promotional and adversarial strategies. Moreover, when women do attempt to participate on a more equal basis, they risk being actively censored by the reactions of men who either ignore them or attempt to delegitimize their contributions. (Herring, 1993, p. 11)

Under the male dominant online circumstances, as Table 3 shows, online language tended to imitate gendered patterns in face-to-face; women's postings were composed of attenuation, hedging, and frequent apologizing, while male postings were relatively longer and were sometimes adversarial with strong assertions and self-promotion. Her study provides evidence that online learning environments might not remove existing gender inequalities and sexism from academic and social interactions. Many studies (Caspi et al., 2008; Guiller & Durndell, 2006; Rovai, 2001; Rovai & Baker, 2005) reaffirmed Herring's (1993) findings partially; they reported that women's online posts consisted of attenuated language with positive and supportive meaning, compared to that of men's authoritative and negatively evaluative language, as women and men practice in face-to-face interaction.

Table 3

Different manners between women and men's online language usage

Women	Men
Attenuated assertions	Strong assertions
Apologies	Self-promotion
Explicit justifications	Presuppositions
Questions	Rhetorical questions
Revealing personal thoughts and feelings	Authoritative
Supporting others	Challenges others
	Humor & Sarcasm

Note: Data from Herring (1993). Table 1. Features of women's and men's language.

Although Herring's (1993) groundbreaking study suggested a possibility that online learning environments might be structured along the lines with persisting sexism in the society, empirical findings of studies that have examined the relationship of online classroom to women's interaction and their success have been mixed (Atai & Chahkandi, 2012).

Feminist researchers Ross and Powell (1990), Burge (1998), Wolfe (1999), Kramarae (2001), and Sullivan (2001), to name a few, have argued that the emerging technology might not produce a chilly climate for women's active participation, due to virtual space's less-discriminatory circumstances. In a comparative study of online and face-to-face class, Caspi et al. (2008) found that males tended to talk over-proportionally in the face-to-face courses, while women posted messages over-proportionally online. Flanagin et al. (2002) identified that females enjoyed the anonymity of online space more, and men reported a greater desire to divulge personal information especially their gender.

Research has suggested that in such spaces women exhibit a variety of participatory behaviors: they contribute to online discussions more frequently (Rovai & Baker, 2005) and collaboratively (Arbaugh, 2000; Bostock & Lizhi, 2005) than do men; they favor online learning environments over face-to-face environments (González-Gómez et al., 2012); they experience more deep learning (Anderson & Haddad, 2005) and receive more support from their instructors in online environments (Lim & Kim, 2003); and they perceive a stronger sense of community (Rovai & Baker, 2005). While a few studies have argued that no gender differences were identified in the measurable outcomes of online learning (Lee & Choi, 2011), most feminist scholars agree that online classrooms might not reproduce the chilly climate for women that exists in traditional classrooms.

Feminist online education studies were mostly based on these two theoretical perspectives. First, from a sociolinguistic perspective, as males and females communicate differently in face-to-face interactions (Coates, 1986; Tannen, 1990, 1991), they may communicate differently online from the gendered way in which they were socialized (Herring, 1993; Wolfe, 1999). Second, from feminist pedagogical perspective, as women tend to prefer connected learning (e.g., collaboration and group discussion) to individual learning more than men (Belenky, Clinchy, Goldberger, & Tarule, 1986), women may enjoy online space more than men do when they feel connected to their group (Rovai, 2001; Rovai & Baker, 2005). For instance, Johnson (2011) adopted the two commonly accepted feminist assumptions as his major hypotheses in the study of social presence: 1) women will have higher levels of interaction than men and 2) women will have a higher level of perceived social presence than men. He used a sample of 303 male and 252 female college students who participated in a required management information systems fundamentals courses at a large university. The two hypotheses were supported by the data. Women were more likely to read each other's postings, make original postings, and make more follow-up postings than men. Also, women had higher perceptions of social presence and were more satisfied with the online learning environment than men. However, women's outperformance, in terms of final grade and retention, was not identified in the study.

Otherwise, Kramarae's (2001) study called into question these gendered assumptions: women preferred to work in collaborative group settings in comparison to men who preferred independent work. Kramarae (2001) analyzed in-depth interview data and questionnaire responses that were collected from 481 women and 53 men, including students, teachers, and administrators who were interested in online education. More than half of respondents preferred

independent study as their first choice, and most of the women tended to loathe or dislike group work in online classes (Kramarae, 2001). Interestingly, many students in Kramarae's (2001) study reported that they liked group discussion instead of group work. As the students reported in Kramarae's (2001) study, the distinction between group discussion and group assignments might be important in terms of the structure of classrooms because perceived connectedness (Rovai, 2001) would not be directly related to academic outcome. Most empirical studies agreed that women were doing more work than men in terms of almost every aspect of online classroom interaction; however, women's outperformance is inconclusive in the studies.

Women's outperformance and gendered interaction pattern in online learning environments may need to be examined in conjunction with other factors. For instance, Kupczynski, Brown, Holland, and Uriegas (2014) examined 959 education majors' online academic performance at a regional university. The study found that that the impact of gender was different for low achieving versus high achieving students; in fact, female students scored significantly higher than male students only in the lower overall GPA group. This study suggested that interaction patterns may vary by student achievement level.

Furthermore, in terms of group gender composition, Savicki and Kelley (2000) reported that the gendered pattern of interactivity of group members varied by the dominant gender of a task group in online discussions. Also, Jeong and Davidson-Shivers (2006) suggested that online interaction participants might adjust their interaction style to the way of the majority; however, the study did not find a significant gender difference in the sample of a male dominated graduate course setting. In this respect, gender group composition and the proportion of women in online learning environments may influence to the pattern of interaction. According to Cochran, Campbell, Baker, and Leeds (2014), men were more likely to withdraw from an online class in

the case of a female-dominated major, such as education and health, but the opposite was true for business, science, and math which have much higher percentages of men than average. Also, according to Wladis, Conway, and Hachey (2015), STEM major women did not perform worse than men in online academic settings, and the two gender groups had almost equal rates of success in the online environment. However, the authors argued that female students' outperformance disappeared in the online environment, and the effect of the online settings may be offset by gender effect because the sampled women had significantly higher success rates in face-to-face courses than men.

Race, Class, and Gender in the Online Classroom

Race and class have begun to be discussed in the online education studies recently. Compared to a large amount of studies on gender and online education, only a few studies examined the race issue, and Wolfe's (2000) study is an exceptional case which discussed race and gender as the main topic in a single empirical research paper. In her study, Wolfe (2000) examined differences among four groups of students. White women participated at far below the average in face-to-face course; however, White men showed the highest participation rate, but "the relative silence of White women was not shared by Hispanic women" (Wolfe, 2000, p. 506) which provided a counternarrative for the stereotype of Hispanic women as passive and docile. Also, White women participated in online discussion more than in face-to-face, and White women only showed the strongest preference for the online space while Hispanic women did not show any difference in participation or preference.

Due to the scarcity of empirical research on race issues in online space, this study had to extend the scope of article searching from online college classroom into non-classroom and non-college setting, web content creation (Correa & Jeong, 2011), youth's digital experience

(Okwumabua, Walker, Hu, & Watson, 2011), and doctoral e-mentoring experience (Berg, 2016). Recent studies on race and online education showed three characteristics. First, most online student attrition research, which tended to consider race and ethnicity as just one of many demographic factors, reported no significant difference in success or drop-out rate of online students based on race and ethnicity (Aragon & Johnson, 2008; Jost, Rude-Parkins, & Githens, 2012; Willging & Johnson, 2004). However, since racial and ethnic minority college students have a higher attrition rate than white students regardless of institution type, non-significant race effect is a problematic result. Although studies have reached no consensus on the influence of race on online students' decisions to drop out (Lee & Choi, 2011; Park & Choi, 2009), African American students were more likely to show lower achievement levels in online spaces (Cochran et al., 2014; Rovai & Ponton, 2005). In a study of online STEM students (Wladis, Conway, et al., 2015), although the authors found that a racial achievement gap existed among the sample students, the gap has not widened in online courses. Otherwise, several recent empirical studies (Kaupp, 2012; Xu & Jaggars, 2014) argued that the racial/ethnic performance gap became much wider in the online environment than in face-to-face courses. Thus, sufficient evidence is not available to conclude that African American and Hispanic students are not disadvantaged in online courses in comparison to their White or Asian peers.

Second, most studies on the issue of race and ethnicity discussed a group of students' perceptions of online education with no regard for social contexts of racial inequality and persistent racial achievement gaps. As a result, the perception-focused studies tended to concentrate on the minority group's negative perceptions of online education, such as anxiety (Ashong & Commander, 2012; Okwumabua et al., 2011) and frustration (Du, Ge, & Xu, 2015; Du, Zhou, Xu, & Lei, 2016). The problem came from the studies' ahistorical standpoint which

did not provide enough explanation for the social contexts of higher education and persistent racial achievement gap. For instance, Ashong and Commander (2012) argued that African American students showed less positive perspective toward online education than the White students. Also, Rovai and Ponton (2005) concluded that African American online students tended to have lower perceived learning and less sense of a learning community.

Conversely, in a different context of study, the African Americans youths valued online space as an opportunity to connect with people and to share identities and their voices while White students did not (Correa & Jeong, 2011). In the study, African American students acknowledged the availability of self-expression online, and White students concentrated on instrumental usage of the online environment. Also, Berg (2016) identified the negative online education experience of underrepresented minority groups came from financial burdens and unsuccessful e-mentoring processes, rather than personal reasons or racial identity. In this respect, reproduction of racial stereotypes on minority group might be a potential pitfall of the current empirical studies if researchers assume negative feelings of the underrepresented students.

Last and most important, gender issues were not discussed in the studies of race and online education. Many studies categorized a student group as a monolithic racial group, such as African American. Kang and Yang (2016) excluded gender variable in their final model because gender differences among African American online students showed little impact on the findings with an effect size less than one percent. Rovai and colleagues published several major studies on race and gender issues in online classroom settings; however, they discussed race (Rovai & Gallien, 2005; Rovai & Ponton, 2005) and gender (Rovai, 2001; Rovai & Baker, 2005) separately in different papers. However, some studies showed that various gender differences

need to be discussed with race (Kaupp, 2012; Wolfe, 2000). For instance, the gender difference among Hispanic and White students was different in Wolfe's (2000) study. White men were the most vocal speakers face-to-face, but they became relatively quiet in online and White women participated in online discussion more than in face-to-face discussion. However, Hispanic women did not show any difference in participation unlike White women. Power structures that may have forced female students of color to experience oppression requires an intersectional way of understanding. Compared to a large amount of studies on gender and online education, a very small number of studies examined the issues of race and class together. The current studies on race and online space tend to describe the racial and ethnic minority group's experience negatively, and they pay little attention to differences among groups, social inequality, and racial achievement gaps.

Chapter Summary

The purpose of this chapter was to review the relevant literature that informed the study of race, class, and gender differences in the online college classroom and to identify the research gaps from the literature. After exploring the history of online college education, the profiles of both individual and institutional characteristics of online college participation were provided in the chapter. Women, older than thirty, and non-full-time students were more likely to choose online courses. Although no distinctive participation pattern was evident for racial and ethnic groups, White students tended to prefer online college more than any other group. Most online students tended to seek online education for career-related reasons with a strong preference for cost-saving and convenient access to college through the Internet.

Several research gaps were identified through a critical review of the extant literature with a focus on virtual classroom interaction. First, most of the reviewed literature depended on

the concept of a monolithic group of women. As several studies reported, women's online interaction might vary by group formation and academic major (Jeong & Davidson-Shivers, 2006; Savicki & Kelley, 2000; Savicki, Lingenfelter, & Kelley, 1996; Wladis, Conway, et al., 2015) or academic performance level (Kupczynski et al., 2014; Taplin & Jegede, 2001), and purpose of interaction (Kramarae, 2001). Most importantly, race and ethnicity were excluded when discussing gender in most studies. As Wolfe (2000) suggested, power mechanisms that silenced female students of color should be addressed separately from the oppressive mechanisms that silence White women. However, no follow-up research has been conducted, even though Wolfe's (2000) pioneering study suggested that the concept of a monolithic group of women in most studies should be re-examined. For instance, Du and colleagues (Du et al., 2015; Du et al., 2016) conducted qualitative interview research with ten African American women in an online graduate program. Although the studies focused on power mechanisms surrounding African American women, specifically, the authors did not mention gender and race differences in the study.

Next, women's academic performance in online learning environments needs to be compared with women's performance at most American higher education institutions. Overall, a higher percentage of all types of degrees were awarded to females than to males except in the science, technology, engineering, and mathematics (STEM) fields, which was observed across all racial/ethnic groups. Women overall had 5% higher college completion rates than men, and the higher female graduation rate was consistently found regardless of race and ethnicity (Carnevale et al., 2018). The reverse gender gap exists only in the STEM fields. The percentage of STEM bachelor's degrees awarded to men versus women was highest for White students (34%) and narrowest for African American students (12%) (Musu-Gillette et al., 2017).

Third, the unproven women's outperformance in digital space is a problematic issue that needs further critical investigation. Most online education studies found that women were interacting more frequently, persistently, and positively in online classrooms than men. Then, the next follow-up question should be why women in the online college classroom could not show a higher level of performance as they usually do in most higher education settings. Early studies, especially Rovai and colleagues' studies of online learning communities (Rovai, 2001; Rovai & Baker, 2005), tended to romanticize the gendered division of online interaction because the survey results showed that women were more satisfied with interaction than men. However, as Kramarae (2001) mentioned, group collaboration might not be welcomed by most online students regardless of gender due to its stressful nature. In this respect, the phenomenon of women's participation without a corresponding advantage in terms of academic achievement needs further investigation. One possible explanation for this phenomenon could be found through examining women's involvement as a part of gendered labor structure in online spaces. In other words, women's online classroom participation might be regarded as undervalued and underexamined labor as much as women's reproductive labor. From a Marxist feminist perspective (Hartmann, 1979, 1981), reproductive labor includes a variety of domestic labor, care labor, and emotional labor, such as house cleaning, cooking, and childcare. The term calls attention to how women have been assigned to the culturally undervalued and historically uncompensated field of work and labor, which sustains the entire capitalist system. As such, women's online classroom participation without an advantage, except self-satisfaction, could be an extended form of reproductive labor in cyberspace.

Lastly, the existing online education studies on race issues tended to describe the racial minority group's experience negatively, and they paid little attention to broad contexts such as

class differences among groups, educational inequality, and racial achievement gaps. In particular, the perception-focused studies tended to describe the minority group's negative perceptions of online education, such as anxiety (Ashong & Commander, 2012; Okwumabua et al., 2011) and frustration (Du et al., 2015; Du et al., 2016). However, the complex meaning of their negative perception of virtual space needs to be understood within a broad context of digital divides (Anderson & Kumar, 2019) and digital racism (Daniels, 2013).

CHAPTER 3

METHODOLOGY

The purpose of this study is to examine the dynamic of online classroom interaction networks and to determine how such virtual relations are connected to the power relationships along the lines of race, class, and gender. This study analyzes both observed and perceived online classroom interaction network. Three major research questions for this study are:

1. In what specific ways, if any, does the asynchronous classroom discussion contribute to a higher level of online student integration?
2. How does the observed classroom network differ from the perceived classroom network?
3. How is the virtual classroom interaction associated with the power relationships along the lines of race, class, and gender?

This chapter reviews the specific methodological components used, including the research design, data collection, and analysis. This chapter is organized into seven sections: conceptual framework, mixed method research, qualitative content analysis, social network analysis, data collection, data structure, and validity and reliability.

Conceptual Framework

The conceptual framework refers to the structure consisting of multiple sets of assumptions, such as paradigm, philosophy, and theoretical orientations, that can hold or support a theory of research in general (Patton, 2015). It describes the framework of inquiry that explains why the research problem under study exists. This section explained how different theories

informed and shaped the current research. The main subject of the current study is the relationship between student interaction and student integration in an online learning environment, which have been discussed by higher education researchers and online education researchers. Accordingly, this study reviewed two major theories: the college student integration model (Tinto, 1993) in higher education studies and the Community of Inquiry (CoI) model (Garrison et al., 1999) in online education studies. However, this social network study adopted multiple concepts from Social network analysis (SNA) research literature to construct the conceptual framework of the current study. Therefore, this section introduced several SNA concepts after an overview of the two education theories. In particular, this section criticized the taken-for-granted assumption of the two famous education theories and invited a different approach to the online classroom.

Student Interaction and Integration in Education Theories

The student integration model (Tinto, 1975, 1988, 1993) is widely accepted in higher education research (Braxton, 2000; Braxton, Hirschy, & McClendon, 2004). A central theme of his theory is the idea that a college student's active engagement in academic and social interaction is critical to success in college. He explained that a college student's drop-out decision arises from a combination of student characteristics and the extent of their academic and social integration into an institution. In other words, he suggested that college student departure from institutions needs to be understood as a longitudinal interactive process between an individual with given attributes, skills, financial resources, prior educational experiences, dispositions (intentions and commitments) and integration with other members within the institution (Tinto, 1993). Therefore, education researchers consider his model as an interactionist model because of its focus on interaction.

His model explained that student integration occurs from on-campus daily encounters, which positively influence goal commitments and student persistence. However, Tinto's model would have very limited applicability for addressing the rapidly changing college student demographics and their academic life. His original model (Tinto, 1975) did not take account of the academic life of working students, commuters, and those students taking classes mostly through online classrooms without an on-campus visit and face-to-face interaction (Bean, 1985; Kember, 1989; Pascarella, Duby, & Iverson, 1983). Traditional college students have been narrowly defined as a selected, residential, full-time student body of 18- to 22-year-olds who matriculate into a baccalaureate degree program right after their high school graduation. In contrast to traditional students at residential 4-year colleges, numerous college students attending commuter universities, community colleges, 2-year colleges, non-selective colleges, and online colleges never experience collegial life and social activities on campus. The original model has been criticized and revised by multiple researchers to understand the diversity of college students in terms of age, socioeconomic class, race, ethnicity, and gender (Bean, 1982; Bean & Metzner, 1985; Carter, 2006; Kember, 1989; Nora & Cabrera, 1996; Nora, Kraemer, & Itzen, 1997; Rendón, Jalomo, & Nora, 2000; Terenzini & Pascarella, 1980)

In online education studies, various theoretical models have been proposed because Tinto's original model had many limitations when applied to online students in virtual classrooms due to the lack of daily face-to-face on-campus interaction. Many online education researchers have adopted CoI model as an online student retention model compatible with the Tinto's model for investigating the relationship between online classroom interactions and student retention (Boston et al., 2009; Meyer, 2013). The CoI model originated from the constructivist view of distance education, which situates learning in the social and interactive

contexts (Garrison et al., 1999). It presumes that online learning occurs within a virtual community through the interaction of three presences: social, cognitive, and teaching. Each of the three presences represents different layers of an online student's perception constructed through online interaction beyond geographic distance.

The student integration model and CoI model were developed in different contexts; however, both models shared similar assumptions about interaction and integration. Regardless of the measurement of different outcomes, two theories assumed a linear relationship between interaction and integration. As a result, the theories suggested that stronger interaction might generate a better outcome for students. While the two theories were developed to support the academic achievement of college students, they were blind to 1) the duality of interaction and 2) negative consequences of social integration, which would be critical to understand and promote women and minority students' learning process. Therefore, in the following section, different perspectives in SNA were explored to construct the conceptual framework of the current study.

Student Interaction and Integration in SNA

Granovetter (1973), in the most cited SNA article, defined the strength of a tie as a complex component of four highly inter-related elements: time, emotional intensity, intimacy, and the reciprocal services. He suggested two main arguments for the impact of the strength of a tie. First, the degree of the strength of existing ties can produce transitivity upon a node that was not connected. As a result, two strong ties among three nodes can increase the probability of the occurrence of another new tie. For instance, two college students who had never met each other might become friends when they realized that both of them had a strong relationship with a third student. Borgatti and Halgin (2011) summarized that "the stronger the tie between two people,

the more likely their social worlds will overlap—that they will have ties to the same third parties" (p. 3).

The second main argument of Granovetter (1973) is that a weak tie gets a kind of strength as a bridge between two clusters of nodes. This argument can be interpreted differently into two different perspectives, and this study called them productive arguments and redundant arguments. The productive argument suggests that the strength of ties causes similarity, closeness, cohesive force, and transitivity within the nodes. The first assumption about the productivity of the strength of ties is deeply related to the closure argument of social capital in Coleman (1988). In addition, the closure argument is very similar to the fundamental assumption of the college student integration model and the CoI model.

Coleman (1988) popularized the concept of social capital, which is conceived as a generative resource from the social structure which cannot be appropriated by any individual. The article addressed three different forms of social capital—obligations and expectations, information channels, and social norms—being related to the schooling system and human resource development in general. In particular, he argued that the lack of social capital impacted sophomores' dropping out behavior before high school graduation (Coleman, 1988). In his analysis of the concept, he defines social capital by its function. In Coleman (1988), social capital refers to "a variety of entities with two elements in common: They all consist of some aspect of social structures, and they facilitate the certain action of actors—whether persons or corporate actors—within the structure" (p. 302). His social capital concept, along with the famous publication of Putnam (2000), had the undeniable merit of giving visibility to the significance of the social network in education research and identifying some of the tie-formation mechanisms.

However, the main concern of early social capital theorists tended to be limited to the positive result of social integration. Recent studies have identified at least four negative consequences and limitations of the closure assumption in social capital theories: exclusion of outsiders, excess claims on group members, restrictions on individual freedoms, and downward leveling norms (Portes, 1998). A strongly connected community does not always guarantee positive outcomes for its members. Moreover, the negative effects of the closed community are not limited to the members but also spread out even beyond the network boundary.

Granovetter (1973) argued that only a weak tie could play a significant role as a bridge in a network because it is not entangled in a cohesive group. A weak tie has a different type of strength in a network since it is the only path to fresh information which is undeliverable within the cohesive group. In this case, more ties might not lead to a productive result because a greater number of ties would be a path for redundant information being cycled in the group. Burt (2004) suggested that a network with more structural holes and less redundant ties will be effectively engaged in innovation or creative knowledge production, which is another main source of the social capital. In this case, a node's structural position in a network is much important than its strength of other ties.

In this respect, the strength of interaction and its impact on student integration needs to be understood carefully with regard to 1) the duality of the strength, 2) negative effect of social integration, and 3) the importance of structural position (e.g., structural hole). The critical insights gained from a review of multiple theories would be applied to the data analysis process and interaction of the research result in the following chapters.

Mixed Method Research

This mixed method research (MMR) includes both quantitative and qualitative data gathered from online courses. An MMR design is a procedure for collecting, analyzing, and integrating both quantitative and qualitative data at some stage of the research process within a single study (Teddlie & Tashakkori, 2010). The definition of MMR varies across the literature in the social sciences, including education research fields. Literally, a mixed method refers to a combination of two or more methods in a single research study (Hesse-Biber, 2010). For the definition of MMR, Johnson, Onwuegbuzie, and Turner (2007) examined different perspectives on MMR by asking thirty-six leading academic scholars and professionals who influence the MMR field significantly to share their definitions of MMR via e-mail. The researchers conducted constant comparative analysis of nineteen definitions of MMR and incorporated them into one comprehensive definition:

> (MMR) is the research paradigm that (a) partners with the philosophy of pragmatism in one of its forms; (b) follows the logic of mixed methods research (including the logic of the fundamental principle and any other useful logics imported from qualitative or quantitative research that are helpful for producing defensible and usable research findings); (c) relies on qualitative and quantitative viewpoints, data collection, analysis, and inference techniques combined according to the logic of mixed methods research to address one's research question(s); and (d) is cognizant, appreciative, and inclusive of local and broader sociopolitical realities, resources, and needs. (Johnson et al., 2007, p. 129)

This definition is comprehensive enough to define MMR; however, many different definitions are always possible because MMR has an inherently complex and boundaryless

nature (DeCuir-Gunby & Schutz, 2016; Shannon-Baker, 2015). Contemporary researchers generally agree that the different definitions of MMR have several characteristics in common (Teddlie & Tashakkori, 2010). Most MMR researchers agree that MMR follows methodological eclecticism, instead of methodological purism:

> the rejection of the incommensurability of paradigms thesis is a major point of demarcation between advocates of MMR and others advocating purist methodological stances. Methodological eclecticism means that we are free to combine methods and that we do so by choosing what we believe to be the best tools for answering our questions. (Teddlie & Tashakkori, 2010, p. 9)

MMR is built on interdisciplinary approaches of multiple researchers characterized by pluralism, flexible research design, dialectic process, open-mind perspective, and rejection of binary thinking; the researchers basically honor a variety of philosophical or theoretical stances (Teddlie & Tashakorie, 2010). In this respect, most contemporary MMR researchers agree on the importance of considering a research process as a continuum rather than a set of dichotomies:

> A hallmark of MMR is its replacement of the either-or from the paradigm debates with continua that describe a range of options from across the methodological spectrum. … which presents a variety of philosophical and methodological continua within a multidimensional space and the placement of specific research methods within that space. (Teddlie & Tashakorie, 2010, p. 10)

By adopting a sequential exploratory mixed method research design (Creswell & Clark, 2018), this research included both quantitative and qualitative data gathered from three online courses and employed two different methods to analyze the data: directed qualitative content analysis and social network analysis. A sequential exploratory mixed method study consists of an

initial qualitative data collection and analysis, followed by a quantitative data collection and analysis (Creswell & Clark, 2018). Sequential research designs would be particularly useful in development, elaboration, and application of first phase data into the next research procedure.

Qualitative Content Analysis

According to the Oxford English Dictionary (Content, n.d.), content refers to the thing that is held or included in something:

1.1. The amount of a particular constituent occurring in a substance

1.2. A list of the chapters or sections given at the front of a book or periodical

1.3. The material dealt with in a speech, literary work, etc., as distinct from its form or style

1.4. Information made available by a website or other electronic medium

In this definition, content analysis (CA) aligns with the third (1.3) definition in general, while the fourth (1.4) definition raises special attention to the online media as a new form of information transaction and communication. CA has maintained interdisciplinary academic interest as a research method since the 1940s (Schreier, 2012), and its academic popularity was driven by the huge impact of the rapid growth of information and computer technology. In fact, CA has languished in the "methodological ghetto" (Bauer, 2000, p. 149) for a long time in social science because it failed to gain scholarly interest continuously. However, the ongoing revolution of information and computer technology motivated social science researchers to revisit the ghetto with "a renewed interest" (Bauer, 2000, p. 132) in CA.

CA allows social science researchers to develop a "systematic description" (Schreier, 2012, p. 58) of large amounts of content. Several common characteristics are identifiable from the early history of CA studies (Berelson, 1952; Holsti, 1969, Kaplan, 1943; Krippendorff, 1980;

Paisley, 1969; Weber, 1985, as cited in Bauer, 2000, p. 133). First, CA is a statistical, quantitative, and objectified approach to qualitative data (Bauer, 2000). This feature is the most distinctive characteristic of CA as compared to other qualitative methodologies, such as hermeneutical approach which aims to provide "comprehensive sense" (Schreier, 2012, p. 3) or "holistic overview" (Schreier, 2012, p. 4) of the content. Instead, CA aims to benefit from generating a replicable coding frame, which is expected to increase validity and inter-coder or inter-interpreter reliability (Bauer, 2000; Krippendorff, 2018). Indeed, CA is a nontraditional research methodology in two ways; it analyzes text which would be unusual for most conventional quantitative social scientists; also, its objectified approach to text could be regarded as a suspicious way of interpreting meaning from the text from most traditional qualitative researchers' point of view.

Second, an underlying assumption of CA is large amounts of textual data which requires a systematic approach to understanding. While no academic researcher confesses that she gave up a systematic approach intentionally, the notion of the systematic approach in CA implies potential data reduction (Graneheim & Lundman, 2004; Krippendorff, 2018; Schreier, 2012). One of the simplest examples of reduction is a "purely descriptive study that counts the frequency of all the coded features of the text" (Bauer, 2000, p. 135). Reduction, abstraction (Graneheim & Lundman, 2004), distillation (Cavanagh, 1997), or condensation (Coffey & Atkinson, 1996), is a key feature of CA, but "at the 'cost' of losing the potential multiplicity of meanings" of data (Schreier, 2012, p. 30).

Content segmentation is a key factor which differentiates CA's coding frame construction from coding in general. The segmentation of content refers to dividing materials into smaller parts which fit in exactly one subcategory within the main category in the coding frame

(Schreier, 2012). The basic units of analysis of this study are each discussion thread, and units of coding include one thread-opening message and replies within each unit of analysis. The unit of coding for this study is a post which contains various units of meaning (Henri, 1992); however, the criteria for segmenting the unit of meaning from both the unit of analysis and the unit of coding is vague because a specific boundary between multiple units of meaning is indeterminable. Hypothetically, a unit of coding consists of five sentences that may have thousands of units of meaning if the message includes multiple interpretations of latent content. Therefore, in order to maximize the virtue of CA, this study delimits a unit of meaning equals a unit of coding, which means one sub-category will be assigned to each post.

Directed Content Analysis

A coding frame can be generated in three different ways with regard to the relationship between interpreter's subjectivity, the data, and preexisting theories: conventional CA, directed CA, and summative CA (Hsieh & Shannon, 2005). In a conventional CA, codes and categories are inductively derived from data as in most qualitative data analysis processes. On the other hand, with a directed CA, existing theory or prior research is employed to develop the initial codes and categories prior to beginning to analyze the data. Summative CA examines how words are used in the content by counting the frequency of each word. When existing literature on the research topic is limited or when the researcher aims to avoid presumptions of existing theories, it is necessary to employ a conventional design. However, the conventional approach can struggle to identify key categories or main themes and ensure the consistency of the coding frame. Otherwise, directed CA benefits from prior research and existing theories, as Hsieh and Shannon (2005) explained:

> The goal of a directed approach to content analysis is to validate or extend conceptually a theoretical framework or theory. Existing theory or research can help focus the research question. It can provide predictions about the variables of interest or about the relationships among variables, thus helping to determine the initial coding scheme or relationships between codes. (p. 1281)

In this respect, a comprehensive review of preexisting theories in directed CA plays a major role in generating coding framework. This study reviewed empirical scholarly journal articles in which race and gender issues have been discussed through both quantitative and qualitative approaches to CA. Literature searches were conducted in the two databases, ERIC and Google Scholar, using three criteria for selecting the studies. Each study: (a) examined online college education or the online college classroom as the primary subject of study, (b) had a section of methodology which provided information to discern its primary data and research method, (c) offered review, empirical findings, or discussions that aimed to understand online classroom interaction. Also, this study employed the snowball method by tracking both the reference list of the most commonly cited review articles (De Wever, Schellens, Valcke, & Van Keer, 2006; Lee & Choi, 2011; Li, 2005; Rourke, Anderson, Garrison, & Archer, 2001; Salvo et al., 2017) and the citation records of the reviewed articles at the Web of Science and Google Scholar.

Online Education CA Studies

Numerous education researchers have employed CA for collecting and analyzing data regarding online bulletin boards (De Wever et al., 2006; Herring, 2010; Rourke et al., 2001). A comprehensive review of online education CA literature (De Wever et al., 2006) found that the extant studies lacked a replicable coding frame, mainly due to arbitrary distinctions made among

the main categories, sub-categories, and codes. In this respect, this study provides a robust set of replicable codes by adopting Bloom's taxonomy, the most well-known and long-standing set of vocabularies for classifying cognitive processes, to establish learning, teaching, and assessing categories (Anderson et al., 2001). Table 4 contains the four main components of the coding frame of this study: three main categories of online classroom interaction (critical, economic, and social), definitions, indicators (and their eight subcategories), and twenty-eight categories and codes.

Table 4

A coding frame for analysis of online classroom discussions

Critical						
Definition	A discussion posting is related to the formal content of the subject matter, and sometimes goes beyond it. It demonstrates critical thinking skills and a profound knowledge level along with high-order cognitive process.					
Indicator	Well-structured, logical, containing both a main argument and supporting details, fully associated with the given course materials					
Category	Creating	Code	Generating	Planning	Producing	
	Evaluating		Checking	Critiquing		
	Analyzing		Differentiating	Organizing	Attributing	
Economic						
Definition	A discussion posting is related to the formal content of the subject matter; it exhibits knowledge and skills related to the cognitive process; however, the cognitive process remains at a basic level since the supporting details tend to be anecdotal, personal, and brief, and consequently unpersuasive; most references are not directly related to the given course materials.					
Indicator	Semi-structured, lacking a logical structure or supporting details					
Category	Applying	Code	Executing	Implementing		
	Understanding		Interpreting	Exemplifying	Classifying	Summarizing
			Inferring	Comparing	Explaining	
	Remembering		Recognizing	Recalling		
Social						

Table 4

A coding frame for analysis of online classroom discussions

Definition	A discussion posting is not related to formal content of the subject matter; it is off-topic. It includes only a topic sentence or a controlling idea without any supporting details.					
Indicator	Unstructured and non-academic, lacking a main argument					
Category	Positive	Code	Greeting	Introducing	Agreeing	Thanking
			Flattering	Empathizing	Apologizing	
	Negative		Flaming	Ignoring		

One commonly acknowledged issue in online education studies is that higher levels of cognitive processing are rarely found in online classroom discussions (Gunawardena, Lowe, & Anderson, 1997; Hew, Cheung, & Ng, 2010; Pawan, Paulus, Yalcin, & Chang, 2003). This conflict between learning theories and the reality of online learners has often entailed a failure to recognize the digital drama of the collaborative process on digital bulletin boards. However, this study embraces online students' socioeconomic decisions as their reason for minimizing the time and energy they put into online postings while still fulfilling the course requirements, and this provides a relevant explanation of the dilemma of congested low-level cognitive processing in online classroom discussions. Also, online classroom interaction is mainly composed of text-based asynchronous communication, which requires a complex skillset that includes not only traditional literacy but also digital literacy (Rovai, 2003; Van de Vord, 2010), and this may limit the active participation of underprivileged students lacking digital readiness (Horrigan, 2016). Thus, the coding framework places the theoretical dilemma within socioeconomic contexts, while avoiding a deficit perspective toward online learners.

Along with qualitative directed CA of the collected online classroom discussion data, SNA was applied to analyze online students' responses for the survey questionnaire which

generated both classroom interaction data and student integration data. The following two sections introduced SNA and explained how both the qualitative coding techniques and SNA methods were applied to analyze the sample online classroom data sets.

Social Network Analysis

SNA supplies a massive reservoir of social scientific concepts and theories for the understanding of the patterns of various types of human networks such as intimate relationships, information exchange, and innovative idea diffusion. SNA draws on various concepts, insights, and methods, mainly from both sociology and graph theory (Borgatti, Everett, & Johnson, 2018; Scott, 2017; Wasserman & Faust, 1994). SNA is not a new academic discipline or one of the many branches of social science. Instead, SNA would be an umbrella term for interdisciplinary approaches to the social network. SNA researchers are interested in understanding the patterns of interaction that occur within a group of actors (a network). Numerous studies in postsecondary education literature have adopted SNA for examining different topics (see Biancani & McFarland, 2013; Kezar, 2014) and various online education researchers (Aviv, Erlich, Ravid, & Geva, 2003; Cho, Gay, Davidson, & Ingraffea, 2007; Doran, Doran, & Mazur, 2011; Erlin, Yusof, & Rahman, 2008; Haythornthwaite, 2000; Lowes, Lin, & Wang, 2007; Shea et al., 2010; Tirado-Morueta, Maraver-López, & Hernando-Gómez, 2017) have utilized SNA as a toolkit for visualizing and analyzing online classroom interactions. The following section introduces only the basic concepts, and the findings section explains each applied SNA method in detail along with the corresponding results of data analysis.

Basic Concepts

In general, a social network can be defined as a set of nodes or vertices (e.g., an individual, a document, an organization) that are linked by one or more relations (Marin &

Wellman, 2011). Data describing the characteristics of a node are considered attribute data, while those addressing connection are relational data. Analysis of relational data requires a set of methods and analytic concepts that are different from the traditional approaches to attribute data (Wasserman & Faust, 1994). A sociogram is a picture in which social units are described as points in two-dimensional space, and relationships among pairs of the social units are represented by lines connecting the two points. A sociomatrix is a two-way matrix in which the rows and columns refer to the social units or events consisting of relationships among them. While networks are usually defined as one-mode networks, with one set of nodes that do not differ from each other, a network can be a two-mode or affiliation network wherein ties exist only between nodes belonging to different sets (e.g., college students and student organizations). SNA produces node level measurements and network-level measurements. A key property of each node is its degree, which represents the number of connections it has to other nodes in a network. For instance, in this study, the degree can represent the number of messages that an individual student has sent or received, or the number of peer students who identified an individual student as a person to ask for advice or with whom they enjoy socializing. However, the meaning of degree can vary by type of interaction and according to the contexts of the network. In this respect, four different centrality measurement techniques have been developed: degree, closeness, betweenness, and eigenvector centrality (Bonacich, 1987; Freeman, 1978; Friedkin, 1991). Degree centrality represents the total number of links a node has, and it includes measures of in-degree and out-degree when relations are directional. Betweenness centrality indicates whether actors serve as bridges in the shortest paths between two actors. Actors with high betweenness centrality have an elevated probability of existing as a link on the shortest path (geodesic) between any two actors in a network. Closeness centrality focuses on how close one

node is to other nodes on average, measured along geodesics. The concept of eigenvector centrality is based on the importance of being connected to other well-connected nodes. Having well-connected neighbor nodes or popular stars in the given network gives a higher eigenvector centrality than having the same number of neighbors who are less well connected. At the network level, SNA offers information about social structure, such as size, density, cohesive subgroups, and centralization. The density of a network is a measurement of how many actual links are observed in a whole network divided by the total possible number of links. Analyzing the distribution of centrality and density helps to identify cohesive subgroups and centralization across the entire network.

Data Collection

This study collected data from three courses delivered entirely online for 16 weeks at a large, southeastern U.S. university: two were offered in the fall of 2018 and one in the spring of 2019. The researcher gained initial access to the email list of the students from the course instructor. Online surveys were distributed two months after the end of the fall semester in 2018 and one month before the end of the spring semester in 2019. Response rates for the two fall courses and the spring course were 37.21% (n = 16) and 100% (n = 21), respectively. Although the response rate of the first survey was not significantly lower than the typical online survey response rate, the fall data contained several issues in terms of data quality.

First, the survey respondents reported severe recall errors. Some students put their answers directly in the text entry field, which was supposed to be filled with a specific name of their classmates. Examples of such responses include, “I can't recall specific names.”, “I don't remember any individual names at this point. I no longer access the online course to look up names to remind me.”, “If I had a class list, I could name several, but I cannot remember all of

the names." Due to the lack of quality data, the first survey results were not enough to investigate virtual classroom networks. Along with the recall problem, negative and simple descriptions of social activities in the classroom undermined data quality significantly. Responses such as "no socializing other than required discussion forum," "I rarely socialized in the course. "I don't usually socialize outside of family. I don't attend school for socialization," rather than the specific names of classmates, filled the text entry field. In this respect, several strategies were implemented to improve the research participation rate and quality of the social network data: a) change of survey timing, b) sending reminder messages and personalized participation encouragement messages, c) guaranteeing substantial benefits for all participants. In addition, the type of social network questionnaire was changed from name generator to roster, since the text entry field might increase the perceived stress level from respondents' perspectives. These strategies resulted in the complete social network data of 21 students, with a 100% participation rate for a single classroom.

Participants

The research participants were 17 women (81%) and four men (19%). The average age was 32.6 years (*SD* = 9.9) and ranged from 23 to 63. Most of these students were full-time working students (*n* = 19, more than 36 hours a week). The students varied in their racial/ethnic and class background: Slightly over 60% (*n* = 13) were White, and just around 30% (*n* = 7) were working-class or below. To examine the effects of social class on classroom participation, the online survey included an additional item asking about the highest educational achievement of the participant's mother. The family background social class result was more skewed than the current social class result, since almost half of students (*n* = 10) reported that their mother had achieved a master's or doctoral degree, and a majority of the rest (*n* = 7) responded that their

mothers had obtained a bachelor's degree. In other words, only four students reported that their mothers did not have higher education experience; this proportion was much lower than both the national average and the state average, of around 50% (Mathews & Hamilton, 2019). The two class-related items were integrated into the final data set, and the low-class group was composed of only three students who identified themselves as working-class and whose mothers did not attend college. In order to ensure the confidentiality of the participants, all of the participant names were replaced with pseudonyms in the final data set. The pseudonyms were adopted from the last names of the United States women's national soccer team players, as a celebration of their achievement and an expression of my own feminist voice.

Data Structure

The data consists of two different types of data sets, which were generated from the two procedures: a qualitative directed content analysis of asynchronous classroom discussion and a self-reported online survey. The data included the three-layered social network data of the online student participants, along with their demographic data and perceived level of student integration data. Note that the current study adapted multiple demographic survey questionnaires from a previous article (Hughes, Camden, & Yangchen, 2016) in which race, class, gender, age, and various other identity markers were carefully considered, and this concern was reflected in the word choice of each demographic question (see Appendix D).

By bringing two major education theories (Garrison et al., 1999; Tinto, 1993) on the college student integration into conversation with SNA research literature, the current study proposed a conceptual framework on online classroom interaction. The conceptual framework determined the multi-layered data structure to address the duality of the strength of classroom interactions, the negative effect of classroom integration, and the importance of position

regarding the core-peripheral network structure. In particular, by integrating critical feminist approaches to classroom interactions with the social network data collection process of the current study, the perceived in-classroom network and out-of-classroom social network were examined along with the observed classroom network.

Observed Classroom Network

Observed Classroom Network data was generated from CA by counting the number and length of messages; length refers to the number of originally student-written text lines in a posting, and excludes direct quotes, citations, and links. Also, the direction of a message, whether undirected or directed to a specific person or a group, was crucial to the analysis of patterns in discussion. The data consists of three types of connections corresponding to the three main categories in the coding frame: social, economic, and critical.

Perceived Classroom Network

The perceived classroom network data were generated from three social network questionnaires, which allowed for individual selection of the corresponding name on the list of students and an instructor. The questions asked were: (1) Suppose you need to ask a student in your [TITLE] course for help, whom would you ask? (Please choose as many relevant names as you can in the class list below.) (2) Who were the people you really enjoyed socializing with in this [TITLE] course? (3) Please choose anyone in this [TITLE] course to whom you are especially close. Please choose the classmate(s) who you have not chosen in one of the previous two questions. In total, the network data was composed of 58 supporting relations and 56 socializing relations; the results from the third questionnaire were not used since most students had chosen the instructor's name or the "no one" option.

Out-of-Classroom Network

The out-of-classroom network data included three different layers of social relationships: the important matter discussion network, the socializing network, and the academic advice network. The following questions were asked: (1) From time to time, most people discuss important matters with other people. Looking back over the last six months, who are the people with whom you discussed matters important to you? (2) Consider the people with whom you like to spend your free time. Over the last six months, who are the people you have been with most often for informal social activities such as going out to lunch, dinner, drinks, films, visiting one each other's homes, and so on? (3) Many online students may feel overwhelmed and sometimes frustrated with the amount of information presented to them and the way it is presented. Who has recently assisted your study for this course, such as reviewing your course assignments, giving academic advice, and spending time listening to questions and concerns about your work in the course? The name generators used for the out-of-classroom network survey were based on the social network survey questionnaires developed by multiple researchers (Burt, 1984; Marin & Hampton, 2007; van der Poel, 1993). The maximum number of name generator slots on the online survey was 7 for each question. In total, the out-of-classroom social network data was composed of 21 egos and 329 alters. While the largest ego network contains 21 alters, the smallest one contains 3 alters. Race and gender homophily questionnaires were developed and included in the survey; however, a class homophily question was not included due to the non-observable and vague characteristics of social class influence in online classroom interactions.

Perceived Level of Student Integration

Along with the demographic questionnaire and multi-layered social network questionnaire, the final section of the online survey requested that participants answer the 5-point

Likert scaled questionnaires of the CoI survey. While student integration is an under-examined topic in online education research fields, the CoI model has been regarded as a model well-suited to investigating the relationship between online classroom interactions and student integration (Boston et al., 2009; Meyer, 2013). This research adopted presence, the main construct of the CoI survey, as a surrogate variable for the level of student integration. In particular, the level of social presence indicates whether the online learning environment is communicative or individualistic (Rourke et al., 2001).

Reliability and Validity

This study employed multiple approaches to secure reliability and validity. First, the research design of the current study has its own triangulating structure as a mixed method research. Since this study employed multiple methods of data collection and data analysis, the following section of research findings demonstrates how the entire research process was full of multiple triangulation activities of the researcher. Qualitative and quantitative data from both the asynchronous classroom discussion and self-conducted online survey provided multiple sources to estimate the level of student interaction and student integration.

Next, the multi-layered structure of the network data was designed to secure reliability of the current study. The data of the current study has three different networks composed of 3 layers per each network. The multilayered structure of the data allowed constant comparison of students' interaction within and between the three networks. The similarity and difference among each layer and each network were crucial to improve the overall quality of the current study. For instance, the opposite direction of the race homophily coefficients between the observed classroom network and the perceived classroom network hinted one of the three major conclusions of the current study. Also, the difference between the supporting layer and the

socializing layer of the perceived network provided important clues to detect a pattern of students' perception of their classmates.

Lastly, a 90-minute data triangulation workshop was conducted to check the reliability of the coding framework. Seven graduate students and one professional researchers from five different education major programs participated in the workshop. After the researcher explained about the concept of triangulation and content analysis, the 8 workshop participants analyzed a sample data set of 33 discussion posts of 17 students. The specific subset was pulled from the most active discussion week data; the week showed 100% participation rate of the students as well as the largest number of student-student interactions. By using the results of the triangulation workshop group activity data, two types of inter-coder reliability were calculated: Cohen's Kappa and Fleiss's Kappa. Fleiss's Kappa is considered as an extension of Cohen's Kappa for three raters or more. These inter-coder reliability measurements are designed to examine how much agreement was observed over and above what would be expected by chance. Fleiss's Kappa has a value from 0 to positive 1. If there is less agreement among the raters than what would be expected by chance, the coefficient might be close to 0; the closer the score is to 1 the better the agreement the coding frame made. There is no general cut-off point to conclude a coding framework is totally reliable and valid. However, most workshop participants found difficulty in understanding the coding framework and conducting content analysis in a limited time. As a result, only half of the workshop participants (n=4) completed their coding in a given time of 25 minutes, and the Fleiss's Kappa showed almost no agreement among the 4 coders ($\kappa = .192$, $p < .001$). In other words, the time limited design of the workshop led to both 50% of coding completion rate and no agreement among the workshop participants.

In sum, the research has 1) employed mixed method research design, 2) collected multi-layered network data, and 3) facilitated a data triangulation workshop to improve the reliability and the validity of the current study. However, the external reliability of the coding framework would be enhanced when multiple coders could conduct their content analysis without time constraints after acknowledging the characteristics of the virtual classroom discussion data since most coders requested more detailed instruction to comprehend a) the context of the virtual classroom discussion, b) content segmentation as a methodological technique of content analysis, and c) the definition of unit of analysis.

CHAPTER 4

FINDINGS

The purpose of this study is to examine the dynamic of online classroom interaction networks and to determine how such virtual relations are connected to the power relationships along the lines of race, class, and gender. This study analyzes both observed and perceived online classroom interaction network. Three major research questions for this study are:

1. In what specific ways, if any, does the asynchronous classroom discussion contribute to a higher level of online student integration?
2. How does the observed classroom network differ from the perceived classroom network?
3. How is the virtual classroom interaction associated with the power relationships along the lines of race, class, and gender?

This chapter is organized to explain three main findings: a) weak association between classroom interaction and student integration, b) gender differences in reciprocity in the observed network, and c) the racial homophily of the majority White students, especially in mutual and core relations.

The Strength of Casual Ties

Twenty-one students sent a total of 1,121 messages, and 834 were directed to them. A total of 381 messages were undirected, meaning they were thread-opening posts written for fulfilling a minimum requirement for course participation. Over 16 weeks, a total of 1,306 discussion posts, comprised of 615 social messages, 577 economic messages, and 114 critical

messages, were posted. The total number of discussion postings was positively associated with the level of student integration (r (19) =.45, $p < .05$); however, it was negatively associated with the average length of discussion postings (r (19) =-.56, $p < .01$). This suggests that a student who participated more actively would report a higher student integration level, but that his or her postings would be relatively brief. In particular, the frequency of social interactions, in terms of both the number of messages sent (r (19) =.47, $p < .05$) and received (r (19) =.54, $p < .05$), was positively associated with the level of student integration; however, the other two types of postings, economic and critical messages, were not associated with the student integration level. Thus, the results of multiple tests of the Pearson correlation coefficients supported the socioeconomic approach of the current study: social interaction was the lion's share of the observed classroom network, and virtual interactions were casual: positive, social, and short.

If two students are linked in the observed network, are they also likely to be linked in the perceived network? If a student interacts frequently with another, is she also likely to name that student in the perceived network? It is possible to hypothesize that the matrix of observed relations would be positively correlated with the matrix of perceived relations. Alternatively, it might be the case that the two relations have nothing to do with one another (no correlation), which suggests that online classroom interaction does not significantly impact students' perceptions of their classmates. In this respect, this study used an inferential SNA technique: Quadratic Assignment Procedure (QAP) (Krackardt, 1987). QAP examines whether a correlation between two matrices is statistically significant or not. After obtaining results from multiple permutations of the matrices by rearranging both their rows and columns, QAP compares the observed correlation coefficient between the two matrices along with the distribution of the coefficients generated from the permutation process.

The in-classroom social network data of the current study consists of two different types of interactions. The perceived classroom network data were generated from analyzing social network questionnaires responses, which were composed of supporting network layer and socializing network layer. The observed classroom network data was generated by analyzing the content of asynchronous discussion postings. Table 5 shows the correlation coefficients among different classroom networks including the two most active weeks (9th and 12th week) and their statistical significance levels; the QAP test function included in the SNA package for R has been applied. The subset data of the two weeks was selected because they yielded the highest number of discussion postings with full student participation; the two cases were rare, as the other weeks saw at least one student's digital absence in terms of discussion participation.

Table 5

Quadratic assignment procedure results of correlations between networks

No.	Network	Layer	1	2	3	4
1	Perceived	Supporting				
2		Socializing	.6145***			
3		9th	.1290*	.0591		
4	Observed	12th	-.1127*	-.0527	.0641	
5		Overall	.0341	.0204	-.0298	-.0298

Note. *p < .05; **p <.01; ***p<0.001 (two-tailed)

A strong positive correlation was identified between the two layers of the perceived network (r = .6145, p < .001). The overall QAP results reaffirmed the casual nature of the observed classroom interactions, which would not influence students' perception and integration processes significantly. Although the supporting network was weakly correlated with the two most active discussion networks, the directions of the QAP coefficient were opposite to each other. Otherwise, because of the fact that the perceived network data was generated from a self-

reported survey of individual students, a mutual relation between two students would be a more reliable indicator of the strength of their relationships than that suggested by casual interactions.

Table 6 shows the number of messages within and between three different sub-network groups: a 4-star, a triangle, and the disconnected group who lacked mutual relations. The data were generated by using the intersection.graph function and the undirected.graph function in the igraph package to detect mutual ties.

Table 6

Number of messages within and between the connected and disconnected groups

From \ To	Mutually Connected			Disconnected	Row sum
	4-Star		Triangle		
	Center	Satellites			
Center	0	41	11	51	103
Satellites	29	11	11	63	114
Triangle	4	10	12	46	72
Disconnected	30	73	58	253	414
Col sum	63	136	92	413	703

The unequal distribution pattern of messages existed within and between the three groups of students: the 4-star, the triangle, and the disconnected. Interaction within the star group was more active and reciprocal than that observed within any others. Almost 40% of the messages from the center were directed to the three satellites, and the three satellites sent a greater number of messages to the star group (13.3) than to the triangle (3.67) and the disconnected (4.5) on average. However, this interaction pattern was not common in the two mutually connected groups, since interactions within the triangle group were not highly distinctive; the frequency of interactions within the triangle group was not a factor in their mutual relations.

The 72 discussion postings and the survey responses of the three students in the triangle group were examined in order to detect any factors might influence the mutual tie generation mechanism; the intensity of their interactions, any homophily of age, workplace, alumni membership, and family relationship were examined. Among many factors, the racial homophily level in the out-of-classroom network of the three White students (74.98) in the triangle was higher than the average of all students (64.41), the average of the four students in the star group (68.18) and the average of all 13 White students in the classroom (73.86); however, the results of multiple t-tests and analysis of variances tests were not statistically significant, at a 95% confidence level.

Overall, the results reaffirmed that the casual nature of the observed classroom interactions has limitations with regard to understanding the perceived classroom network structure, since no clear evidence was found from the observed interactions within the triangle group for answering why and how they created mutual relations. Also, the preliminary findings suggested that nonreciprocal interactions might be pervasive in the classroom, except within the 4-star group, and the racial homophily of the majority of White students might influence students' perception of their peers, regardless of discussion participation.

Gender Difference in Reciprocity

Table 7 summarizes the average number and lengths of discussion posts and the level of discussion network reciprocity level across different demographic groups according to race, class, and gender, along with the results of Welch's Two Sample t-tests. Women students posted longer and more frequent messages than men. By limiting the data boundary to student-student interactions and excluding interactions between student and instructor and undirected messages,

this study applied the reciprocity function in the igraph package (Csardi & Nepusz, 2006) in order to calculate the level of reciprocity within each of the 253 discussion threads.

Table 7

Gender, class, and race difference in the observed classroom network

	Number of Postings					
	Sent by Students (n = 1121)			Received from Students (n = 703)		
	M	*SD*	t-test (df)	*M*	*SD*	t-test (df)
Women	68.75	32.73	22.48*** (961.06)	38.14	12.43	0.65 (369.58)
Men	40.91	8.12		37.62	7.43	
Middle	66.44	33.72	7.34*** (493.91)	39.17	11.44	9.99*** (116.75)
Low	55	13.77		28.84	8.13	
Non-White	80.98	42.17	13.92*** (529.88)	41.98	16.15	5.89*** (311.42)
White	53.17	12.19		35.75	6.85	
	Length of Postings					
	Sent			Received		
Women	6.56	7.84	-2.39** (200.24)	4.1	2.68	0.83 (230.93
Men	8.27	8.33		3.9	2.52	
Middle	7.01	8.18	2.91*** (249.29)	4.11	2.7	1.53 (108.88)
Low	5.42	5.91		3.70	2.12	
Non-White	6.33	8.24	-1.69* (974.38)	3.97	2.67	-0.67 (531.09)
White	7.15	7.68		4.11	2.64	
	Network Reciprocity (n = 253)					
	M	*SD*	t-test (df)			

Table 7

Gender, class, and race difference in the observed classroom network

Women	0.3102	0.37	4.44***
Men	0.0911	0.27	(72.34)
Middle	0.2734	0.36	-0.14
Low	0.2841	0.39	(37.54)
Non-White	0.2781	0.38	0.11
Whites	0.2726	0.36	(190.75)

Note: *p<0.1; **p<0.05; ***p<0.01

Gender difference proved to be the area of the most pronounced divergence. The larger proportion of the men's messages were undirected messages, which would be posted to fulfill the minimum weekly course participation requirement. Statistically significant gender differences in both the level of participation and reciprocity suggested that women were interacting more actively and in a more reciprocal manner in online classrooms than men, a data point open to multiple interpretations. Racial and class differences in several indicators of discussion participation were also statistically significant. The results suggested that socioeconomic background might influence activity in discussion participation; however, network reciprocity was not associated with both race and class. Figure 1 depicts the difference in the discussion network reciprocity of the two gender groups across race and class. The results suggested a strong gender effect because all three different men's groups across race and class received more messages than they contributed, while all four subgroups of women rarely heard back from their male peers.

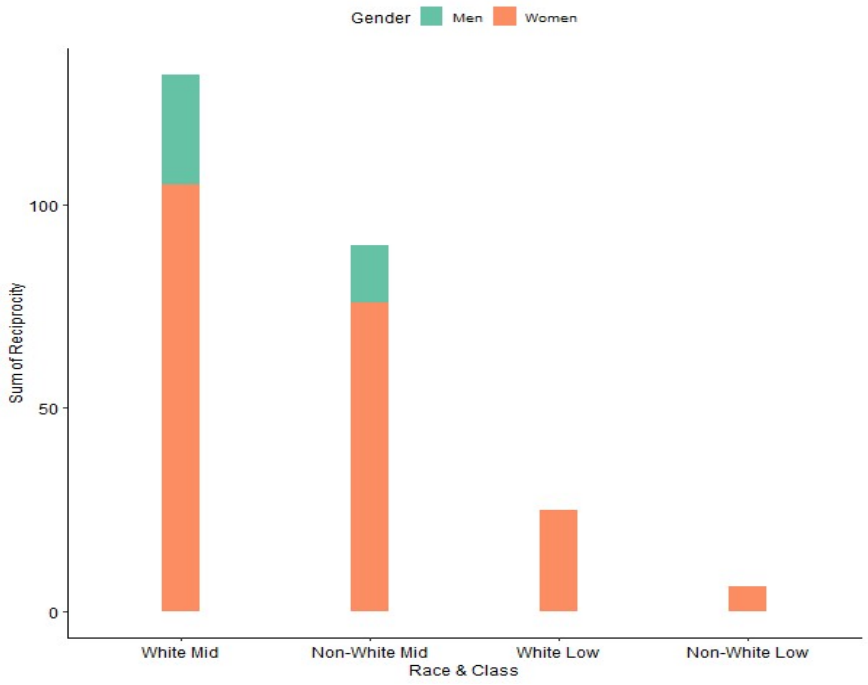

Figure 1. Reciprocity level by race, class, and gender

However, as the discussion network is unbalanced in terms of gender composition, it is difficult to draw solid conclusions about the impact of gender differences. To compensate for this unequal number of both students and their interaction dyads, this study assessed how the observed results differ from those one should expect given the gender composition of the sample online classroom. To do so, the next section explains the concept of homophily and its measurement assortativity coefficient.

Race Homophily at the Core

This section compares three different types of network homophily levels, all obtained from the same sample. Table 8 summarizes the assortativity coefficients of both the observed classroom network and the perceived classroom network across different demographic groups according to race, class, and gender. Network assortativity was calculated to identify homophily across race, class, and gender in both the observed and perceived classroom network. A measurement of assortativity was introduced by Newman (2002), and his network homophily

measurement has been applied widely since the publication of Noldus and Van Mieghem (2015). The assortativity coefficient quantifies the extent to which connected nodes share similar properties; a higher coefficient value indicates that connected nodes tend to have the same characteristics. In a perfectly homophilic network, all nodes are connected to other nodes of the same attribute. Since the assortativity coefficient is a type of Pearson correlation coefficient, when it equals to zero, the network is non-assortative, while when it equals to minus one the network is completely disassortative (Newman, 2002). The assortativity function in the igraph package is designed to measure the level of homophily present in the graph, based on node attributes. Two versions of the assortativity coefficient function were available in the 1.2.4.1 version of the igraph package, depending on whether the node attribute is a continuous variable or a categorical variable. Since the three node attributes of the research question--race, class, and gender--are categorical variables, corresponding function assortativity_nominal was used to measure the level of homophily for the two networks.

Table 8

Assortativity coefficient r of the virtual classroom networks

Network	Layer	*n*		*r*		
		Nodes	Links	Race	Gender	Class
Observed	Social	21	438	-.0667	-.1233	-.0799
	Economic	21	226	-.0816	-.1503	-.0640
	Critical	21	39	-.0126	-.1008	.0877
	Total	21	703	-.0606	-.1317	-.0835
Perceived	Socializing	21	56	.0169	-.2021	.0233
	Supporting	21	58	.0787	-.2246	.1171
	Other	21	5	.2857	-.3636	NA

Although all the coefficients are close to zero, meaning it is difficult to determine an assortative or disassortative pattern, the consistency in the direction of coefficients hints at several patterns. First, the consistently negative coefficients of gender assortativity reaffirmed the findings suggesting gender differences in reciprocity. Women were more reciprocal than men, and gender was not a factor of homophily in both networks. Next, it is notable that the direction of the race assortativity coefficients for both networks were opposite to each other. In other words, while the online students did not interact with each other in a racially homophilic way, they disclosed their preference for same-race students through naming them as their supportive person (asking advice) or identifying them as friends (socializing with) in the perceived classroom network.

Both gender heterophily and racial homophily were reaffirmed in the out-of-classroom network data. The average proportions of same-gender and same-race ties in the out-of-classroom network were 23.61% and 64.41%, respectively. The racial homophily levels exhibited by the four groups were significantly different, and White students showed the highest level (73.86%) of this tendency; African American, Hispanic, and Asian student groups were 49.82%, 39.29%, and 64.71% respectively. The racial homophily pattern of these results-the consistent gender heterophily across groups and latent racial homophily of the White students-corresponds with the fact that each of the two mutually connected groups' sociogram included one white man, regardless of his discussion participation.

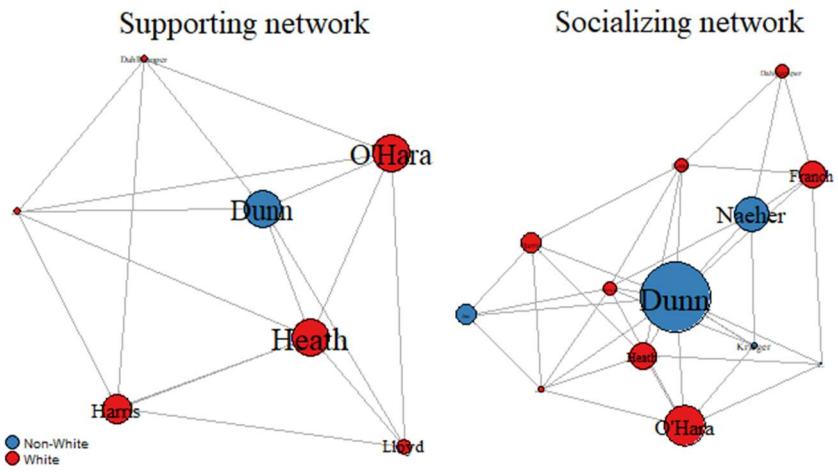

Figure 2. Racial composition at the core of the perceived classroom network

The figure shows the core groups with the highest K-core level in the two perceived classroom networks. K-core refers to a maximal group of entities, all of which are connected to at least k other entities in the group; maximal means the maximum number of nodes within the group (Wasserman & Faust, 1994). The socializing network contained a higher number of connections and nodes, and it was a more diverse network, compared to the supporting network. The size of each node (circle) indicated its in-degree centrality (popularity), the size of the student's name indicated its eigenvector centrality in the observed network, and two colors were selected to highlight the group's racial composition. The sociogram showed that White students were more likely to be included in the core network, that is, the most respected and popular students in the classroom. While there were five non-white students in the core group of 13 students (38%) in the socializing network, it is worth mentioning that the supporting network included only one non-white student among a total of seven (14%): Dunn, the most active and reciprocal student at the center of the star group (see Table 6 & Figure 2). Her lone presence as a non-White woman student invites further investigation with regard to the latent racial homophily of the majority race group of Whites in the online classroom. The results suggest that, although all the students interacted with each other and exchanged thoughts disassortatively or almost

randomly, the majority White students formed their subgroups in a hidden way, likely a racially homophilic way. The disembodied nature of the online classroom might counterbalance the race homophily mechanism in discussion situations temporarily; however, it does not seem to impact students' perceptions of their peers.

CHAPTER 5

DISCUSSION AND CONCLUSIONS

The purpose of this study is to examine the dynamic of online classroom interaction networks and to determine how such virtual relations are connected to the power relationships along the lines of race, class, and gender. This study analyzes both observed and perceived online classroom interaction networks while answering three major research questions, which are:

1. In what specific ways, if any, does the asynchronous classroom discussion contribute to a higher level of online student integration?
2. How does the observed classroom network differ from the perceived classroom network?
3. How is the virtual classroom interaction associated with the power relationships along the lines of race, class, and gender?

The following major conclusions have been drawn from the findings. First, the association between the level of asynchronous classroom discussion participation and the level of student integration was too weak to infer any pattern in the classroom. Instead, casual networking formed the lion's share of the asynchronous classroom discussion. This casual networking was composed of short social postings, similar to small talk in face-to-face conversation. These similarities demonstrate how the students are connected with as well as disconnected from each other through virtual classroom interactions. Second, although all the students interacted with each other and exchanged thoughts disassortatively or almost randomly,

racial homophily among the majority White students was identified at the core of the perceived network in terms of popularity and mutuality. The disembodied nature of the online classroom might counterbalance the race homophily mechanism in discussion situations temporarily; however, it does not seem to impact students' perceptions of their peers. Lastly and most importantly, power relationships along the lines of race, class, and gender were deeply reflected in the virtual classroom network. In essence, white male students were more likely to be respected and more popular than others without frequent or substantial interaction, students of color with lower socioeconomic status were the quietest group, and women were far more likely to engage in reciprocal interactions than men.

In this final chapter, the findings of the current study were elaborated concerning a critical question about the relationship between micro-level classroom interactions and macro-level socioeconomic structures in the context of the relevant literature. In particular, this section explains how the conclusions contribute to extending three major bodies of literature: 1) critical and feminist education studies, 2) online education studies, and 3) social network analysis.

The Predominantly Middle-Class Virtual Classroom

The overarching assumption of the current study was related to the socioeconomic network structure of the online classroom. The first conclusion, which answered the first question, is that observed online classroom interactions would barely produce any difference in the level of online student integration, because the majority of the interactions consisted of casual. Similar to how small talk affects characterizes most social interactions at gatherings like cocktail parties and dinner parties in the U.S., crowded as they are with middle-class Americans., the socializing nature of the predominantly middle-class virtual classroom leads online students to adopt a conversation manner akin to middle-class habitus (Bourdieu, 1987; Bourdieu &

Passeron, 1990), to be more generous and reciprocal than usual, and to avoid being too serious (Collins & Sanderson, 2015). While the academic nature of the virtual college classroom lets online students remain academically engaged by reading articles and writing assignments formally, the casual, middle-class like environment regulates the language practices of the participants informally. This informal structure is neither coded in the learning management system nor encouraged by the course instructor. Speaking seriously was not officially prohibited; however, nobody responded to the few serious posts in the online classroom because contributing to serious discussion topics might require additional time and energy. In addition to the few serious contributors, the course instructor kept attempting to nudge students to elevate their conversation to the next level. The instructor replied to every student's post every week by asking for elaboration and pointing to the course objective that resonated with each student's post; however, most students did not respond to the instructor's additional replies, but simply thanked her. Hopefully, the instructor's continuous pedagogical endeavors would eventually begin to affect the quality of her students' individual assignments; however, the current study did not include such information in the main data set.

The concept of embeddedness helps us understand the relationship between micro-level socioeconomic interactions and macro-level social structure (Block, 2003; Granovetter, 2017). Our understanding of the micro-network of the virtual classroom could be enhanced by asking how the economic actors are embedded within this macro-level social structure. In social sciences, the concept of embeddedness has previously been critically examined by scholars Polanyi (2018) and Granovetter (1985). Polanyi (2001) argued that the historical functions of the market could not be analyzed when the economic system was considered as disassociated from the social context in which markets are embedded. Granovetter (1985) proposed the notion of

socially embedded economic action as a means of theorizing that economic actions are structured by the social networks within which economic actors are connected. By adopting the concept of the embedded market at the macro-level in Polanyi (2001), Granovetter (1985) examined the micro-level decision-making process of individuals as embedded within social networks.

The socioeconomic embeddedness approach to online classroom interactions allows for a clear understanding of the social class gap at the level of virtual classroom participation. The current study shows that the group of working-class students were far less active in discussion participation in terms of the number and length of discussion posts. Although the digital divide has been widely discussed in the extant literature, the fact that the online education classroom requires intensive writing and reading skills for participation, along with a set of knowledge, experience, and information regarding computer literacy, has been underexamined. While non-white women were represented at the highest levels of discussion participation, mainly due to Dunn's unparalleled participation level, the two working-class non-white women were the quietest students in the classroom. The social class gap among non-white students was tremendous when compared to other gaps between the two social class groups of white women or men; it should be noted that the classroom data lacked working-class non-white men.

Although the race, class, and gender difference in student-student interaction in the classroom is not new to critical education scholars (Bierema, 2009; Brookfield, 2005; Johnson-Bailey, Baumgartner, & Bowles, 2010; Tisdell, Hanley, & Taylor, 2000), the issue has been neglected by learning theory-driven approaches in most online education studies, rooted as they are in rationalist approaches, from behaviorism and socio-cognitive developmentalism to connectivism (Boler, 2007). A critical approach to online education is needed in order to explain the digital disparity that is happening virtually, but urgently, in the classroom. The point here is

not to appraise social or economic issues separately, which might produce another version of rationalism. Instead, the current research sheds light on the socioeconomic structures embedded in the everyday practices of online students.

Latent Race Homophily

The next conclusion addresses the second research question with a focus on race homophily: How does the observed classroom network differ from the perceived classroom network? The online students interacted almost randomly regardless of their race; however, a significant level of racial homophily among the White students was at the core of the perceived network. Compared to the consistency in gender heterophily across multiple social networks of online students, the inconsistent directions of the race homophily coefficients required a critical interpretation of the socioeconomic structure of the online classroom. In particular, the vexing question of why the core supporting group included only one student of color demands further investigation of the digital racial homophily of the majority White students. There was only one student of color in the core supporting group, although there were seven more students of color in the classroom, and most of them interacted in the classroom fairly with the exception of the two working-class students. Academic performance of the student of color was exceptional: her number of postings was even larger than the sum of the four least active students' postings. Her outstanding course participation along with her lone presence in the core classroom network suggests a hidden threshold in the process of student integration for students of color that does not exist for majority White students.

Regarding the casual nature of virtual classroom interactions, it can be argued that racial homophily was not a decisive factor in online student integration. In particular, the racial homophily of the majority White students did not appear in the observed network since

disembodied virtual interactions would diminish the level of racial homophily drastically in the classroom. The online college classroom requires a significant level of self-regulation skills including both time management techniques and impression management skills (Yang, Baldwin, & Snelson, 2017) since the online learning management system is a powerful tool of both assessment and surveillance (Land & Bayne, 2005), which might impact the raceless interactions of the online students.

However, regarding the mismatch between the observed classroom network and the perceived classroom network, the dramaturgical distinction of frontstage and backstage is useful in addressing the hidden social structure of the virtual classroom. The unapproachable gap between the frontstage (the observed classroom network) and the backstage (the perceived classroom network) suggests that students of color encounter a hidden barrier against creating meaningful relationships with their White peers. The latent racial homophily of the majority White students still exists between the frontstage and the backstage, and this is a well-known and uncomfortable truth in collegial life (Picca & Feagin, 2007; Steinfeldt et al., 2010).

The findings of the current study provide some clues regarding digital racial homophily, rather than clear evidence of digital racism. Also, racial homophily is a phenomenon with multiple causes and effects. In the most foundational social network analysis studies, different types of homophily were identified to distinguish previously existing homogeneity and the results of homophily. For instance, McPherson, Smith-Lovin, and Cook (2001) attempted to distinguish inbreeding homophily (e.g., personal choice based on preference for a similar attribute) from baseline homophily (e.g., the segregated racial/ethnic habitus in the U.S.) to examine the relevance of homophily concepts at the macro level due to the culturally bound and historically uneven distribution of the population and its varying characteristics. In a recent

study, Wimmer and Lewis (2010) unfolded five tie-generating mechanisms been considered to be indicative of racial homophily. The authors reported that the impact of racial homophily needs to be discerned, since it overlaps with other major tie-generating mechanisms, such as propinquity, psychological balancing, and availability. In particular, for underrepresented groups of students, creating and maintaining social networks would be more complex tasks than it is for their majority white male peers because social distance from the dominant group might cause significant issues in their academic and social integration process (Kraemer, 1997). According to a recent study (Gilkes Borr, 2019), the racial homophily of African American students in a predominantly white college campus was not triggered by racial exclusion from the majority racial group. Instead, it argued that African American students' homophily was a result of their strategic choices made while building mutual support systems and creating positive self-images.

The Unpaid Digital Labor of Women

In answering the last question, "How does virtual interaction associate with the power relationships along the lines of race, class, and gender?", strong evidence of the gender differences in reciprocal behavior should be highlighted compared to the limited evidence of the social class gap in classroom participation and the latent racial homophily. Women students interacted with their peers in a more reciprocal way than did men. Not only did women students reply more than men (reciprocity), but women responded more frequently to men than to women (gender heterophily). Since classroom participation accounts only for 30% of the final grade in the sampled classroom, women's extra discussion contribution without a corresponding advantage requires critical interpretation of the social structure of the online learning environment. In classroom settings, an official method of rewarding students' academic work could be established through the course instructor's recognition of their efforts in the form of

grading. However, students' reciprocal behaviors are difficult to reward since there is no defined criteria for socioemotional behavior. Also, these were voluntary actions: no one forced the online women students to do more work than men in the classroom. Therefore, the point here is not about giving extra credit but about understanding what this extra work is and why women did it, but men did not.

Examining women's voluntary reciprocal behavior as a part of the overall gendered labor structure could be one possible interpretation of the gendered labor structure of the virtual classroom. The relationship between gender and labor division has long been reported in multiple settings, such as families, local communities, organizations, and small group discussions, for decades. Feminists have identified the double burden that women face in modern social institutions: women hold a paying job in the labor market and then conduct unpaid domestic work in both private and public spheres. According to feminist economics scholars (Ferber & Nelson, 2009; Folbre, 2001; Hartmann, 1979, 1981), reproductive labor includes a variety of domestic, care, and emotional labor, such as house cleaning, cooking, and childcare. The term reproductive labor calls attention to how women have been assigned to culturally undervalued and historically uncompensated fields of work, and this dynamic sustains the entire societal system.

Along with reproductive labor, reciprocity would be key to explaining the gendered labor structure of the virtual classroom. Due to societal norms and expectations, the burden of unpaid work might fall on woman's shoulders even if she and her male classmate study at the same place and work the same hours. As such, women participating in online classroom activities that offer no grade-related advantage could be a form of extended reproductive labor in cyberspace.

In addition, the benefits of women students' active online interaction-labor would be shared by everyone in the classroom because their reciprocity generates public goods (England, 2005).

Nobody forces women to do more work in the classroom. While both men and women might be required to do gender (Butler, 1999; West & Zimmerman, 1987) the social expectations they are supposed to fulfill might influence the virtual classroom network structure differently. Men were silent and did not respond to their peers, whereas women invested more time and energy in the unpaid work in the virtual classroom. Although the virtual classroom was not a male-dominated place, as many online environments have been since the early days of the Internet, the reciprocal behaviors of women in the online classroom contributed to the reproduction of the gendered labor structure of the classroom. This is the micro-level socioeconomic mechanism of how gender inequality continues and sustains the virtual classroom, without explicit male-dominance. Along with the sociolinguistic and feminist pedagogical approaches in the reviewed literature, dramaturgy would be an alternative method for examining the socioeconomic structure of the virtual classroom since the consistent gender heterophily in the diverse social networks of the online students suggests that they perform gendered scripts, which could be a hidden factor of the gendered labor structure of the virtual classroom. If no one interrogates this gendered pattern, the unpaid digital labor of women online students will disproportionately contribute to the public good continuously, and everyone will benefit from the sustainable social network structure of the online college classroom yet fail to recognize the gendered labor structure, just as humans have done throughout history.

Implications and Recommendations for Future Research

Both theoretical and practical implications have been drawn from a combination of the empirical findings, theoretical interpretations, and review of the existing literature. These

findings are informed by the critical feminist approach to online college education. Going forward, detailed recommendations for future research can inform students, instructors, and administrators.

Implications for Theory

This study, as critical feminist education research, examined virtual classroom interactions with a focus on the intersections of race, class, and gender. The findings of the current study have several theoretical implications relevant to critical feminist theory, and contribute to addressing some of the current research gaps in critical education studies. Just as critical and feminist theorists focus on the interlocking systems of multiple oppressions, the current study addressed the ways in which race, class, and gender affected the socioeconomic aspects of online classroom interaction. Since numerous critical scholars conducting research in areas concerning women and minority students have suggested that there is a need for ongoing, systematic research to understand the learning experiences of these student populations, the theoretical framework and corresponding methodological tools of the current study could be utilized as needed in a digital context.

This study revealed the significance of the socioeconomic contexts of online college education by addressing a) the possible exclusion of underprivileged students lacking cultural capital for active online classroom participation, b) the latent racial homophily of majority White students that is hidden behind observed interactions, and c) the gendered labor structure of the virtual classroom. Women's outperformance was distinctive in terms of both the substantial amount of time and energy they spent on online classroom discussion participation and the social outcome of humanizing the digital space. In this respect, women's reciprocal behavior in the online classroom should be analyzed as undervalued and underexamined labor, much as

women's reproductive labor is often ignored and unpaid in society. The current study pointed out that feminist online education scholars might analyze the gender difference in online classroom interactions as an issue borne of the gendered labor structure, along with the gendered socialization process and gender differences in communication and learning styles. In other words, women's contribution to cyberspace needs to be understood as shadow labor in the digital era.

Next, this study attempted to shed light on the backstage of the online classroom and called attention to its embedded socioeconomic contexts. The 'scene' continues to fade from the color-blind perspective of online instructors and education researchers because their access to the virtual classroom is limited to the frontstage, which is controlled under the academic surveillance system. In an essay, American media scholar Jenkins (2002) noted forcefully that "Perhaps when early white Netizens were arguing that cyberspace was 'color-blind,' what they really meant was that they desperately wanted a place where they didn't have to think about, look at or talk about racial differences" (para. 4). This dominant color-blind perspective would hinder us from encountering and countering power relationships along the lines of race and class.

Interpreting the findings of class differences in participation levels and the latent racial homophily of the majority White students is an experience similar to that of answering the question "is a glass of water half-empty or half-full?" Some optimists would argue that the virtual classroom has a great potential to overcome existing power structures via its disembodied interaction, under the powerful control of academic surveillance system, whereas from a more pessimistic perspective, the phenomenon would serve as proof of the limitations of virtual interactions, since students are disconnected from each other. The empirical evidence of the current study is admittedly limited, but hopefully it can serve as to initiate an academic

conversation about how to create a diverse and inclusion-oriented online classroom in order to overcome the decontextualized perspective that currently dominates online education research.

Implications for Practice

The practical implications of the current study would call special attention to two necessary academic programs for both online instructors and higher education leaders. First, the results reveal there is a critical need for diversity initiatives in online instruction and course design. One such theoretical program would be named Digital Affirmative Action, with the caveat that it would be a source of controversy in the postsecondary educational environment supported by the Trump administration. This initiative might include programs such as: a) e-mentoring for underprivileged minority students lacking self-confidence in virtual interaction, and b) focused professional development to help instructors and online education specialists theoretically acknowledge the multiple hidden barriers faced by students, and empirically analyze the differential impacts of race, class, and gender in classroom interactions. As critical education literature purports that minority students often lack digital readiness, it would be more than beneficial for such students to be connected to instructors and online education specialists who acknowledge the multiple hidden barriers embedded in virtual classroom interactions.

A critical analysis of college classroom interactions and the ways in which they are entangled in interlocking systems of oppression has long been the main subject of feminist and critical education studies. In particular, feminist teachers have been deeply concerned with women's access to education and the social contexts in which education is embedded. Online education gained popularity as an effective tool of feminist pedagogy. For instance, social media activities have greatly encouraged young generations' classroom discussion participation, which incorporated feminism into their everyday lives (Baker & Ryalls, 2014), a trend powerfully

buttressed by cyberfeminism and hashtag feminism (Brown, Ray, Summers, & Fraistat, 2017; Mendes, Ringrose, & Keller, 2018). Many feminist teachers introduced multiple cases of inclusive, mutually supportive, and safe spaces for teaching and learning, which showed the full potential for the realization of a feminist classroom (Aneja, 2017; Flores, Gómez, Roa, & Whitson, 2018; Herman & Kirkup, 2017). Against this background, it is evident that online teachers can act both as an agent that reinforces the values of the dominant social group but also as an agent of social transformation. If online teachers acknowledge the fact that power relationships and privilege impact virtual classroom interactions significantly, the full potential of emerging information technologies would be achieved.

For this purpose, this study provided replicable and straightforward methodological tools and techniques, such as a qualitative content analysis coding framework, a network analysis of reciprocity and homophily, and the inferential network analysis technique. The potential of the research methods can be fully realized when these methods help education practitioners gain a better understanding of their classrooms and programs. Also, although the current study may have limited generalizability from a traditional quantitative methodological perspective, the replicable methods could be used in other contexts due to their high transferability.

Recommendations for Future Research

The current study aimed to highlight the continual need to address issues of race, class, and gender even beyond the scope of critical higher education studies, which still primarily focuses on the face-to-face on-campus student interaction that is taken-for-granted. Also, virtual classroom interactions should not be limited to those that can be observed. The findings suggest that online students interact almost randomly regardless of their racial differences; however, a significant level of racial homophily among the White students was detected in the core

supporting network. Compared to the consistency in gender heterophily across multiple social networks of online students, the inconsistent directions of the racial homophily coefficients demand a critical interpretation of the social structure of the online classroom. In particular, the vexing question of why the core group included the most active woman of color only, requires even further investigation of digital racial homophily. Future research should highlight how different racial and ethnic groups of women are dis/connected from the classroom, both as students and faculty members. However, the current data set derived from a single classroom is insufficient to address the diverse experiences of multiple racial and ethnic groups. In particular, the large variance in reciprocity levels among women students and the participation gap among non-White women according to social class requires additional explanation when it is compared to men's consistent non-reciprocal manner and the small gaps between other social class groups of White women or men. One possible approach would be a critical dramaturgy of the intersections of race, class, and gender within the virtual classroom.

Furthermore, since the SNA methods applied in the previous analysis process were mostly descriptive, distributional assumptions about particular network structural properties were not considered. Statistical modeling of the sample network can help us understand how certain network properties are more commonly observed in the network than might be expected by chance. By conducting a test of inferences generated from the descriptive SNA findings from sample classroom interactions and their impact on network structure, it is necessary to validate the hypotheses from the probabilistic viewpoint. In addition, to determine whether the effects of race, class, and gender on academic and social relations were influential or not, traditional inferential statistics (e.g., regression analysis) is inapplicable because network data is inherently relational; it violates the basic assumptions of independence. In this respect, contemporary SNA

researchers use Exponential-Family Random Graph Models (ERGM), previously known as p* models (Anderson, Wasserman, & Crouch, 1999; Holland & Leinhardt, 1981; Robins, Pattison, Kalish, & Lusher, 2007; Wasserman & Pattison, 1996) for developing inferential models that estimate parameters from sample network data. ERGM regards the observed network as one realization from a set of possible networks with similar important characteristics, which would be the outcome of stochastic process (Robins et al., 2007). The ERGM package included in the statnet package for R (Handcock, Hunter, Butts, Goodreau, & Morris, 2003; Hunter, Handcock, Butts, Goodreau, & Morris, 2008) has been applied multiple times during data analysis; the package has the capability of approximating a maximum likelihood estimator for an ERGM given a network data set. However, since the model approximation process could not successfully provide any reliable statistical model for addressing race, class, and gender differences, mainly due to the limited size of the sample, future research incorporating more cases of classroom networks is a promising avenue through which to further explore the conclusions and implications drawn from this study.

Concluding Remarks

Against this background, this social network analysis study of online education from a critical perspective was proposed and developed. The underlying assumption of the research was neither that of uncritical technology-hype nor techno-pessimism. While analyzing the multi-layered network data of the virtual classroom, I saw myself as a sociologist of online education, one who seeks to engage in the contemporary discussion about the relationship between emerging information technologies and equity in postsecondary education.

As a result, this study revealed the social network structure of the virtual classroom and was enhanced by a steady focus on inequality and social justice issues. The major findings

regarding race, class, and gender differences in the virtual classroom might extend to the current scope of both online education studies and critical education studies. However, due to the limited sample size, any generalization of the major findings needs to be accompanied by careful interpretations of the results. In addition, this research has limitations, since multiple factors such as the instructor's role, course design and structure, student academic majors, and the level of education were not adopted for analyzing the data. However, this exploratory study, which provided robust methodological tools that are replicable by future researchers, expects to initiate a new direction for further academic discussion among researchers in multiple academic fields who are interested in online education. If online college education researchers keep asking the decontextualized rationalist questions of "how-to-increase" or "how-to-improve" without consideration of the power structures, the socioeconomic embeddedness of online education might be easily neglected. As a result, the dominant color-blind, gender-blind, technophilic approach in academia will exacerbate the current situation of digital divides and the gendered digital labor structure. Still, many working-class women and minority students are intrigued by the 'anytime, anywhere promise' of the online courses and online degree programs, and their high enrollment hides an extremely high student attrition rate (Cottom, 2017). For decades, the online classroom has been famous for this anytime, anywhere access, but now, education researchers should ask another any-question to start a real conversation pertaining to diversity and social justice: "Can anyone be successful in online learning?"

Final Note: The national average proportion of online college course takers was approximately 30% and a much smaller proportion (12%) of students at the sample institution were taking online classes. However, a sudden change happened while submitting a full manuscript of the current dissertation study in the middle of the Spring semester in 2020. The

Centers for Disease Control and Prevention in the U.S. (CDC) released guidelines recommending canceling or postponing in-person events throughout the United States on March 15, 2020. Also, CDC encouraged all people to practice social distancing, self-quarantine, and isolation to slow the spread of COVID-19. Since the CDC's announcement, U.S. colleges have rushed to close their campuses and transition their students to online learning. The sample institution, along with all schools and colleges across the nation, transformed into an online-only institution. No statistics were required to calculate the number of online college students because 100% of American college students are taking courses online not to study but to survive in the pandemic era.

A sudden transition to online education revealed two opposite sides of online college education. At first glance, the current emergent transition proved how important developing quality online college education as an alternative means for course which is uniquely immune from the coronavirus. On the other hand, some alarming incidents proved how virtual classrooms would not be immune to persistent power relationships along the lines of race, class, and gender. For instance, many students in lower-income households might lack necessary resources to complete coursework at home due to lack of reliable access to a computer or internet connectivity; existing digital divides across race and class would extend to digital academic achievement gap (Auxier & Anderson, 2020; Hobbs & Hawkins, 2020). Also, multiple cases of Zoombombing (Lorenz, 2020; McKenzie, 2020) were driven by digital trolls who share hateful speech and pornographic content to disrupt virtual meetings, especially to stalk women and threaten minority participants in the meeting. The pandemic crisis forced all of us to confront an unprecedented challenge; however, some had to encounter a harsher reality due to persisting power structures. These incidents, homework gaps, and Zoombombing, correspond to the

findings of the current study, even though this study was completed a few months before the nationwide exodus to online education.

REFERENCES

Allen, I. E., & Seaman, J. (2007). *Online nation: Five years of growth in online learning*. Newburyport, MA: Sloan Consortium.

Allen, I. E., & Seaman, J. (2010). *Learning on demand: Online education in the United States, 2009*. Newburyport, MA: Sloan Consortium.

Allen, I. E., & Seaman, J. (2012). *Conflicted: Faculty and online education, 2012*. Newburyport, MA: Inside Higher Ed, Babson Survey Research Group and Quahog Research Group, LLC.

Allen, I. E., & Seaman, J. (2013). *Changing course: Ten years of tracking online education in the United States*. Needham, MA: Babson Survey Research Group and Quahog Research Group, LLC.

Allen, I. E., & Seaman, J. (2014). *Grade change: Tracking online education in the United States, 2013*. Needham, MA: Babson Survey Research Group and Quahog Research Group, LLC.

Allen, I. E., & Seaman, J. (2015). *Grade level, 2014: Tracking online education in the United States*. Needham, MA: Babson Survey Research Group and Quahog Research Group, LLC.

Allen, I. E., & Seaman, J. (2016). *Online report card: Tracking online education in the United States*. Needham, MA: Babson Survey Research Group and Quahog Research Group, LLC.

Allen, I. E., & Seaman, J. (2017). *Digital learning compass: Distance education enrollment report 2017*. Oakland, CA: Babson Survey Research Group, e-Literate, and WCET.

Anderson, C. J., Wasserman, S., & Crouch, B. (1999). A p* primer: logit models for social networks. *Social Networks, 21*(1), 37–66. doi:10.1016/S0378-8733(98)00012-4

Anderson, M., & Kumar, M. (2019, May, 7). Digital divide persists even as lower-income Americans make gains in tech adoption. *Pew Research Center*. Retrieved from www.pewresearch.org/fact-tank/2019/05/07/digital-divide-persists-even-as-lower-income-americans-make-gains-in-tech-adoption/

Anderson, M. D., & Haddad, C. (2005). Gender, voice, and learning in online course environments. *Journal of Asynchronous Learning Networks, 9*(1), 3–14.

Aneja, A. (2017). Blending in: Reconciling feminist pedagogy and distance education across cultures. *Gender and Education*, *29*(7), 850–868. doi:10.1080/09540253.2016.1237621

Aragon, S. R., & Johnson, E. S. (2008). Factors influencing completion and noncompletion of community college online courses. *American Journal of Distance Education, 22*(3), 146–158. doi:10.1080/08923640802239962

Arbaugh, J. B. (2000). An exploratory study of the effects of gender on student learning and class participation in an Internet-based MBA course. *Management Learning, 31*(4), 503–519. doi:10.1177/1350507600314006

Arbeit, C. A., & Horn, L. (2017). *A profile of the enrollment patterns and demographic characteristics of undergraduates at for-profit institutions (NCES 2017-416)*. Washington, DC: National Center for Education Statistics.

Archer, W., & Garrison, R. D. (2010). Distance education in the age of the internet. In C. E. Kasworm, A. D. Rose, & J. M. Ross-Gordon (Eds.), *Handbook of adult and continuing education* (pp. 317–326). Thousand Oaks, CA: Sage.

Arenson, K. W. (1998a, November, 2). More colleges plunging into uncharted waters of on-line courses. *The New York Times*.

Arenson, K. W. (1998b, October, 7). N.Y.U. sees profits in virtual classes. *The New York Times*.

Ashong, C. Y., & Commander, N. E. (2012). Ethnicity, gender, and perceptions of online learning in higher education. *MERLOT Journal of Online Learning and Teaching, 8*(2), 98–110.

Aslanian, C. B., Clinefelter, D. L., & Magda, A. J. (2019). *Online college students 2019: Comprehensive data on demands and preferences*. Louisville, KY: Wiley edu, LLC.

Astin, A. W. (1984). Student involvement: A developmental theory for higher education. *Journal of college student personnel, 25*(4), 297–308.

Atai, M. R., & Chahkandi, F. (2012). Democracy in computer-mediated communication: Gender, communicative style, and amount of participation in professional listservs. *Computers in Human Behavior, 28*(3), 881–888. doi:10.1016/j.chb.2011.12.007

Attinasi, L. C. (1989). Getting in: Mexican Americans' perceptions of university attendance and the implications for freshman year persistence. *The Journal of Higher Education, 60*(3), 247–277. doi:10.2307/1982250

Auxier, B., & Anderson, M. (2020, March, 16). As schools close due to the coronavirus, some U.S. students face a digital ‘homework gap’. *Pew Research Center*. Retrieved from https://www.pewresearch.org/fact-tank/2020/03/16/as-schools-close-due-to-the-coronavirus-some-u-s-students-face-a-digital-homework-gap/

Aviv, R., Erlich, Z., Ravid, G., & Geva, A. (2003). Network analysis of knowledge construction in asynchronous learning networks. *Journal of Asynchronous Learning Networks, 7*(3), 1–23.

Baker, A. A., & Ryalls, E. (2014). Technologizing feminist pedagogy: Using blog activism in the gender studies classroom. *Feminist Teacher*, *25*(1), 23–38.

Bauer, M. W. (2000). Critical content analysis: A review. In M. W. Bauer & G. Gaskell (Eds.), *Qualitative researching with text, image and sound: A practical handbook* (pp. 131–151). London, UK: Sage.

Bean, J. P. (1982). Student attrition, intentions, and confidence: Interaction effects in a path model. *Research in Higher Education, 17*(4), 291–320. doi:10.1007/bf00977899

Bean, J. P. (1985). Interaction effects based on class level in an explanatory model of college student dropout syndrome. *American Educational Research Journal, 22*(1), 35–64. doi:10.3102/00028312022001035

Bean, J. P., & Metzner, B. S. (1985). A conceptual model of nontraditional undergraduate student attrition. *Review of Educational Research, 55*(4), 485–540. doi:10.3102/00346543055004485

Belenky, M. F., Clinchy, B., Goldberger, N., & Tarule, J. (1986). *Women's ways of knowing: The development of self, voice, and mind*. New York, NY: Basic Books.

Bell, B. S., & Federman, J. E. (2013). E-learning in postsecondary education. *The Future of Children, 23*(1), 165–185.

Berg, G. A. (2016). The dissertation process and mentor relationships for African American and Latina/o students in an online program. *American Journal of Distance Education, 30*(4), 225–236. doi:10.1080/08923647.2016.1227191

Bergmann, H. F. (2001). The silent university: The Society to Encourage Studies at Home, 1873-1897. *The New England Quarterly, 74*(3), 447–477. doi:10.2307/3185427

Bernard, R. M., Abrami, P. C., Borokhovski, E., Wade, C. A., Tamim, R. M., Surkes, M. A., & Bethel, E. C. (2009). A meta-analysis of three types of interaction treatments in distance education. *Review of Educational Research, 79*(3), 1243–1289. doi:10.3102/0034654309333844

Bernard, R. M., Abrami, P. C., Lou, Y., Borokhovski, E., Wade, A., Wozney, L., . . . Huang, B. (2004). How does distance education compare with classroom instruction? A meta-analysis of the empirical literature. *Review of Educational Research, 74*(3), 379–439. doi:10.3102/00346543074003379

Best Colleges. (2017). *Online education trends report*. Seattle, WA.

Best Colleges. (2018). *Online trends in education report*. Seattle, WA.

Best Colleges. (2019). *Online education trends report*. Seattle, WA.

Bettinger, E. P., Fox, L., Loeb, S., & Taylor, E. S. (2017). Virtual classrooms: How online college courses affect student success. *American Economic Review, 107*(9), 2855–2875. doi:10.1257/aer.20151193

Biancani, S., & McFarland, D. A. (2013). Social networks research in higher education. In M. B. Paulsen (Ed.), *Higher education: Handbook of theory and research* (Vol. 28, pp. 151–215). Dordrecht, Netherlands: Springer.

Bierema, L. L. (2009). Critiquing human resource development's dominant masculine rationality and evaluating its impact. *Human Resource Development Review, 8*(1), 68–96. doi:10.1177/1534484308330020

Block, F. (2003). Karl Polanyi and the writing of The Great Transformation. *Theory and Society, 32*(3), 275–306. doi:10.1023/A:1024420102334

Bok, D. (2003). *Universities in the marketplace: The commercialization of higher education*. Princeton, NJ: Princeton University Press.

Boler, M. (2007). Hypes, hopes and actualities: New digital Cartesianism and bodies in cyberspace. *New Media & Society, 9*(1), 139–168. doi:10.1177/1461444807067586

Bonacich, P. (1987). Power and centrality: A family of measures. *American journal of sociology, 92*(5), 1170–1182.

Borgatti, S. P., Everett, M. G., & Johnson, J. C. (2018). *Analyzing social networks* (2nd ed.). Thousand Oaks, CA: Sage.

Borgatti, S. P., & Halgin, D. S. (2011). On network theory. *Organization Science, 22*(5), 1168–1181. doi:10.1287/orsc.1100.0641

Bostock, S. J., & Lizhi, W. (2005). Gender in student online discussions. *Innovations in Education and Teaching International, 42*(1), 73–85. doi:10.1080/14703290500048978

Boston, W. E., Ice, P., Díaz, S. R., Richardson, J., Gibson, A. M., & Swan, K. (2009). An exploration of the relationship between indicators of the community of inquiry framework and retention in online programs. *Journal of Asynchronous Learning Networks, 13*(3).

Bouhnik, D., & Marcus, T. (2006). Interaction in distance-learning courses. *Journal of the American Society for Information Science and Technology, 57*(3), 299–305. doi:10.1002/asi.20277

Bourdieu, P. (1987). *Distinction: A social critique of the judgement of taste* (R. Nice, Trans.). Cambridge, MA: Havard University Press.

Bourdieu, P., & Passeron, J.-C. (1990). *Reproduction in education, society and culture* (R. Nice, Trans. 2nd ed.). Thousand Oaks, CA: Sage.

Bower, B. L., & Hardy, K. P. (2004). From correspondence to cyberspace: Changes and challenges in distance education. *New Directions for Community Colleges, 2004*(128), 5–12. doi:doi:10.1002/cc.169

Braxton, J. M. (Ed.) (2000). *Reworking the student departure puzzle*. Nashville, TN: Vanderbilt University Press.

Braxton, J. M., Hirschy, A. S., & McClendon, S. A. (2004). *Understanding and reducing college student departure*. San Francisco, CA: Jossey-Bass.

Britton, D. M. (2017). Beyond the chilly climate:The salience of gender in women's academic careers. *Gender & Society, 31*(1), 5–27. doi:10.1177/0891243216681494

Brookfield, S. (2005). *The power of critical theory: Liberating adult learning and teaching*. San Francisco, CA: Jossey-Bass.

Brown, A. H., Cervero, R. M., & Johnson-Bailey, J. (2000). Making the invisible visible: Race, gender, and teaching in adult education. *Adult Education Quarterly, 50*(4), 273–288.

Brown, M., Ray, R., Summers, E., & Fraistat, N. (2017). #SayHerName: A case study of intersectional social media activism. *Ethnic and Racial Studies*, *40*(11), 1831–1846. doi:10.1080/01419870.2017.1334934

Burge, E. (1998). Gender in distance education. In C. C. Gibson (Ed.), *Distance learners in higher education: Institutional responses for quality outcomes* (pp. 25–45). Madison, WI: Atwood.

Burt, R. S. (1984). Network items and the general social survey. *Social Networks, 6*(4), 293–339. doi:10.1016/0378-8733(84)90007-8

Burt, R. S. (2004). Structural holes and good ideas. *American journal of sociology, 110*(2), 349–399. doi:10.1086/421787

Butler, J. (1999). *Gender trouble: Feminism and the subversion of identity*. New York, NY: Routledge.

Cao, Y., & Habash, T. (2017). *College complaints unmasked: 99 Percent of student fraud claims concern for-profit colleges*: The Century Foundation. Retrieved from https://tcf.org/content/report/college-complaints-unmasked/?session=1.

Carnevale, A. P., Smith, N., & Gulish, A. (2018). *Women can't win: Despite making educational gains and pursuing high-wage majors, women still earn less than men*. Washington, DC: Georgetown University Center on Education and the Workforce.

Carr, S. (2000, February 11). As distance education comes of age, the challenge is keeping the students. *The Chronicle of Higher Education,* pp. A39–A41. Retrieved from https://www.chronicle.com/article/As-Distance-Education-Comes-of/14334

Carter, D. F. (2006). Key issues in the persistence of underrepresented minority students. *New Directions for Institutional Research, 2006*(130), 33–46. doi:10.1002/ir.178

Casey, D. M. (2008). A journey to legitimacy: The historical development of distance education through technology. *TechTrends, 52*(2), 45. doi:10.1007/s11528-008-0135-z

Caspi, A., Chajut, E., & Saporta, K. (2008). Participation in class and in online discussions: Gender differences. *Computers & Education, 50*(3), 718–724. doi:10.1016/j.compedu.2006.08.003

Cavanagh, S. (1997). Content analysis: Concepts, methods and applications. *Nurse Researcher, 4*(3), 5–16. doi:10.7748/nr.4.3.5.s2

Chamberlain, A. (2017). Demystifiying the gender pay gap: Evidence from glassdoor salary data. Retrieved from https://www.glassdoor.com/research/app/uploads/sites/2/2016/03/Glassdoor-Gender-Pay-Gap-Study.pdf

Chamberlain, A., & Jayaraman, J. (2017). The pipeline problem: How college majors contribute to the gender pay gap. Retrieved from https://www.glassdoor.com/research/app/uploads/sites/2/2017/04/FULL-STUDY-PDF-Gender-Pay-Gap2FCollege-Major.pdf

Chickering, A. W., & Reisser, L. (1993). *Education and identity* (2nd ed.). San Francisco, CA: Jossey-Bass.

Cho, H., Gay, G., Davidson, B., & Ingraffea, A. (2007). Social networks, communication styles, and learning performance in a CSCL community. *Computers & Education, 49*(2), 309–329. doi:10.1016/j.compedu.2005.07.003

Christensen, C. M., & Eyring, H. J. (2011). *The innovative university: Changing the DNA of higher education from the inside out*. San Francisco, CA: Jossey-Bass.

Clinefelter, D. L., & Aslanian, C. B. (2016). *Online college students 2016: Comprehensive data on demands and preferences*. Louisville, KY: The Learning House, Inc.

Clinefelter, D. L., & Aslanian, C. B. (2017). *Online college students 2017: Comprehensive data on demands and preferences*. Louisville, KY: The Learning House, Inc.

Coates, J. (1986). *Women, men, and language: A sociolinguistic account of sex differences in language*. New York, NY: Longman.

Cochran, J. D., Campbell, S. M., Baker, H. M., & Leeds, E. M. (2014). The role of student characteristics in predicting retention in online courses. *Research in Higher Education, 55*(1), 27–48. doi:10.1007/s11162-013-9305-8

Coffey, A., & Atkinson, P. (1996). *Making sense of qualitative data: Complementary research strategies*. Thousand Oaks, CA: Sage.

Coleman, J. S. (1988). Social capital in the creation of human capital. *American journal of sociology*, S95–S120.

Collins, P. H. (1993). Toward a new vision: Race, class, and gender as categories of analysis and connection. *Race, Sex & Class, 1*(1), 25–45.

Collins, R., & Sanderson, S. K. (2015). *Conflict sociology: A sociological classic updated*. New York, NY: Routledge.

Content. (n.d.). *In Oxford English Dictionary* Retrieved from https://en.oxforddictionaries.com/definition/content.

Correa, T., & Jeong, S. H. (2011). Race and online content creation. *Information, Communication & Society, 14*(5), 638–659. doi:10.1080/1369118X.2010.514355

Cottom, T. M. (2017). *Lower ed: The troubling rise of for-profit colleges in the new economy*. New York, NY: The New Press.

Coulter, X., & Mandell, A. (2010). Nontraditional students and information technology: The siren call of the virtual classroom and its impact on progressive educational ideals. In T. T. Kidd (Ed.), *Online education and adult learning: New frontiers for teaching practices* (pp. 284–304). Hershey, PA: Information Science Reference.

Creswell, J. W., & Clark, V. L. P. (2018). *Designing and conducting mixed methods research* (3rd ed.). Thousand Oaks, CA: Sage.

Cronin, J. M., & Bachorz, P. M. (2005). The rising of Phoenix, and what it means for higher education. *Journal of Education, 186*(1), 11–21.

Cross, K. P. (1981). *Adults as learners*. San Francisco, CA: Jossey-Bass.

Csardi, G., & Nepusz, T. (2006). The igraph software package for complex network research. *InterJournal, Complex Systems, 1695*(5), 1–9.

Daniels, J. (2009). *Cyber racism: White supremacy online and the new attack on civil rights*. Lanham, MD: Rowman & Littlefield Publishers, Inc.

Daniels, J. (2013). Race and racism in Internet Studies: A review and critique. *New Media & Society, 15*(5), 695–719. doi:10.1177/1461444812462849

Daniels, J. (2015). "My brain database doesn't see skin color": Color-blind racism in the technology industry and in theorizing the web. *American Behavioral Scientist, 59*(11), 1377–1393. doi:10.1177/0002764215578728

De Wever, B., Schellens, T., Valcke, M., & Van Keer, H. (2006). Content analysis schemes to analyze transcripts of online asynchronous discussion groups: A review. *Computers & Education, 46*(1), 6–28. doi:10.1016/j.compedu.2005.04.005

DeCuir-Gunby, J. T., & Schutz, P. A. (2016). *Developing a mixed methods proposal: A practical guide for beginning researchers*. Thousand Oaks, CA: Sage.

Dennen, V. P. (2005). From message posting to learning dialogues: Factors affecting learner participation in asynchronous discussion. *Distance Education, 26*(1), 127–148. doi:10.1080/01587910500081376

Doherty, W. (2006). An analysis of multiple factors affecting retention in Web-based community college courses. *The Internet and Higher Education, 9*(4), 245–255. doi:10.1016/j.iheduc.2006.08.004

Doran, P. R., Doran, C., & Mazur, A. (2011). Social network analysis as a method for analyzing interaction in collaborative online learning environments. *Journal of Systemics, Cybernetics and Informatics, 9*(7), 10–16.

Du, J., Ge, X., & Xu, J. (2015). Online collaborative learning activities: The perspectives of African American female students. *Computers & Education, 82*, 152–161. doi:10.1016/j.compedu.2014.11.014

Du, J., Zhou, M., Xu, J., & Lei, S. S. (2016). African American female students in online collaborative learning activities: The role of identity, emotion, and peer support. *Computers in Human Behavior, 63*, 948–958. doi:10.1016/j.chb.2016.06.021

Dynarsky, S. (2018, January, 19). Online courses are harming the students who need help the most. *The New York Times*.

Edelson, P. J., & Pittman, V. V. (2008). Historical perspectives on distance learning in the United States. In W. J. Bramble & S. Panda (Eds.), *Economics of distance and online learning: Theory, practice, and research* (pp. 72–87). New York, NY: Routledge.

England, P. (2005). Emerging theories of care work. *Annual Review of Sociology, 31*(1), 381–399. doi:10.1146/annurev.soc.31.041304.122317

Engstrom, C., & Tinto, V. (2008). Access without support is not opportunity. *Change,* 46–50.

Erlin, Yusof, N., & Rahman, A. A. (2008, August). *Integrating content analysis and social network analysis for analyzing asynchronous discussion forum.* Paper presented at the 2008 International Symposium on Information Technology, Kuala Lumpur, Malaysia.

Ferber, M. A., & Nelson, J. A. (Eds.). (2009). *Beyond economic man: Feminist theory and economics*. Chicago, IL: University of Chicago Press.

Flanagin, A. J., Tiyaamornwong, V., O'Connor, J., & Seibold, D. R. (2002). Computer-mediated group work: The interaction of sex and anonymity. *Communication Research, 29*(1), 66–93. doi:10.1177/0093650202029001004

Flores, P., Gómez, N. R., Roa, A. F., & Whitson, R. (2018). Reviving feminism through social media: From the classroom to online and offline public spaces. *Gender and Education*, 1–16. doi:10.1080/09540253.2018.1513454

Folbre, N. (2001). *The invisible heart: Economics and family values*. New York, NY: New Press.

Freeman, L. C. (1978). Centrality in social networks conceptual clarification. *Social Networks, 1*(3), 215–239. doi:10.1016/0378-8733(78)90021-7

Friedkin, N. E. (1991). Theoretical foundations for centrality measures. *American journal of sociology, 96*(6), 1478–1504.

Garibaldi, A. M. (2014). The expanding gender and racial gap in American higher education. *The Journal of Negro Education, 83*(3), 371–384. doi:10.7709/jnegroeducation.83.3.0371

Garrison, D. R., Anderson, T., & Archer, W. (1999). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education, 2*(2), 87–105. doi:10.1016/S1096-7516(00)00016-6

Gilkes Borr, T. (2019). The strategic pursuit of black homophily on a predominantly white campus. *The Journal of Higher Education, 90*(2), 322–346. doi:10.1080/00221546.2018.1513305

González-Gómez, F., Guardiola, J., Martín Rodríguez, Ó., & Montero Alonso, M. Á. (2012). Gender differences in e-learning satisfaction. *Computers & Education, 58*(1), 283–290. doi:10.1016/j.compedu.2011.08.017

González Canché, M. S., & Rios-Aguilar, C. (2015). Critical social network analysis in community colleges: Peer effects and credit attainment. *New Directions for Institutional Research, 2014*(163), 75–91. doi:10.1002/ir.20087

Goodman, J., Melkers, J., & Pallais, A. (2019). Can online delivery increase access to education? *Journal of Labor Economics, 37*(1), 1–34. doi:10.1086/698895

Graneheim, U. H., & Lundman, B. (2004). Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Education Today, 24*(2), 105–112. doi:10.1016/j.nedt.2003.10.001

Granovetter, M. S. (1973). The strength of weak ties. *American journal of sociology, 78*(6), 1360–1380. doi:10.1086/225469

Granovetter, M. S. (1985). Economic action and social structure: The problem of embeddedness. *American journal of sociology, 91*(3), 481–510. doi:10.1086/228311

Granovetter, M. S. (2017). *Society and economy: Framework and principles*. Cambridge, MA: The Belknap Press of Harvard University Press.

Greene, B., & Meek, A. (1998). Distance education in higher education institutions: Incidence, audiences, and plans to expand. Washington, DC: National Center for Education Statistics.

Guiller, J., & Durndell, A. (2006). 'I totally agree with you': Gender interactions in educational online discussion groups. *Journal of Computer Assisted Learning, 22*(5), 368–381. doi:10.1111/j.1365-2729.2006.00184.x

Gunawardena, C. N., Lowe, C. A., & Anderson, T. (1997). Analysis of a global online debate and the development of an interaction analysis model for examining social construction

of knowledge in computer conferencing. *Journal of Educational Computing Research, 17*(4), 397–431. doi:10.2190/7mqv-x9uj-c7q3-nrag

Gurin, P., Dey, E., Hurtado, S., & Gurin, G. (2002). Diversity and higher education: Theory and impact on educational outcomes. *Harvard Educational Review, 72*(3), 330–367. doi:10.17763/haer.72.3.01151786u134n051

Hall, R. M., & Sandler, B. R. (1982). *The classroom climate: A chilly one for women? The project on the status and education of women*. Washington, D.C.: The Association of American Colleges.

Handcock, M. S., Hunter, D. R., Butts, C. T., Goodreau, S. M., & Morris, M. (2003). Statnet: Software tools for the statistical modeling of network data

Hanover Research. (2014). *Trends in higher education marketing, recruitment, and technology*. Washington, DC: Hanover Research.

Hanover Research. (2015). *2016 trends in higher education marketing, enrollment, and technology*. Washington, DC: Hanover Research.

Hansen, J. D., & Reich, J. (2015). Democratizing education? Examining access and usage patterns in massive open online courses. *science, 350*(6265), 1245–1248. doi:10.1126/science.aab3782

Harasim, L. (1996). Online education: The future. In T. Harrison & T. Stephen (Eds.), *Computer networking and scholarly communication in the twenty-first-century university* (pp. 203–214). New York, NY: SUNY Press.

Harasim, L. (2000). Shift happens: Online education as a new paradigm in learning. *The Internet and Higher Education, 3*(1), 41–61. doi:10.1016/S1096-7516(00)00032-4

Harasim, L. (2011). *Learning theory and online technologies*. New York, NY: Routledge

Hartmann, H. I. (1979). The unhappy marriage of Marxism and feminism: Towards a more progressive union. *Capital & Class, 3*(2), 1–33.

Hartmann, H. I. (1981). The family as the locus of gender, class, and political struggle: The example of housework. *Signs: Journal of Women in Culture and Society, 6*(3), 366–394.

Haythornthwaite, C. (2000). Online personal networks. *New Media & Society, 2*(2), 195–226. doi:10.1177/14614440022225779

Henri, F. (1992). Computer conferencing and content analysis. In A. R. Kaye (Ed.), *Collaborative learning through computer conferencing: The najaden papers* (pp. 117–136). New York, NY: Springer.

Herman, C., & Kirkup, G. (2017). Combining feminist pedagogy and transactional distance to create gender-sensitive technology-enhanced learning. *Gender and Education*, *29*(6), 781–795. doi:10.1080/09540253.2016.1187263

Herring, S. C. (1993). Gender and democracy in computer-mediated communication. *Electronic Journal of Communication, 3*(2).

Herring, S. C. (2010). Web content analysis: Expanding the paradigm. In J. Hunsinger, L. Klastrup, & M. Allen (Eds.), *International Handbook of Internet Research* (pp. 233–249). Dordrecht, Netherlands: Springer.

Hesse-Biber, S. N. (2010). *Mixed methods research: Merging theory with practice*. New York, NY: Guilford.

Hew, K. F., Cheung, W. S., & Ng, C. S. L. (2010). Student contribution in asynchronous online discussion: A review of the research and empirical exploration. *Instructional Science, 38*(6), 571–606. doi:10.1007/s11251-008-9087-0

Hill, C., & Lawton, W. (2018). Universities, the digital divide and global inequality. *Journal of Higher Education Policy and Management, 40*(6), 598–610. doi:10.1080/1360080X.2018.1531211

Hiltz, S. R. (1994). *The virtual classroom: Learning without limits via computer networks*. Norwood, NJ: Ablex Publishing Corporation.

Hobbs, T. D., & Hawkins, L. (2020, June, 5). The results are in for remote learning: It didn't work. *The Wall Street Journal*. Retrieved from https://www.wsj.com/articles/schools-coronavirus-remote-learning-lockdown-tech-11591375078

Holland, P. W., & Leinhardt, S. (1981). An exponential family of probability distributions for directed graphs. *Journal of the American Statistical Association, 76*(373), 33–50. doi:10.1080/01621459.1981.10477598

Holmberg, B. (1989). *Theory and practice of distance education*. London, UK: Routledge.

Holmberg, B. (1995). The evolution of the character and practice of distance education. *Open Learning: The Journal of Open, Distance and e-Learning, 10*(2), 47–53. doi:10.1080/0268051950100207

Horrigan, J. B. (2016, March, 22). Lifelong learning and technology. *Pew Research Center*. Retrieved from www.pewresearch.org/internet/2016/03/22/lifelong-learning-and-technology/

Hoxby, C. M. (2014). The economics of online postsecondary education: MOOCs, nonselective education, and highly selective education. *American Economic Review, 104*(5), 528–533. doi:10.1257/aer.104.5.528

Hsieh, H. F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research, 15*(9), 1277–1288. doi:10.1177/1049732305276687

Hughes, J. L., Camden, A. A., & Yangchen, T. (2016). Rethinking and updating demographic questions: Guidance to improve descriptions of research samples. *Psi Chi Journal of Psychological Research, 21*, 138–151.

Hughey, M. W., & Daniels, J. (2013). Racist comments at online news sites: A methodological dilemma for discourse analysis. *Media, Culture & Society, 35*(3), 332–347. doi:10.1177/0163443712472089

Humiston, J. P., Marshall, S. M., Hacker, N. L., & Cantu, L. M. (2020). Intentionally creating an inclusive and welcoming climate in the online learning classroom. In L. Kyei-Blankson, E. Ntuli, & J. Blankson (Eds.), *Handbook of research on creating meaningful experiences in online courses* (pp. 173–186). Hershey, PA: IGI Global.

Hunter, D. R., Handcock, M. S., Butts, C. T., Goodreau, S. M., & Morris, M. (2008). ERGM: A package to fit, simulate and diagnose exponential-family models for networks. *Journal of statistical software, 24*(3), 1–29.

Hurtado, S. (2007). Linking diversity with the educational and civic missions of higher education. *The review of higher education, 30*(2), 185–196. doi:10.1353/rhe.2006.0070

Hurtado, S., Milem, J. F., Clayton-Pedersen, A. R., & Allen, W. R. (1998). Enhancing campus climates for racial/ethnic diversity: Educational policy and practice. *The review of higher education, 21*(3), 279–302. doi:10.1353/rhe.1998.0003

International Telecommunication Union. (2019). Measuring digital development: Facts and figures 2019. Geneva, Switzerland: ITU publications.

Ishitani, T. T. (2006). Studying attrition and degree completion behavior among first-generation college students in the United States. *The Journal of Higher Education, 77*(5), 861–885. doi:10.1353/jhe.2006.0042

Jack, A. A. (2019). *The privileged poor: How elite colleges are failing disadvantaged students*. Cambridge, MA: Harvard University Press.

Jenkins, H. (2002, April, 1). Cyberspace and race. *MIT Technology Review*. Retrieved from http://www.technologyreview.com/web/12797/

Jeong, A., & Davidson-Shivers, G. V. (2006). The effects of gender interaction patterns on student participation in computer-supported collaborative argumentation. *Educational Technology Research and Development, 54*(6), 543–568. doi:10.1007/s11423-006-0636-4

Johnson-Bailey, J. (2016). Adult basic education and the cyber classroom. *Journal of Research and Practice for Adult Literacy, Secondary, and Basic Education, 5*(3), 50–55.

Johnson-Bailey, J., Baumgartner, L. M., & Bowles, T. A. (2010). Social justice in adult and continuing education: Laboring in the fields of reality and hope. In C. E. Kasworm, A. D. Rose, & J. M. Ross-Gordon (Eds.), *Handbook of adult and continuing education* (pp. 339–349). Thousand Oaks, CA: Sage.

Johnson-Bailey, J., & Cervero, R. M. (1996). An analysis of the educational narratives of reentry black women. *Adult Education Quarterly, 46*(3), 142–157. doi:10.1177/074171369604600302

Johnson-Bailey, J., & Cervero, R. M. (1998). Power dynamics in teaching and learning practices: An examination of two adult education classrooms. *International Journal of Lifelong Education, 17*(6), 389–399. doi:10.1080/0260137980170605

Johnson-Bailey, J., & Lee, M. (2005). Women of color in the academy: Where's our authority in the classroom? *Feminist Teacher, 15*(2), 111–122.

Johnson, R. B., Onwuegbuzie, A. J., & Turner, L. A. (2007). Toward a definition of mixed methods research. *Journal of Mixed Methods Research, 1*(2), 112–133. doi:10.1177/1558689806298224

Johnson, R. D. (2011). Gender differences in e-learning: Communication, social presence, and learning outcomes. *Journal of Organizational and End User Computing, 23*(1), 79–94. doi:10.4018/joeuc.2011010105

Jost, B., Rude-Parkins, C., & Githens, R. P. (2012). Academic performance, age, gender, and ethnicity in online courses delivered by two-year colleges. *Community College Journal of Research and Practice, 36*(9), 656–660. doi:10.1080/10668921003744876

Kang, H., & Yang, Y. (2016). Interaction of African American learners online: An adult education perspective. *American Journal of Distance Education, 30*(2), 80–88. doi:10.1080/08923647.2016.1155913

Kasworm, C. E., & Pike, G. R. (1994). Adult undergraduate students: Evaluating the appropriateness of a traditional model of academic performance. *Research in Higher Education, 35*(6), 689–710.

Kaupp, R. (2012). Online penalty: The impact of online instruction on the latino-white achievement gap. *Journal of Applied Research in the Community College, 19*(2), 8–16.

Keegan, D. (1996). *Foundations of distance education* (3rd ed.). London, UK: Routledge.

Kember, D. (1989). A longitudinal-process model of drop-out from distance education. *The Journal of Higher Education, 60*(3), 278–301. doi:10.2307/1982251

Kentnor, H. E. (2015). Distance education and the evolution of online learning in the United States. In D. J. Flinders & C. M. Moroye (Eds.), *Curriculum and teaching dialogue* (Vol. 17, pp. 21–34). Charlotte, NC: Information Age Publishing Inc.

Kezar, A. (2014). Higher education change and social networks: A review of research. *Journal of Higher Education, 85*(1), 91–125. doi:10.1353/jhe.2014.0003

Kidd, T. T. (Ed.) (2010). *Online education and adult learning: New frontiers for teaching practices*. Hershey, PA: Information Science Reference.

Kishimoto, K., & Mwangi, M. (2009). Critiquing the rhetoric of "safety" in feminist pedagogy: Women of color offering an account of ourselves. *Feminist Teacher, 19*(2), 87–102.

Krackardt, D. (1987). QAP partialling as a test of spuriousness. *Social Networks, 9*(2), 171–186. doi:10.1016/0378-8733(87)90012-8

Kraemer, B. A. (1997). The academic and social integration of Hispanic students into college. *The review of higher education, 20*(2), 163–179.

Kramarae, C. (2001). The third shift: Women learning online. Washington, DC: American Association of University Women Educational Foundation.

Krippendorff, K. (2018). *Content analysis: An introduction to its methodology* (4th ed.). Thousand Oaks, CA: Sage.

Kuo, Y.-C., & Belland, B. R. (2016). An exploratory study of adult learners' perceptions of online learning: Minority students in continuing education. *Educational Technology Research and Development, 64*(4), 661–680. doi:10.1007/s11423-016-9442-9

Kupczynski, L., Brown, M., Holland, G., & Uriegas, B. (2014). The relationship between gender and academic success online. *Journal of Educators Online, 11*(1).

Land, R., & Bayne, S. (2005). Scree or monitor? Issues of surveillance and disciplinary power in online learning environments. In R. Land & S. Bayne (Eds.), *Education in cyberspace* (pp. 165–178). New York, NY: RoutledgeFalmer.

Lee, K. (2017). Rethinking the accessibility of online higher education: A historical review. *The Internet and Higher Education, 33*, 15–23. doi:10.1016/j.iheduc.2017.01.001

Lee, Y., & Choi, J. (2011). A review of online course dropout research: implications for practice and future research. *Educational Technology Research and Development, 59*(5), 593–618. doi:10.1007/s11423-010-9177-y

Levin, R. A., & Hines, L. M. (2017). Educational television, Fred Rogers, and the history of education. *History of Education Quarterly, 43*(2), 262–275. doi:10.1111/j.1748-5959.2003.tb00123.x

Levine, A. (2001). The remaking of the American university. *Innovative Higher Education, 25*(4), 253–267. doi:10.1023/a:1011094507049

Lewis, L., Alexander, D., & Farris, E. (1997). Distance education at postsecondary education institutions (NCES 98-062). Washington, DC: National Center for Education Statistics.

Lewis, L., Snow, K., Farris, E., & Levin, D. (1999). Distance education at postsecondary education institutions: 1997-98 (NCES 2000-13). Washington, DC: National Center for Education Statistics.

Li, Q. (2005). Gender and CMC: A review on conflict and harassment. *Australasian Journal of Educational Technology, 21*(3), 382–406. doi:10.14742/ajet.1327

Lim, D. H., & Kim, H. (2003). Motivation and learner characteristics affecting online learning and learning application. *Journal of Educational Technology Systems, 31*(4), 423–439. doi:10.2190/0lw0-ke8x-mdyh-x27f

Lorenz, T. (2020, March, 20). 'Zoombombing': When video conferences go wrong. *The New York Times*. Retrieved from https://www.nytimes.com/2020/03/20/style/zoombombing-zoom-trolling.html

Lowes, S., Lin, P., & Wang, Y. (2007). Studying the effectiveness of the discussion forum in online professional development courses. *Journal of Interactive Online Learning, 6*(3), 181–210.

Magda, A. J., & Aslanian, C. B. (2018). *Online college students 2018: Comprehensive data on demands and preferences*. Louisville, KY: The Learning House, Inc.

Mann, H. (1848/1957). Twelfth annual report : Moral education, political education, and the relation of church, state, and public school in a free society. In L. A. Cremin (Ed.), *The republic and the school: The education of free men* (pp. 84–97). New York, NY: Teachers College Press.

Marin, A., & Hampton, K. N. (2007). Simplifying the personal network name generator: Alternatives to traditional multiple and single name generators. *Field Methods, 19*(2), 163–193. doi:10.1177/1525822x06298588

Marin, A., & Wellman, B. (2011). Social network analysis: An introduction. In J. Scott & J. Carrington, Peter (Eds.), *The SAGE handbook of social network analysis* (pp. 11–25). Thousand Oaks, CA: Sage.

Mathews, T. J., & Hamilton, B. E. (2019). Educational attainment of mothers aged 25 and over: United States, 2017 *NCHS Data Brief* (Vol. 332). Hyattsville, MD: National Center for Health Statistics.

Matthews, D. (1999). The origins of distance education and its use in the United States. *Technological Horizons in Education Journal, 27*(2), 54–67.

Mayadas, A. F., Bourne, J., & Bacsich, P. (2009). Online education today. *science, 323*(5910), 85–89. doi:10.1126/science.1168874

Mazzolini, M., & Maddison, S. (2003). Sage, guide or ghost? The effect of instructor intervention on student participation in online discussion forums. *Computers & Education, 40*, 237–253. doi:10.1016/S0360-1315(02)00129-X

McFarland, J., Hussar, B., Wang, X., Zhang, J., Wang, K., Rathbun, A., . . . Mann, F. B. (2018). *The condition of education 2018 (NCES 2018-144)*. Washington, DC: National Center for Education Statistics.

McKenzie, L. (2020, April, 3). 'Zoombies' take over online classrooms. *Inside Higher Ed*. Retrieved from https://www.insidehighered.com/news/2020/04/03/zoombombing-isn%E2%80%99t-going-away-and-it-could-get-worse

McMurtrie, B. (2017, October 23). Controversy at George Washington U. highlights challenges of diving deeply into online education. *The Chronicle of Higher Education*. Retrieved from https://www.chronicle.com/article/Controversy-at-George/241528

McPherson, M., Smith-Lovin, L., & Cook, J. M. (2001). Birds of a feather: Homophily in social networks. *Annual Review of Sociology, 27*(1), 415–444. doi:10.1146/annurev.soc.27.1.415

Mendes, K., Ringrose, J., & Keller, J. (2018). #MeToo and the promise and pitfalls of challenging rape culture through digital feminist activism. *European Journal of Women's Studies*, *25*(2), 236–246. doi:10.1177/1350506818765318

Mettler, S. (2014). *Degrees of inequality: How the politics of higher education sabotaged the American dream*. New York, NY: Basic Books.

Meyer, K. A. (2003). Face-to-face versus threaded discussions: The role of time and higher-order thinking. *Journal of Asynchronous Learning Networks, 7*(3), 1–11.

Meyer, K. A. (2013). The case for the Community of Inquiry (CoI) influencing student retention. In D. R. Garrison & Z. Akyol (Eds.), *Educational communities of inquiry: Theoretical framework, research, and practice* (pp. 317–333). Hershey, PA: IGI Global.

Meyer, T. C. (1983). Teleconferencing as a medium for continuing education of health professionals: A fifteen year perspective. *Möbius: A Journal for Continuing Education Professionals in Health Sciences, 3*(2), 73–79. doi:10.1002/chp.4760030215

Moore, M. G. (1993). Theory of transactional distance. In D. Keegan (Ed.), *Theoretical principles of distance education* (pp. 22–38). New York, NY: Routledge.

Moore, M. G., & Kearsley, G. (2011). *Distance education: A systems view of online learning* (3rd ed.). Belmont, CA: Wadsworth.

Muse, H. E. (2003). The web-based community college student: An examination of factors that lead to success and risk. *The Internet and Higher Education, 6*(3), 241–261. doi:10.1016/S1096-7516(03)00044-7

Musu-Gillette, L., Brey, C. d., McFarland, J., Hussar, W., Sonnenberg, W., & Wilkinson-Flicker, S. (2017). *Status and trends in the education of racial and ethnic groups 2017 (NCES 2017-051)*. Washington, DC: National Center for Education Statistics.

Nandi, D., Hamilton, M., & Harland, J. (2012). Evaluating the quality of interaction in asynchronous discussion forums in fully online courses. *Distance Education, 33*(1), 5–30. doi:10.1080/01587919.2012.667957

Newman, M. E. J. (2002). Assortative mixing in networks. *Physical Review Letters, 89*(20), 208701. doi:10.1103/PhysRevLett.89.208701

Noble, D. F. (1998). Digital diploma mills: The automation of higher education. *First Monday, 3*(1). doi:10.5210/fm.v3i1.569

Noldus, R., & Van Mieghem, P. (2015). Assortativity in complex networks. *Journal of Complex Networks, 3*(4), 507–542. doi:10.1093/comnet/cnv005

Nora, A., & Cabrera, A. F. (1996). The role of perceptions of prejudice and discrimination on the adjustment of minority students to college. *The Journal of Higher Education, 67*(2), 119–148. doi:10.1080/00221546.1996.11780253

Nora, A., Kraemer, B., & Itzen, R. (1997). *Persistence among non-traditional Hispanic college students: A causal model. ASHE Annual Meeting Paper*. Retrieved from http://proxy-remote.galib.uga.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=ED415824&site=eds-live

Okwumabua, T. M., Walker, K. M., Hu, X. G., & Watson, A. (2011). An exploration of African American students' attitudes toward online learning. *Urban Education, 46*(2), 241–250. doi:10.1177/0042085910377516

Olsen, F. (2002, November, 1). Phoenix rises: The university's online program attracts students, profits, and praise. *The Chronicle of Higher Education*.

Park, J.-H., & Choi, H. J. (2009). Factors influencing adult learners' decision to drop out or persist in online learning. *Journal of Educational Technology & Society, 12*(4), 207–217.

Parsad, B., & Lewis, L. (2008). Distance education at degree-granting postsecondary institutions: 2006–07 (NCES 2009–044). Washington, DC: National Center for Education Statistics.

Pascarella, E. T. (1991). *How college affects students* (1st ed.). San Francisco, CA: Jossey-Bass.

Pascarella, E. T., & Chapman, D. W. (1983). A multiinstitutional, path analytic validation of Tinto's model of college withdrawal. *American Educational Research Journal, 20*(1), 87–102. doi:10.2307/1162676

Pascarella, E. T., Duby, P. B., & Iverson, B. K. (1983). A test and reconceptualization of a theoretical model of college withdrawal in a commuter institution setting. *Sociology of Education, 56*(2), 88–100. doi:10.2307/2112657

Pascarella, E. T., Pierson, C. T., Wolniak, G. C., & Terenzini, P. T. (2004). First-generation college students: Additional evidence on college experiences and outcomes. *The Journal of Higher Education, 75*(3), 249–284.

Pascarella, E. T., & Terenzini, P. T. (1998). Studying college students in the 21st century: Meeting new challenges. *The review of higher education, 21*(2), 151–165.

Patterson, B., & McFadden, C. (2009). Attrition in online and campus degree programs. *Online Journal of Distance Learning Administration, 12*(2).

Patton, M. Q. (2015). *Qualitative research & evaluation methods: Integrating theory and practice* (4th ed.). Thousand Oaks, CA: Sage.

Pawan, F., Paulus, T. M., Yalcin, S., & Chang, C.-F. (2003). Online learning: Patterns of engagement and interaction among in-service teachers. *Language Learning & Technology, 7*(3), 119–140.

Perrin, A., & Turner, E. (2019, August, 20). Smartphones help blacks, Hispanics bridge some – but not all – digital gaps with whites. *Pew Research Center*. Retrieved from www.pewresearch.org/fact-tank/2019/08/20/smartphones-help-blacks-hispanics-bridge-some-but-not-all-digital-gaps-with-whites/

Picca, L. H., & Feagin, J. R. (2007). *Two-faced racism: Whites in the backstage and frontstage*. New York, NY: Routledge.

Polanyi, K. (2001). *The great transformation: The political and economic origins of our time* (2nd ed.). Boston, MA: Beacon Press.

Polanyi, K. (2018). *Economy and society: Selected writings*. Medford, MA: Polity Press.

Portes, A. (1998). Social capital: Its origins and applications in modern sociology. *Annual Review of Sociology, 24*(1), 1–24.

Poushter, J. (2016, February, 22). Smartphone ownership and internet usage continues to climb in emerging economies. *Pew Research Center*. Retrieved from www.pewresearch.org/global/2016/02/22/internet-access-growing-worldwide-but-remains-higher-in-advanced-economies/

Putnam, R. D. (2000). *Bowling alone: The collapse and revival of American community*. New York: Simon & Schuster.

Radford, A. W. (2011). *Learning at a distance: Undergraduate enrollment in distance education courses and degree programs (NCES 2012-154)*. Washington, DC: National Center for Education Statistics.

Rendón, L. I., Jalomo, R. E., & Nora, A. (2000). Theoretical considerations in the study of minority student retention in higher education. In J. M. Braxton (Ed.), *Reworking the student departure puzzle* (pp. 127–156). Nashville, TN: Vanderbilt University Press.

Robert, H. W., & Jason, D. B. (2004). Interaction and immediacy in online learning. *The International Review of Research in Open and Distributed Learning, 5*(2). doi:10.19173/irrodl.v5i2.186

Robins, G., Pattison, P., Kalish, Y., & Lusher, D. (2007). An introduction to exponential random graph (p*) models for social networks. *Social Networks, 29*(2), 173–191. doi:10.1016/j.socnet.2006.08.002

Ross, C. (2012). Are the sleeping giants awake? Non-profit universities enter online education at scale. Boston, MA: The Parthenon Group. Retrieved from www.profnetconnect.com/chrisross/go/.../d1aa62c081f517f391400b66bcc810bf.

Ross, L. R., & Powell, R. (1990). Relationships between gender and success in distance education courses: A preliminary investigation. *Research in distance education, 2*(2), 10–11.

Rourke, L., Anderson, T., Garrison, D. R., & Archer, W. (2001). Methodological issues in the content analysis of computer conference transcripts. *International Journal of Artificial Intelligence in Education, 12*, 8–22.

Rovai, A. P. (2001). Building classroom community at a distance: A case study. *Educational Technology Research and Development, 49*(4), 33. doi:10.1007/bf02504946

Rovai, A. P. (2003). In search of higher persistence rates in distance education online programs. *The Internet and Higher Education, 6*(1), 1–16. doi:10.1016/S1096-7516(02)00158-6

Rovai, A. P., & Baker, J. D. (2005). Gender differences in online learning: Sense of community, perceived learning, and interpersonal interactions. *Quarterly Review of Distance Education, 6*(1), 31–44.

Rovai, A. P., & Gallien, L. B. (2005). Learning and sense of community: A comparative analysis of African American and Caucasian online graduate students. *The Journal of Negro Education, 74*(1), 53–62.

Rovai, A. P., & Ponton, M. K. (2005). An examination of sense of classroom community and learning among African American and Caucasian graduate students. *Journal of Asynchronous Learning Networks, 9*(3), 77–92.

Salvo, S., Shelton, K., & Welch, B. (2017). African American males and online education: A review of the literature. *Online Journal of Distance Learning Administration, 20*(4).

Savicki, V., & Kelley, M. (2000). Computer mediated communication: Gender and group composition. *CyberPsychology & Behavior, 3*(5), 817–826. doi:10.1089/10949310050191791

Savicki, V., Lingenfelter, D., & Kelley, M. (1996). Gender language style and group composition in internet discussion groups. *Journal of Computer-Mediated Communication, 2*(3). doi:10.1111/j.1083-6101.1996.tb00191.x

Schreier, M. (2012). *Qualitative content analysis in practice*. London, UK: Sage.

Schudde, L. T., & Goldrick-Rab, S. (2016). Extending opportunity, perpetuating privilege: Institutional stratification amid educational expansion. In M. N. Bastedo, P. G. Altbach, & P. J. Gumport (Eds.), *American higher education in the 21st century: Social, political, and economic challenges* (4th ed.). Baltimore, MD: Johns Hopkins University Press.

Scott, J. (2017). *Social network analysis* (4th ed.). London, UK: Sage.

Scott, J. C. (1999). The Chautauqua movement. *The Journal of Higher Education, 70*(4), 389–412. doi:10.1080/00221546.1999.11780769

Seaman, J. E., Allen, I. E., & Seaman, J. (2018). *Grade increase: Tracking distance education in the United States*. Oakland, CA: Babson Survey Research Group.

Shannon-Baker, P. (2015). Making paradigms meaningful in mixed methods research. *Journal of Mixed Methods Research,, 10*(4). doi:10.1177/1558689815575861

Shavit, Y., Arum, R., Gamoran, A., & Menachem, G. (2007). *Stratification in higher education: A comparative study*. Stanford, CA: Stanford University Press.

Shea, P., Hayes, S., Vickers, J., Gozza-Cohen, M., Uzuner, S., Mehta, R., . . . Rangan, P. (2010). A re-examination of the community of inquiry framework: Social network and content analysis. *The Internet and Higher Education, 13*(1), 10–21. doi:10.1016/j.iheduc.2009.11.002

Solórzano, D. G. (1998). Critical race theory, race and gender microaggressions, and the experience of Chicana and Chicano scholars. *International Journal of Qualitative Studies in Education, 11*(1), 121–136. doi:10.1080/095183998236926

Solórzano, D. G., Ceja, M., & Yosso, T. (2000). Critical race theory, Racial microaggressions, and campus racial climate: The experiences of African American college students. *The Journal of Negro Education, 69*(1/2), 60–73.

Steinfeldt, J. A., Foltz, B. D., Kaladow, J. K., Carlson, T. N., Pagano Jr, L. A., Benton, E., & Steinfeldt, M. C. (2010). Racism in the electronic age: Role of online forums in expressing racial attitudes about American Indians. *Cultural Diversity and Ethnic Minority Psychology, 16*(3), 362–371. doi:10.1037/a0018692

Stephens, N. M., Fryberg, S. A., Markus, H. R., Johnson, C. S., & Covarrubias, R. (2012). Unseen disadvantage: How American universities' focus on independence undermines the academic performance of first-generation college students. *Journal of Personality and Social Psychology, 102*(6), 1178–1197. doi:10.1037/a0027143

Sue, D. W., Bucceri, J., Lin, A. I., Nadal, K. L., & Torino, G. C. (2007). Racial microaggressions and the Asian American experience. *Cultural Diversity and Ethnic Minority Psychology, 13*(1), 72–81. doi:10.1037/1099-9809.13.1.72

Sue, D. W., Capodilupo, C. M., Torino, G. C., Bucceri, J. M., Holder, A. M. B., Nadal, K. L., & Esquilin, M. (2007). Racial microaggressions in everyday life: Implications for clinical practice. *American Psychologist, 62*(4), 271–286. doi:10.1037/0003-066X.62.4.271

Sullivan, P. (2001). Gender differences and the online classroom: Male and female college students evaluate their experiences. *Community College Journal of Research and Practice, 25*(10), 805–818. doi:10.1080/106689201753235930

Sullivan, P. (2002). “It's easier to be yourself when you are invisible”: Female college students discuss their online classroom experiences. *Innovative Higher Education, 27*(2), 129–144. doi:10.1023/a:1021109410893

Sullivan, R., Fulcher-Rood, K., Kruger, J., Sipley, G., & van Putten, C. (2019). Emerging technologies for lifelong learning and success: A MOOC for everyone. *Journal of Educational Technology Systems, 47*(3), 318–336. doi:10.1177/0047239518821065

Swan, K. (2001). Virtual interaction: Design factors affecting student satisfaction and perceived learning in asynchronous online courses. *Distance Education, 22*(2), 306–331. doi:10.1080/0158791010220208

Tannen, D. (1990). *You just don't understand: Women and men in conversation* (1st ed.. ed.). New York, NY: Morrow.

Tannen, D. (1991). Teacher's classroom strategies should recognise that men and women use language differently. *The Chronicle of Higher Education, 37*(40), B1–B3.

Taplin, M., & Jegede, O. (2001). Gender differences in factors influencing achievement of distance education students. *Open Learning: The Journal of Open, Distance and e-Learning, 16*(2), 133–154. doi:10.1080/02680510120050307

Taylor, P., Parker, K., Lenhart, A., & Patten, E. (2011, August 28). The digital revolution and higher education: College presidents, public differ on value of online learning. *Pew Research Center*. Retrieved from https://files.eric.ed.gov/fulltext/ED524306.pdf

Teddlie, C., & Tashakkori, A. (2010). Overview of contemporary issues in mixed methods research. In A. Tashakkori & C. Teddlie (Eds.), *Sage handbook of mixed methods in social & behavioral research* (2nd ed., pp. 1–41). Thousand Oaks, CA: Sage.

Terenzini, P. T., & Pascarella, E. T. (1980). Toward the validation of Tinto's model of college student attrition: A review of recent studies. *Research in Higher Education, 12*(3), 271–282. doi:10.1007/bf00976097

Terenzini, P. T., Springer, L., Yaeger, P. M., Pascarella, E. T., & Nora, A. (1996). First-generation college students: Characteristics, experiences, and cognitive development. *Research in Higher Education, 37*(1), 1–22. doi:10.1007/bf01680039

Thierry, V., & Deborah, L. (2000). Critical success factors in online education. *International Journal of Educational Management, 14*(5), 216–223. doi:10.1108/09513540010344731

Thurmond, V., & Wambach, K. (2004). Understanding interactions in distance education: A review of the literature. *International Journal of Instructional Technology and Distance Learning, 1*(1), 9–25.

Tiene, D. (2000). Online discussions: A survey of advantages and disadvantages compared to face-to-face discussions. *Journal of Educational Multimedia and Hypermedia, 9*(4), 371–384.

Tinto, V. (1975). Dropout from higher education: A theoretical synthesis of recent research. *Review of Educational Research, 45*(1), 89–125. doi:10.3102/00346543045001089

Tinto, V. (1988). Stages of student departure: Reflections on the longitudinal character of student leaving. *Journal of Higher Education, 59*(4), 438–455. doi:10.2307/1981920

Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of student attrition* (2nd ed.). Chicago, IL: University of Chicago Press.

Tirado-Morueta, R., Maraver-López, P., & Hernando-Gómez, Á. (2017). Patterns of participation and social connections in online discussion forums. *Small Group Research, 48*(6), 639–664. doi:10.1177/1046496417710726

Tisdell, E. J., Hanley, M. S., & Taylor, E. W. (2000). Different perspectives on teaching for critical consciousness. In A. L. Wilson & E. R. Hayes (Eds.), *Handbook of adult and continuing education* (pp. 132–146). San Francisco, CA: Jossey-Bass.

Tresman, S. (2002). Towards a strategy for improved student retention in programmes of open, distance education: A case study from the Open University UK. *The International Review of Research in Open and Distributed Learning, 3*(1). doi:10.19173/irrodl.v3i1.75

Turkle, S. (2011). *Alone together: Why we expect more from technology and less from each other*. New York, NY: Basic Books.

Van de Vord, R. (2010). Distance students and online research: Promoting information literacy through media literacy. *The Internet and Higher Education, 13*(3), 170–175. doi:10.1016/j.iheduc.2010.03.001

van der Poel, M. G. M. (1993). Delineating personal support networks. *Social Networks, 15*(1), 49–70. doi:10.1016/0378-8733(93)90021-C

van Deursen, A., & Helsper, E. J. (2015). The third-level digital divide: Who benefits most from being online? In J. Helsper Ellen (Ed.), *Communication and Information Technologies Annual* (Vol. 10, pp. 29–52). Bingley, UK: Emerald Group Publishing Limited.

Verduin Jr., J. R., & Clark, T. A. (1991). *Distance education: The foundations of effective practices*. San Francisco, CA: Jossey-Bass.

Vrasidas, C., & McIsaac, M. S. (1999). Factors influencing interaction in an online course. *American Journal of Distance Education, 13*(3), 22–36. doi:10.1080/08923649909527033

Waits, T., Lewis, L., & Greene, B. (2003). Distance education at degree-granting postsecondary institutions: 2000–2001 (NCES 2003–017). Washington, DC: National Center for Education Statistics.

Warburton, E. C., Bugarin, R., & Nunez, A.-M. (2001). *Bridging the gap: Academic preparation and postsecondary success of first-generation students (NCES2001-153)*. Washington, DC: National Center for Education Statistics.

Wasserman, S., & Faust, K. (1994). *Social network analysis: Methods and applications*. Cambridge, UK: Cambridge University Press.

Wasserman, S., & Pattison, P. (1996). Logit models and logistic regressions for social networks: I. An introduction to Markov graphs andp. *Psychometrika, 61*(3), 401–425. doi:10.1007/BF02294547

Wessel, D. (2015, June 18). High stakes and a potential standoff over student-loan debt relief. *The Wall Street Journal*. Retrieved from https://blogs.wsj.com/washwire/2015/06/18/high-stakes-and-a-potential-standoff-over-student-loan-debt-relief/

West, C., & Zimmerman, D. H. (1987). Doing gender. *Gender and Society, 1*(2), 125–151.

Willging, P. A., & Johnson, S. D. (2004). Factors that influence students' decision to drop out of online courses. *Journal of Asynchronous Learning Networks, 8*(4), 105–118.

Wimmer, A., & Lewis, K. (2010). Beyond and below racial homophily: ERG models of a friendship network documented on Facebook. *American journal of sociology, 116*(2), 583–642. doi:10.1086/653658

Wladis, C., Conway, K. M., & Hachey, A. C. (2015). The online STEM classroom-Who succeeds? An exploration of the impact of ethnicity, gender, and non-traditional student characteristics in the community college context. *Community College Review, 43*(2), 142–164. doi:10.1177/0091552115571729

Wladis, C., Hachey, A. C., & Conway, K. M. (2015). The representation of minority, female, and non-traditional STEM majors in the online environment at community colleges: A nationally representative study. *Community College Review, 43*(1), 89–114. doi:10.1177/0091552114555904

Wolfe, J. L. (1999). Why do women feel lgnored? gender differences in computer-mediated classroom interactions. *Computers and Composition, 16*(1), 153–166. doi:10.1016/S8755-4615(99)80011-5

Wolfe, J. L. (2000). Gender, ethnicity, and classroom discourse: Communication patterns of hispanic and white students in networked classrooms. *Written Communication, 17*(4), 491–519. doi:10.1177/0741088300017004003

Xu, D., & Jaggars, S. S. (2011). The effectiveness of distance education across Virginia's community colleges: Evidence from introductory college-level math and English courses. *Educational Evaluation and Policy Analysis, 33*(3), 360–377. doi:10.3102/0162373711413814

Xu, D., & Jaggars, S. S. (2014). Performance gaps between online and face-to-face courses: Differences across types of students and academic subject areas. *The Journal of Higher Education, 85*(5), 633–659. doi:10.1080/00221546.2014.11777343

Yang, D., Baldwin, S., & Snelson, C. (2017). Persistence factors revealed: Students' reflections on completing a fully online program. *Distance Education, 38*(1), 23–36. doi:10.1080/01587919.2017.1299561

Yeboah, A. K., & Smith, P. (2016). Relationships between minority students online learning experiences and academic performance. *Online Learning, 20*(4).

Yoon, H. (2019). An online college near me: Exploring the institutional factors of e-learners' local orientation. *The International Review of Research in Open and Distributed Learning, 20*(5), 64–84. doi:10.19173/irrodl.v20i5.4432

Yosso, T., Smith, W., Ceja, M., & Solórzano, D. (2009). Critical race theory, racial microaggressions, and campus racial climate for Latina/o undergraduates. *Harvard Educational Review, 79*(4), 659–691. doi:10.17763/haer.79.4.m6867014157m707l

APPENDIX A

Invitation Letter (Full version)

Dear COURSE TITLE Students,

Hello. I am a graduate student in the Department of Lifelong Education, Administration, and Policy at the University of Georgia. I invite you to participate in a research study entitled *Online College Education: Differences in Online Classroom Interaction*. The purpose of this study is to contribute to the academic discussion of online education by investigating the differential impact of classroom interaction of students of diverse backgrounds. We obtained your contact information from your course instructor Dr. NAME in PROGRAM NAME. By completing this online questionnaire, you are agreeing to participate in the research project described above. Here is the link for the questionnaire. Also, you may find the same link in your mail box as well as in your course announcement board.

https://ugeorgia.ca1.qualtrics.com/jfe/form/SV_8q9GjI6u1UnHo0d

You are eligible to be in this study because you are enrolled in the COLLEGE NAME online course COURSE TITLE in the SEMESTER. Your participation will involve a survey and should only take about **10 minutes**. Your involvement in the study is voluntary, and you may choose not to participate or to stop at any time without penalty or loss of benefits to which you are otherwise entitled. You are unable to retrieve any information once your survey has been submitted.
We would appreciate your taking the time to complete the following survey. Your responses are voluntary and will be confidential. The results of the research study may be published, but your name or any identifying information will never be used. In fact, the published results will be presented in summary form only. As a thank you for your time spent completing the survey in full, you will obtain **$10 Starbucks gift card**, but you do not need to participate in the survey for the gift.
The findings from this project may provide information on impacts of online classroom interaction on learning outcomes. There are no known risks or discomforts associated with this research.
If you have any questions about this research project, please feel free to contact me at (706) 461-5160 or by e-mail to hyungjoo@uga.edu or contact my methodologist Dr. Robinson at (706) 542-0417 or by e-mail to sodawn@uga.edu. Questions or concerns about your rights as a research participant should be directed to the Chairperson of the University of Georgia Institutional Review Board at (706) 542-3199 or by e-mail to irb@uga.edu.

Thank you for your consideration.

Sincerely,

Hyungjoo Yoon

Ph.D. Candidate
Department of Lifelong Education, Administration, and Policy
University of Georgia

APPENDIX B

Invitation Letter (Shortened version)

Hello. My name is Hyungjoo Yoon. I am a graduate student in the Department of Lifelong Education, Administration, and Policy at the University of Georgia. I invite you to participate in my dissertation research study entitled *Online College Education: Differences in Online Classroom Interaction*. The purpose of this study is to contribute to the academic discussion of online education by investigating the differential impact of classroom interaction of students of diverse backgrounds. You are eligible to be in this study because you are enrolled in the COLLEGE NAME online course COURSE TITLE in the SEMESTER. Your participation will involve a survey and should only take about **10 minutes**. Here is the link for the questionnaire.
https://ugeorgia.ca1.qualtrics.com/jfe/form/SV_8q9GjI6u1UnHo0d
Your responses are voluntary and will be confidential. There are no known risks or discomforts associated with this research. As a thank you for your time spent completing the survey in full, you will obtain **$10 Starbucks gift card**, but you do not need to participate in the survey for the gift.
If you have any questions about this research project, please feel free to contact me at (706) 461-5160 or by e-mail to hyungjoo@uga.edu. By completing and returning the online questionnaire, you are agreeing to participate in the research project described on the consent from attached in the online survey.
Thank you for your consideration.

Sincerely,

Hyungjoo Yoon

Ph.D. Candidate
Department of Lifelong Education, Administration, and Policy
University of Georgia

APPENDIX C

Consent Form

Welcome to the Online Classroom Interaction Survey

You are being invited to participate in a research study entitled *Online College Education: Differences in Online Classroom Interaction*. This research hopes to find out whether online adult education classroom interaction influences a student's sense of learning community and learning outcomes. Your participation will involve allowing the researchers to use the data that were collected through your participation in the COURSE TITLE, COLLEGE NAME, SEMESTER**.** Two types of data will be collected and analyzed only for research purposes. First, records of the asynchronous interactions in the online classroom will be used to identify classroom participation patterns and network structures of the classroom. Second, your survey response will be analyzed in conjunction with your online classroom interaction data. The online classroom interaction data collection procedures will begin after the end of this semester only if you accept to participate in this research by completing this survey.

Your participation, of course, is voluntary but would be greatly appreciated. You may choose not to participate or to withdraw your consent at any time without penalty or loss of benefits to which you are otherwise entitled. If you agree to provide the researcher with your data for this research project, please simply click the line below and type your name; if you do not agree, none of your data will be included in the research and you can still participate in the program. If you decide to withdraw from the study, the information that can be identified as yours up until

that time will be kept as part of the study and may continue to be analyzed, unless you make a written request to remove, return, or destroy the information.

The results of the research study may be published, but your name and any identifying information will not be used. In fact, the published results will be presented in summary form only. Any personal information (e.g., name, contact information) that could identify you will be removed or changed before files are shared with other researchers or results are made public.

There are no known risks associated with this research. The findings from this project may contribute to a better understanding of the social structure of online classroom interaction.

The researchers conducting this study are: **Hyungjoo Yoon**. You may ask any questions you have now. If you have questions later, you are encouraged to contact me at River's Crossing Graduate Assistant Room 109; 706-461-5160; **hyungjoo@uga.edu**

Questions or concerns about your rights as a research participant should be directed to the Chairperson, University of Georgia Institutional Review Board, 609 Boyd GSRC, Athens, Georgia 30602-7411; 706-542-3199; irb@uga.edu.

Please note that this survey will be best displayed on a laptop or desktop computer. Some features may be less compatible for use on a mobile device.

- ○ I consent, begin the study. (1)
- ○ I do not consent; I do not wish to participate. (2)

APPENDIX D

Demographic and Social Network Questionnaire

Q1 Please type your First and Last Name.

_____

Part 1: Demographic Survey

Q2 How do you currently describe your gender identity?

o Please specify: (1) _____

o I prefer not to answer. (2)

Q3 What is your age in years?

o Please specify: (1) _____

o I prefer not to answer. (2)

Q4 Which categories describe you? Select all that apply to you:

o American Indian or Alaska Native—For example, Navajo Nation, Blackfeet Tribe, Mayan, Aztec, Native Village of Barrow Inupiat Traditional Government, Nome Eskimo Community (1)

o Asian—For example, Chinese, Filipino, Asian Indian, Vietnamese, Korean, Japanese (2)

o Black or African American—For example, Jamaican, Haitian, Nigerian, Ethiopian, Somalian (3)

o Hispanic, Latino or Spanish Origin—For example, Mexican or Mexican American, Puerto Rican, Cuban, Salvadoran, Dominican, Columbian (8)

o Middle Eastern or North African—For example, Lebanese, Iranian, Egyptian, Syrian, Moroccan, Algerian (9)

o Native Hawaiian or Other Pacific Islander—For example, Native Hawaiian, Samoan, Chamorro, Tongan, Fijian, Marshallese (4)

o White—For example, German, Irish, English, Italian, Polish, French (5)

o Some other race, ethnicity, or origin, please specify: (6)

_____

o I prefer not to answer. (7)

Q5 Do you have a long-lasting or chronic condition (physical, visual, auditory, cognitive or mental, emotional, or other) that substantially limits your study in this course? (your ability to communication; to learn, remember, or concentrate)?

o Yes (1)

o No (2)

o I prefer not to answer. (3)

Q6 If yes, please indicate the terms that best describe the condition(s) you experience:

o Please specify: (1) _____

o I prefer not to answer. (2)

Q7 Do you have biological, adopted, foster, or step children?

- o No (1)
- o No, but I am (or my partner is) pregnant or in the process of adopting (2)
- o Yes, one child (3)
- o Yes, two children (4)
- o Yes, three children (5)
- o Yes, four or more children (6)
- o I prefer not to answer. (7)

Q8 Which social class group do you identify with?

- o Poor (1)
- o Working class (2)
- o Middle class (3)
- o Affluent (4)
- o I prefer not to answer. (5)

Q9 What is the highest level of education your mother achieved?

- o Some high school (1)
- o High school diploma or equivalent (2)
- o Some college or vocational training (3)
- o Bachelor's degree (4)
- o Master's degree or specialist degree (5)
- o Doctorate degree (6)
- o Other, please specify (7) _____

o I prefer not to answer. (8)

Q10 On average, how many hours do you work a week, including time at an office, in the field, or working at home?

o 35 or more hours (1)

o Less than 35 hours (2)

o I prefer not to answer. (3)

Q11 What type of employer do you have?

o I am an employee of a private for-profit company or business, or of an individual, for wages, salary, or commissions. (1)

o I am an employee of a private not-for-profit, tax-exempt, or charitable organization. (2)

o I am a local, state, or federal government employee. (3)

o I am self-employed in my own or family business, professional practice, or farm. (4)

o I prefer not to answer. (5)

Part 2: Social Network Survey

For the following three in-classroom social network questions, please choose relevant names in the class list below as many as you can.

Q12 Suppose you need to ask a student in your course for help, whom would you ask? (Please choose as many relevant names as you can in the class list below.)

Q13 Who were the people you really enjoyed socializing with in this course?

Q14 Please choose anyone in this course who is especially close to you. Please choose the classmate(s) who you have not chosen in one of the previous two questions.

For the following two out-of-classroom social network questions, please list only first name, nick name, or last initial (not full names) in order to protect the listed people's confidentiality. Please be sure that you will remember to whom each name refers, as you will be asked to identify your relationship with the person on the follow-up questions. They must be not one of your classmates in this online course.

Q15 From time to time, most people discuss important matters with other people. Looking back over the last six months—who are the people with whom you discussed matters important to you?

Q16 Is each person like you? (You have answered: "Q2 response" and "Q4 Race response")

Q17 What is each person's relationship to you?

Q18 Consider the people with whom you like to spend your free time. Over the last six months, who are the people you have been with most often for informal social activities such as going out to lunch, dinner, drinks, films, visiting one another's homes, and so on?

Q19 Is each person like you? (You have answered: "Q2 response" and "Q4 response")

Q20 What is each person's relationship to you?

Q21 Many online students may feel overwhelmed and sometimes frustrated with the amount of information presented to them and the way it is presented. Who has recently assisted your study for this course, such as reviewing your course assignment, giving academic advice, spend time listening to questions and concerns about your work in the course?

Q22 Is each person like you? (You have answered: "Q2 response" and "Q4 response")

Q23 What is each person's relationship to you?