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**AN ANALYSIS OF UNDERGRADUATE STUDENT SATISFACTION,
RETENTION, AND GRADUATION BY INSTRUCTIONAL
MODALITY AND RACIAL/ETHNIC GROUPS**

A dissertation submitted to
Marshall University
in partial fulfillment of
the requirements for the degree of
Doctor of Education
in
Leadership Studies
by

Kevin Daniel Struble

Approved by

Dr. Bobbi Nicholson, Committee Chairperson

Dr. Ronald Childress

Dr. Michael Shenkle

Marshall University
May 2023

Approval of Dissertation


We, the faculty supervising the work of Kevin Daniel Struble, affirm that the dissertation, *An Analysis of Undergraduate Student Satisfaction, Retention, and Graduation By Instructional Modality and Racial/Ethnic Groups*, meets the high academic standards for original scholarship and creative work established by the EdD Program in Leadership Studies and the College of Education and Professional Development. The work also conforms to the requirements and formatting guidelines of Marshall University. With our signatures, we approve the manuscript for publication.



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Date

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Dedication

This dissertation is dedicated to my wife, Brittany, and three sons, Clark, Oliver, and Henry. You have provided me with steadfast love, support as I furthered my education, and a continued desire to better myself. To my wife, because you always believe in me and encourage me to pursue my passions. To my sons, because I want to lead by example and encourage you to work hard and chase your dreams. All of you are the best part of me. I love you.

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Abstract

This study investigated whether instructional modality in an undergraduate degree program, either traditional on-campus or asynchronous online, and racial/ethnic group could predict students' reports of satisfaction with the institution, retention year-over-year, and graduation within an eight-year award rate. Data from surveys and enrollment status were collected on undergraduate students enrolled in a bachelor's degree program by instructional modality over a timespan of eight academic years at a single institution. The researcher analyzed categorical predictor variables of instructional modality and racial/ethnic groups with the dichotomous outcome variables of low or high satisfaction, did not or did retain, and did not or did graduate through six research questions and multiple binomial logistic regression tests. This study identified statistically significant results by instructional modality for students' reports of satisfaction with the institution (i.e., online students were more likely to report high satisfaction), retention year-over-year (i.e., on-campus students were more likely to retain), and graduation rate (on-campus students were more likely to graduate). It further identified statistically significant results by instructional modality and racial/ethnic groups for students' reports of satisfaction with the institution (i.e., on-campus White students were more likely to report high satisfaction than other on-campus racial/ethnic groups and online Black or African American students were more likely to report high satisfaction than other online racial/ethnic groups), retention year-over-year (i.e., on-campus White students were more likely to retain than other on-campus racial/ethnic groups and online White students were more likely to retain than other online racial/ethnic groups), and graduation rate (i.e., on-campus White students were more likely to graduate than other on-campus racial/ethnic groups and online White students were more likely to graduate than other online racial/ethnic groups).

Chapter 1: Introduction

While the United States has become increasingly more diverse and college campuses are enrolling a more diverse student body, the achievement of completing a college degree is disproportionately low among underrepresented racial and ethnic student groups such as Black/African American, Latino/Hispanic, American Indian/Alaska Native, and Native Hawaiian students (Ajayi et al., 2021; Brown, 2008; Fan et al., 2021; Parnes et al., 2020; Stohs & Schutte, 2019; Yue et al., 2018). To close this gap, colleges and universities must focus their attention on initiatives that help underrepresented groups, or non-White racial and ethnic groups collectively, succeed and attain their degrees. Student retention has been one of the most studied topics in higher education to help students graduate. According to Seery et al. (2021), college student retention continues to be an issue on both two- and four-year traditional college campuses and is even more problematic for online courses, as they have a 10-20% higher failed retention rate than traditional courses.

Tinto's (1975) seminal work established the model of student integration that focuses on retention where student interactions with other students, faculty, and the institutional environment have both singular and culminating associations with student dropout rates. He discussed the role that campus community, including social and academic, plays in helping determine whether students will be successful in college. While earlier theories viewed college student departure as the result of idiosyncrasies (i.e., personal characteristics, intellectual inadequacies) and the inability to integrate into the institutional system, Tinto's (1975) work acknowledged the impact and responsibility of institutional decisions and culture in shaping student retention. Astin (1993) added to the model of student integration through this theory of student involvement, which emphasized the importance of active student participation at both the

psychosocial and physical levels as an indicator for increased academic performance and retention. Campus community and student engagement require more than simple social interactions to meet the needs of its students. It requires a strategic approach to campus diversity, equity, and inclusion initiatives targeted toward the traditionally high attrition student populations.

Race on campus continues to be a higher education issue that receives a good amount of attention and research. *The Chronicle of Higher Education* (2021) has dedicated time and resources to engaging higher education in conversations about racial diversity, equity, and inclusion through a weekly newsletter: “Race on Campus.” Campus climate research, particularly the Campus Racial Climate model that was developed over time through the collective research of Sylvia Hurtado and Jeffrey Milem, highlight the barriers engrained within higher education institutions for decades and their negative implications for underrepresented groups (Hurtado et al., 1998; Hurtado et al., 1999; Milem et al., 2004; Milem et al., 2005). The campus racial climate barriers discussed in their model can be found in and through five institutional components: institutional legacy, psychological climate, behavioral climate, structural climate, and compositional diversity (Hurtado et al., 1998; Milem et al., 2004). McClain and Perry (2017) stressed these are critical elements to campus climate that may play an integral part in marginalizing underrepresented groups, and while colleges and universities have actively taken large strides toward closing the divide, institutions must continue to assess and evaluate campus environment and its impact on all students.

As a more diverse student body enters postsecondary education and more course and degree program offerings are available through different instructional modalities (i.e., face-to-face, online learning, hybrid, blended, etc.), continued research is needed on underrepresented

groups and their college performance. If any student, and at times even more the underrepresented student, do not feel welcomed, are unsatisfied with the campus climate, and feel their expectations are not being met, they are less likely to retain year-over-year at the institution and graduate (Bowman and Culver 2018; Burke, 2019; Forrester, 2015; Grier-Reed et al. 2016; Mosholder et al. 2016; Weaver et al. 2017).

Review of Literature

A review of the literature for this study focused on undergraduate student satisfaction, retention, and graduation rates of underrepresented groups. According to Causey et al. (2020), the most recent national six-year completion rate for undergraduate students is 60.1% and the eight-year completion rate is 61.3%. Underrepresented groups, however, make up less than half of these graduates. Banks and Dohy (2019) studied barriers to persistence, retention, and graduation of underrepresented groups in higher education. They focused their research on institutions that took active steps toward closing the achievement gap and found that while retention and graduation are a priority for many institutions, marginalized and underrepresented students were often overlooked when developing such initiatives because the most predominant (or White) student needs were typically addressed as opposed to the unique needs of varying student demographics. Premraj et al. (2021) reviewed key factors that affect retention rates of undergraduate underrepresented groups in science, technology, engineering, and mathematics (STEM) majors, a predominantly White field. Their setting was a single research university in Texas where they reviewed a sample of 2,422 student records (i.e., minority status, sex, GPA, high school rank, SAT score). Results showed that institutions must focus targeted resources on additional programs (i.e., pre-major courses, summer bootcamps, and first-year interventions) to

increase graduation rates of underrepresented groups who entered with lower SAT or lower first-year GPAs (Premraj et al., 2021).

Lin et al. (2019) used the UC Berkeley Student Experience in the Research University (SERU) survey to study the impact of course learning, research experience, and climate of diversity on student satisfaction at a single research-intensive institution. Out of 7,219 undergraduate students who responded to the survey, they found that while undergraduates were generally satisfied, a small moderate effect size was seen in race. It was found that the strongest forecaster of student satisfaction was climate of diversity, while the least was the research experience received on campus. The results showed that a diverse campus increased student satisfaction, more than course learning experiences or research practice, across all undergraduates, but was more pronounced in Black/African American students (Lin et al., 2019). Parker III and Trolan (2020) also used the SERU survey from 10 institutions with a total sample of 33,786 students, though as noted in the limitations 82% were White. Their results showed that frequent student-faculty interactions through communication by e-mail or in-person, fair and equitable treatment by faculty, and access to faculty outside of class were positively associated with positive perceptions of a diverse climate. Lewis et al. (2021) studied campus climate through experienced racial microaggression at a historically White institution through an online survey and open-ended interview questions, investigating the frequency of racial microaggressions and students' sense of belonging in an academic setting. Lewis et al. (2021) recruited 1,170 student participants who self-identified as members of an underrepresented group. Their findings revealed that greater frequencies of racial microaggression predicted underrepresented groups' lower sense of belonging, and that Black students specifically

experienced significantly higher frequency of racial microaggression than other underrepresented student groups (Lewis et al., 2021).

Lewis and Shah (2021) conducted a qualitative study to interpret perceptions on diversity and inclusion initiatives from Black undergraduate students attending predominantly White institutions. They surveyed a focus group of 30 Black undergraduate students at a university with an enrollment of 26,362 undergraduates, of whom only 10% were Black students. Findings revealed three emerging themes that negatively affect the satisfaction and retention of Black students: surface level diversity, Whiteness-centered diversity and inclusion, and a sense of not belonging (Lewis and Shah, 2021). Mwangi et al. (2018) also conducted a qualitative study to examine Black students' thoughts on campus climate with broader national issues of race and social justice movements through 45–60-minute interviews. Participants were individuals who identified as current Black undergraduate students or graduated in the last two years and attended a predominantly White institution. Results found four emerging themes: negative perceptions of Blackness on campus, campus racial climate mirroring societal racial climate, race-relations issues and national news affecting interactions on campus, and a desire to influence the future racial climate (Mwangi et al., 2018). Each of these recent studies in relation to the work of Tinto (1975), Astin (1993), and Hurtado et al. (1998) shows that campus climate plays a determining role in underrepresented student groups' obtaining a college degree. Little research has been conducted, however, on the extent to which academic climate – specifically choices regarding instructional modality (on-campus or online) – may affect underrepresented groups' college success.

Problem Statement

While opportunities and access to a college degree have increased over the years, the traditional climate in which one is obtained has not always been conducive for everyone. Student satisfaction and college success are often associated with integration and campus support (Astin, 1970; Tinto 1993). Linley (2018) argued that campus climates are built upon a system that benefits White students over underrepresented students through factors such as institutional legacy, structural diversity, and psychological and behavioral dimensions. Together these phenomena continue to negatively affect and marginalize underrepresented groups on college campuses. McClain and Perry (2017) reported that research has shown underrepresented groups do not retain year-over-year at an institution due to negative campus racial climates (Brooks et al., 2012; Gasman, 2014; Hunn 2014; Jaschik & Lederman, 2014; Quaye et al., 2015).

Higher education should not benefit only a certain group of people, but instead serve all populations in achieving the knowledge, skills, and experience needed to advance professionally and achieve financial stability. With advancements in technology and an increasing number of online programs, students' options for obtaining a college degree have expanded considerably via improvements in accessibility and as more traditional non-profit and public institutions enter the online marketplace. These developments have rendered previous physical, financial, and/or cultural barriers to higher education less prevalent (Morris et al., 2020), but online providers may squander their potential to serve underrepresented student groups in obtaining a postsecondary degree if they do not conduct a systematic examination of their role in mitigating established barriers to student success.

Purpose of the Study

The purpose of this study was to examine whether instructional modality, the method for which academic courses and degree programs are delivered by an institution, either on-campus (face-to-face, traditional, or residential) or online (distance education), enhances underrepresented student groups' likelihood of earning a college degree. The intent was to discern whether the absence of traditional on-campus racial climate barriers may increase the satisfaction, retention, and graduation rates of underrepresented students through exclusively asynchronous online degree programs (Hurtado et al., 1998; Hurtado et al., 1999; Milem et al., 2004; Milem et al., 2005). This study has the potential to inform institutions of higher education of the impact that instructional modalities may have on underrepresented groups and encourage an internal examination of instructional practices and program options. The findings of this study could be used to help higher education leaders further recognize the effect of campus racial climate barriers, dedicate resources to review internal institutional structures and policies, research new instructional modality degree programs and options, and encourage new initiatives to evaluate the needs of underrepresented student groups regardless of instructional modality.

Research Questions

The following questions guided this study:

Research Question 1: To what extent does instructional modality predict undergraduate students' reports of satisfaction with the institution?

Research Question 2: To what extent does instructional modality predict undergraduate students' retention year-over-year?

Research Question 3: To what extent does instructional modality predict undergraduate students' graduation rates?

Research Question 4: To what extent does instructional modality based on race/ethnicity predict undergraduate students' reports of satisfaction with the institution?

Research Question 5: To what extent does instructional modality based on race/ethnicity predict undergraduate students' retention year-over-year?

Research Question 6: To what extent does instructional modality based on race/ethnicity predict undergraduate students' graduation rates?

Definition of Terms

For this study, the following definitions applied.

Graduation Rate (Outcome Measures): A measure of student success reported by degree-granting institutions to describe the outcomes (e.g., received award or did not receive award) of degree/certificate-seeking undergraduate students who are not only first-time, full-time students, but also part-time attending and non-first time (transfer-in) students. These measures provide an 8-year award-completion rate by degree level (certificates, associates, and bachelor's degrees) for those who conferred an undergraduate degree after entering an institution (National Center for Educational Statistics, n.d.-a).

Instructional modality: The method for which academic courses and degree programs are delivered by an institution, either on-campus (face-to-face, traditional, or residential) or online (distance education).

On-campus course/program: A learning experience that occurs synchronously on a physical college or university campus with face-to-face instruction and interaction between students and instructors at the same time.

Online course/program: A learning experience "through internet in an asynchronous environment where students engage with instructors and fellow students at a time of their

convenience and do not need to be co-present online or in a physical space” (Singh & Thurman, 2019, p. 302).

Race/ethnicity: “Classification indicating general racial or ethnic heritage. Race/ethnicity data are based on the Hispanic ethnic category and the race categories listed below (five single-race categories, plus the Two [*sic*] or more races category). Race categories exclude persons of Hispanic ethnicity unless otherwise noted: American Indian or Alaska Native, Asian, Black or African American, Hispanic or Latino, Native Hawaiian or Other Pacific Islander, Two [*sic*] or more races, White” (De Brey et al., 2019, p. 206).

Retention Rate: “A measure of the rate at which students persist in their educational program at an institution, expressed as a percentage. For four-year institutions, this is the percentage of first-time bachelors (or equivalent) degree-seeking undergraduates from the previous fall who are again enrolled in the current fall” (NCES, n.d.-b). For the purposes of this study, the definition is expanded to include first-time bachelors (or equivalent) degree-seeking undergraduates from the previous spring or summer who are again enrolled in the current spring or summer.

Method

This non-experimental, descriptive study focused on student racial/ethnic groups enrolled at a single, predominantly White institution in either an exclusively on-campus or exclusively online academic degree program. The researcher had approval to request extant, institutional-level information that includes student satisfaction, retention, and graduation rates (dependent variables), as well as instructional modality and race/ethnicity (independent variables) data from the 2014-2015 through 2021-2022 academic years. These data were provided in a secure manner from the university’s Analytics and Decision Support Office, cleaned to remove blank cells, and

each variable was be coded as binary/dichotomous. A binary logistic regression was conducted for each research question to understand which, if any, student characteristics (i.e., instructional modality and race/ethnicity) are predictive of student satisfaction, retention, and graduation.

Student perception of institutional performance, or satisfaction, was measured through the Student Satisfaction Inventory (SSI) for synchronous on-campus students and the Priorities Survey for Online Learners (PSOL) for asynchronous online students. Both instruments, used by over 3,000 institutions, were developed by Ruffalo Noel Levitz, an organization focused on partnering with colleges and universities to help with student success. The PSOL was developed to complement the previously established SSI and contains both comparable and unique questions where appropriate.

Retention was defined as students who were seeking a degree who returned to the same institution to continue their studies one academic year after their initial semester of enrollment (fall-to-fall, spring-to-spring, or summer-to-summer). Graduation rates were defined and calculated by the Integrated Postsecondary Education Data System (IPEDS) definition for outcome measures as first-time, full-time students and part-time attending and non-first time (transfer-in) students who conferred their undergraduate degree within an 8-year award-completion rate. Each of these items were compared with student racial/ethnic groups (i.e., White, Black or African American, Hispanic or Latino, Asian, Two [*sic*] or more races, American Indian or Alaska Native, and Native Hawaiian or Other Pacific Islander) with the intent to better understand whether instructional modality (on-campus or online) offered more favorable satisfaction, retention, and/or graduation outcomes.

Delimitations

While educational research is beneficial to the field, such studies are not without delimitations. This non-experimental, descriptive study design had its own delimitations in that while predictions were examined, causal conclusions could not be reached (McMillan, 2016). In addition, the survey instruments that were used to obtain data rely on the perceptions of only those who voluntarily completed the survey, who may have a specific bias, whether positive or negative, about instructional modality or the institution when completing the survey that those who did not complete the survey may not feel. This limits data accuracy due to participant subjectivity (Kerlinger, 1966). The questionnaires, which are self-reporting, may be limited and subject to potential contamination due to the response of those who decided to participate (Johnson & Christensen, 2000). The survey for online students was sent to only a sample of the large online student population due to cost, though all on-campus students – a smaller population – received the on-campus student survey. Last, the SSI for on-campus students and PSOL for online students contain both comparable and unique questions over the three different years they were conducted. Of the 63 SSI questions and 54 PSOL questions, there were 21 questions that were comparable with the remainder questions for each individual survey focusing on unique campus and instructional modality satisfaction on academic and institutional services. Since only 21 questions were used in this study for comparability purposes, the removal of the additional unique and purposeful questions may have resulted in missed data or helpful information concerning student perceptions on the institution for each separate instructional modality.

Another delimitation of this study were the intrinsic differences in instructional modality, student enrollment, and racial/ethnic group representation. The researcher was unable to

establish a control group as each sample had already occurred naturally. Participants selected their respective instructional modality, individually decided whether to retain year-over-year at the same institution and/or graduate or not based upon their individual circumstances and completed a survey based upon their own personal motivations. On-campus students typically enroll for reasons that differ from online students, and vice versa. Since the researcher did not interview participants, such subjective and qualitative information cannot be obtained.

A final delimitation was the setting and timeframe of the study. The research was conducted at a single, Southeastern, four-year, private predominantly White institution that offered degree programs across the two instructional modalities of exclusively on-campus and exclusively online over the most recent eight academic years. Due to the varying sizes in enrollment (approximately 15,000 students on-campus and 100,000 students online), the participant sizes differed by degree program modality and resulted in demographic limitations with varying sample numbers in and among student racial/ethnic groups. All enrolled on-campus students were invited to complete the SSI each academic year administered while, due to cost, only 19,999 enrolled online students were invited to complete the PSOL each academic year administered using stratified random sampling. It should also be noted that online students usually transfer or drop-out at a higher rate than their on-campus counterparts, potentially influencing the results (Muljana & Luo, 2019; Protopsaltis & Baum, 2019). Due to the above delimitations, the generalizability of this study is reduced.

Significance

The attainment of a college degree has shown to increase income and financial stability in the United States (Cheah, 2021; Tamborini et al., 2015; United States Department of Education [USDE], 2016). Since the 1960s, the United States population has continued to become more

racially and ethnically diverse, but gaps in underrepresented groups enrolling in college, persisting, and graduating continue to widen despite legislative policies and postsecondary efforts (USDE, 2016). Underrepresented groups have been less likely to graduate than White students due to what some believe to be institutional structural barriers, equity gaps across campuses, and adverse campus racial climates (Banks & Dohy, 2019; Bowman & Denson, 2022; Brown et al., 2022; Huerta et al., 2021; Kauser et al., 2021; Li et al., 2022; Mills, 2021; Strayhorn, 2013). Studies have found that negative racial climates and barriers exist on traditional college campuses for underrepresented groups and result in attrition, feelings of isolation and discouragement, missed academic development, and loss of career opportunities (Cabrera, 2014; Li et al., 2022; Reynolds et al., 2010; Smith et al., 2011). Degree offerings and enrollment in online education, meanwhile, continue to increase and have the potential to mitigate the institutional barriers of a traditional college campus education for underrepresented groups (Bosch et al., 2019, Ruiz & Sun, 2021).

As there is a lack of targeted research on underrepresented students in online education (Bosch et al., 2018; Joosten & Cusatis, 2020; Yeboah & Smith, 2016), this study has the potential to help higher education institutions understand student satisfaction on instructional performance, retention, and graduation rates across underrepresented groups regarding synchronous on-campus and asynchronous online programs. If underrepresented students are more satisfied, retain year-over-year at the institution, and graduate at a better rate in one modality over the other, postsecondary institutions can look for ways to increase certain opportunities, course and program offerings, and support. The results of this study add to the existing body of research on underrepresented groups' college enrollment, graduation rates, and potential gainful employment.

Chapter 2: Literature Review

A higher education degree can afford opportunities and income that those without may otherwise be unable to obtain. Recent data show that underrepresented groups are not retaining year-over-year at their institution or graduating from college at the same rate as White students (National Center for Education Statistics, 2021; National Student Clearinghouse, 2021). Various studies in the past few decades have presented findings that emphasize the importance of a college degree and its ability to offer graduates both social and occupational upward mobility (Breen & Jonsson, 2005; Hout, 1988; Ishida et al., 1995; Ma et al., 2019; Pfeffer & Hertel, 2015; Torche, 2011). Wealth disparity and economic indicators, such as employment, poverty, and homeownership, can be tied to a college education and data show Whites as being more advantaged than underrepresented groups in these areas (Espinosa et al., 2019; Nam, 2021; Posselt & Grodsky, 2017; Reardon & Fahle, 2017; Turk, 2019). College attrition of underrepresented students has been attributed to a more hostile campus racial environment and underestimation of their satisfaction with the traditional campus system (Adedoyin, 2022; Albright & Hurd, 2020; Arellano & Vue, 2019; McGee, 2020; Williams, 2020).

More recently, however, online education has grown and expanded in offerings, often with similar or lower tuition rates and fees than a traditional campus, as additional on-campus costs are not required, increasing overall accessibility (Guzman et al., 2020; Palvia et al., 2018). It has also been presumed an online classroom could provide a safer environment for traditionally marginalized students because of the anonymity of the online class structure, though still not without its challenges for underrepresented student (Erichsen & Bolliger, 2011; Humiston et al., 2020; Sullivan, 2002). One way to explore the issue of underrepresented student satisfaction and retention with higher education is to examine whether online education could

positively affect underrepresented groups in the attainment of a college degree. This chapter will discuss the importance of higher education access, course and program modality options, retention theories, recent student retention and graduation rates, and campus climate models.

Higher Education Access

Access to higher education is important because it affords professional opportunities and financial gain within a competitive market and economy. To aid in the accessibility of a college degree, the federal government enacted the Higher Education Act (HEA) in 1965 to govern and strengthen colleges and universities through various resources and regulations while providing financial assistance to students seeking a postsecondary education. Its initial intent was to make college more affordable for low-income families and individuals through legislation that established accessible student-aid programs (Glater, 2016). As the demographics and needs of the American people evolved over time and reauthorization acts occurred in Congress, the HEA expanded its student-aid process which has evolved into today's student needs-based financial aid and student loan program (Mirzoyan, 2020). Access to higher education has also become more prevalent today due to a global economy, market demands for highly qualified workers, degree accessibility through the internet, and the availability of financial aid through both state and federal funding for both public and private institutions making the need for a college even more desirable (Watson, 2019).

The HEA remains an important piece of legislation because it provides support and access to higher education attainment for those who desire a college degree and a higher median income. According to the National Center for Education Statistics (NCES, 2020), in 2020, the median income for those with a bachelor's degree was 63% higher than for those with just a high school diploma. This pattern of higher income earnings is also positively associated with college

degree attainment for males and females, and Black, Hispanic, and Asian racial and ethnic groups (NCES, 2020). Student loan debt is, conversely, highest among Black students who attended college and is even higher for those who obtained a bachelor's degree, having borrowed on average \$30,000 or more than others (Baker & Montalto, 2019). The Federal Reserve (2017) shows that after college graduation, 23% of Hispanic students and 20% of Black students are behind on their loan payments, compared to 6% of White students. Researchers have attributed these racial differences in college debt to societal wealth disparity and socioeconomic status, family background, postsecondary education attainment difference, family resources and net worth, family contributions to college, and salaries after college (Houle & Addo, 2019; Addo et al., 2016). These differences result in underrepresented students relying more on student loans and less on family resource to cover college costs. It shows that while higher education is accessible across racial and ethnic groups, Black and Hispanic students are not having the same financial benefits.

According to a recent Gallup survey, 51% American's believe a college education to be very important, though it should be noted this is lower than previous survey results. More interestingly, the report found that Black and Hispanics adults, two of the larger underrepresented groups in higher education nationally, were more likely to view a college education as very important than White adults (Marken, 2019). Student enrollment and degree attainment are, however, disproportionate among Black and Hispanic students. While Black student enrollment grew steadily between 1966 and 2010 from 282,000 to 2.5 million, due to the civil rights movement and various changes in government and institutional policies, enrollment since 2010 has declined to 1.9 million because of economic hardship, social issues, and unwelcome campus environments (Adedoyin, 2022). According to the Hispanic Association of

Colleges and Universities (2022), Hispanic student enrollment in higher education continues to grow and is set to increase over 10% by 2026, more than any other racial or ethnic group, but the percentage gap between White and Hispanic students who have attained a bachelor's degree is similar today to what it was a decade ago (U.S. Department of Education [ED], 2022). Of the over 2 million bachelor's degrees conferred in 2020, 61.3% were conferred to White students, 10.2% to Black students, 15.7% to Hispanic students, 8.4% to Asian/Pacific Islander, 0.5% to American Indian/Alaska Native, and 4.0% to two or more races (ED, 2021b).

While underrepresented student groups entering higher education have increased over the years, enrollment and degree completion have not kept up with the same overall demographics of the United States. Underrepresented students have been less likely to retain year-over-year at their institution or reach degree completion, resulting in large unemployment and wealth gaps between racial and ethnic groups (Erwin & Thomsen, 2021). According to the American Council on Education (ACE), between 1997 and 2017 the United States population increased by more than 50 million people, with minority racial and ethnic groups experiencing the largest growth, and undergraduate bachelor's degree attainment increasing 31% overall during the same 20-year timespan (Espinosa et al., 2019). Despite the increase in minority racial and ethnic groups within the United States, underrepresented group college degree attainment has not been comparable. Even though the White population decreased from 71.9% to 61.0% over this 20-year timespan, their bachelor's degree attainment had the largest increase of any racial and ethnic group growing from 17.5% to 23.7% over the same two decades (Espinosa et al., 2019).

Course and Program Modalities

Traditional on-campus higher education continues to maintain enrollment and offer valuable degree programs while providing traditional college-age students a unique social

campus environment and learning experience. While enrollment in higher education has risen over the past few decades, declining national birth rates are requiring institutions to rethink the traditional pipeline of college-age students and look at how better to recruit new students or demographics and to build services to better retain current students year-over-year at their college or university (Cheslock & Jaquette, 2022; Grawe, 2018; Zahneis, 2021). Through the expansion of the internet and technological advancements with the personal computer and cell phone over the past two decades, postsecondary institutions have turned to online education to capture additional enrollment into courses and programs and to increase revenue. Online learning and online degree program offerings have also continued to expand and grow in popularity more recently, giving non-traditional college students the flexibility and opportunity to obtain a degree without the need to leave their jobs or hometowns to take classes (Castro & Tumibay, 2021).

The unexpected interruption and impact of the COVID-19 pandemic on higher education has also resulted in most institutions moving toward hybrid, blended, and/or online learning with an understanding that it may become the new normal (Guppy et al., 2022). As more primary, secondary, and post-secondary schools offer online courses, students will become more familiar with this modality and may begin to view online learning as a normal part of the learning process. The National Council for State Authorization Reciprocity Agreements (NC-SARA) is an organization that offers leadership for the State Authorization Reciprocity Agreement (SARA) on the regulation of distance education programs in collaboration with states, postsecondary institutions, and policymakers. Their recent report of participating institutions on pandemic perspectives found in fall 2019 and fall 2020 (including emergency remote learning impacted by COVID-19) that over 50% of institutions increased their exclusively online learning options; 30% of institutions increased their exclusively online learning enrollment by more than

25%; the percentage of institutions that had exclusively online learning enrollment increased from 5% in fall 2019 to 14% in fall 2020; and that distance education enrollment nearly doubled between fall 2019 and fall 2020 (NC-SARA, 2021). Cheslock and Jaquette (2022) found that the number of students taking online courses increased 22% between the fall 2012 semester and fall 2018, while the number of students taking traditional on-campus courses fell about 9% during the same time. In just the last six years, enrollment in online classes has increased 246% (Kane & Dahlvig, 2022). Traditional college and universities are now looking to maintain a competitive edge and improve their financial position by offering or increasing their offerings in online learning (Cheslock & Jaquette, 2022; Kane & Dahlvig, 2022).

Most of the research conducted on higher education has focused on traditional on-campus learning and students due to its longstanding traditions, expansion, demand, and presence over the years. On-campus courses and degree programs have served as the foundation of academia. They require seated class times on a brick-and-mortar campus where faculty lecture and engage students in a shared learning community on a weekly basis. Until the Industrial Revolution in the twentieth century, traditional college-aged students attended colleges and universities closer to home. As transportation methods advanced (e.g., personal automobile), students began attending institutions at a further distance, but still through the traditional on-campus modality. It was not until the twenty-first century and the innovation of newer technologies that online education opened the door for both traditional and non-traditional college-aged student to attend college from anywhere and at any time.

One of the fastest growing sectors over the last decade of education has been online learning (Cohen & Baruth, 2017; Ginder et al., 2017; Gonzalez-Gonzalez et al., 2020; Seaman et al., 2018). Dziuban et al. (2016) discussed the progression of online education in four phases,

from the launching of the internet in the 1990s, to the development of Learning Management Systems (LMS) software from 2000-2007, to massive open online courses (MOOCs) from 2008-2012, and now more recently the growth of online education over traditional college enrollment. Technology and communication have consistently and rapidly advanced and allowed for higher education to build an infrastructure that supports nontraditional students in furthering their education through online platforms (Palvia et al., 2018). Online learning utilizes the internet and learning management systems to deliver course materials, assignments, announcements and regular communication, faculty-student and student-student interactions, and faculty feedback on assignments. This modality allows faculty and students to be at a distance from one another in both space and time while still meeting the course learning outcomes and program requirements for a college degree. Institutions of higher education have looked to online learning courses and programs to help increase enrollment and revenue (Bryan et al., 2018; Ortagus & Derreth, 2020). Online learning has offered students the opportunity to take courses, learn materials, and engage with their peers through a more flexible schedule as opposed to in-person class sessions and without the need to move to a college campus. If the trend toward online learning continues to increase, it has the potential to reshape the field of higher education.

Student Retention and Satisfaction

Student retention is considered a key indicator of higher education success and if students are not satisfied with their institution, they are less likely to retain in their program year-over-year at the institution (Al Hassani & Wilkins, 2022; Burke, 2019). This is important in higher education as it affects reputation, finances, recruitment, rankings, donors, and other areas that influence the status of an institution. In fact, there has been an institutional shift over the decades from focusing on student outcomes and achievement and more toward graduating students due to

the financial implications of dropout rates (Burke, 2019). Understanding and implementing retention initiatives and services are a must for higher education administrators. While no single issue is the primary reason for student dropout, institutions must review and consider what can be done to limit attrition (Nieuwoudt & Pedler, 2021). Student recruitment already takes up a large portion of institutional resource as it costs approximately three-to-five times as much to recruit a student as it does to retain one at the institution who is already enrolled (Cuseo, 2010). With more educational options and financial assistance available, students are no longer constrained by geographical location or access to funding. Colleges and universities, both public and private, must focus on student retention and overall satisfaction if they want to keep their students.

Retention Models

Proctor et al. (2018) described retention as “a program-controlled variable defined as the degree of direct involvement of student in the academic and social life of their programs” (p. 507). It is important to define retention in the field of education and educational research as it is often confused with persistence. Proctor et al. (2018) described persistence as “a student-controlled variable defined as students’ decision to maintain continuous enrollment in a program” (p. 507). This difference can provide a helpful and clear distinction between retention and persistence. Retention should be viewed as a variable within the control of the institution and where the student returns to the same institution either the next semester or year for continued enrollment. Persistence, however, is a personal decision made by the individual student to return to any postsecondary institution to pursue their college education.

Prior to the 1970s, retention research focused primarily on individual characteristics and demographics of the student instead of social relationships and institutional environment (Burke,

2019). Spady (1970, 1971), one of the first researchers to develop a model on higher education retention, looked at the dropout process within higher education through the application of Durkheim's (1951) theory of suicide and how sociological factors correlate with suicide rates. Spady (1970, 1971) assumed the dropout process was affected by one's family background, which can be linked to academic potential (e.g., performance, grades, etc.) and normative congruence (e.g., intellect, development, support, etc.) in terms of the dispositions, attitudes, and expectations of the individual with the expectations and demands of the institutions. This model associated student's entering college, or a new social structure, with academic potential and normative congruence and their impact on social integration as a mediating factor linked to satisfaction, commitment, and attrition (Spady, 1970, 1971).

Tinto's (1975, 1993) student integration model suggests that students are more likely to retain at the same institution each year if they are personally connected both academically and socially with the institution. If a student feels isolated or disconnected from the institution, they are less likely to reenroll. It is this intellectual engagement and sense of community that Tinto (1993) argues is indicative of student retention. The model views an individual's range of background traits (e.g., family, finances, race/ethnicity, high school GPA, etc.) as an important predictor to initial institutional commitment and desire to graduate, which in turn affects academic performance and social integration. If these indicators do not align and a student does not integrate into the campus environment, they are more likely to withdraw (Tinto's 1975, 1993). Astin (1999) complements Tinto's model through a construct of student involvement. This involvement focuses on the physical and psychological effort that a student puts into their academic studies. It even recommends that institutions look more at what students do and want and less on what educator's or administrator's think is best (Astin, 1999). Both models of student

integration and student involvement look at the needs, actions, and overall satisfaction of the student as a means for retention.

While these previous models concentrated on the traditional student who attended college on-campus, researchers have also looked at models for nontraditional student retention as their enrollment has increased in higher education. Bean and Metzner (1985) focused their attrition model on nontraditional students who, by the nature of their characteristics, lack the usual social integration of traditional students on a college campus. They looked at multiple variables that influence a nontraditional student's level of satisfaction with an institution and desire to retain each year or dropout. These variables include background (e.g., age, enrollment status, goals, etc.), academics (e.g., study habits, advising, course availability, etc.), environmental issues (e.g., finances, employment, family, etc.), and social integration with varying degrees of academic (GPA) and psychological (e.g., satisfaction, commitment, stress, etc.) outcomes. Their primary focus was on the variables and external factors not normally attributed to traditional students (Bean & Metzner, 1985).

Moore (1993) also looked at nontraditional students, specifically distance education students, when he developed the theory of transactional distance, which is based upon three main dimensions: dialogue, structure, and learner autonomy. Transactional distance suggests there is a psychological and communicative, not geographical, space between instructor and learner during the learning process. Dialogue refers to instructor and learner quality of interactions over frequency, structure means the rigidity and flexibility of courses to meet learner needs, and learner autonomy implies the level at which the learner takes control of their learning experience and educational goals (Moore, 1993). It is each of these and their relationships with one another

that affects a nontraditional student's decision to persist, dropout, or even transfer to another institution.

Student Satisfaction

While most student retention theories traditionally focus on academic performance and social integration as reasons for why dropout occurs, few primarily focus on the importance of overall student satisfaction with the institution and its relationship with student success (Astin, 1999; Bean, 1980; Moore, 1993; Spady, 1970, Suhre et al., 2007; Tinto, 1975; Tinto, 1993). Satisfaction has often been used by companies and businesses to gauge customer services, trends, appreciation, and expectations. Kotler and Clarke (1986) defined satisfaction as the state one feels after an experience or outcome that has either been fulfilled or not fulfilled to one's expectations – levels of expectation in connection to perceived performance (Kotler & Clarke, 1986). Higher education has become increasingly like the corporate world in that students are viewed as consumers, resulting in recruitment and retention operating in monetary terms with the understanding that student satisfaction has institutional implications (Strelan et al., 2020). Student satisfaction can be defined by colleges and universities as a perception of the needs and wants of a student being met after participating in any number of campus activities or learning environments (Lin et al., 2008). Taking this into consideration, a focus on student satisfaction may be positively associated with a student's desire to persist in higher education (Strelan et al., 2020).

One cannot look at student satisfaction appropriately without understanding it in terms of the demographics of college students and their current enrollment and retention status.

According to the Ruffalo Noel Levitz 2018 National Student Satisfaction and Priorities Report (2018), the racial and ethnic breakdown of overall student satisfaction at four-year private

colleges and universities varies with Caucasians at 60%, Hispanics at 56%, and African Americans and Asians at 46% percent. The National Student Clearinghouse (2021) found that of the most recent entering freshmen cohort at four-year private institutions, first-year retention by race and ethnicity showed Asians were highest at 90.9%, followed by Caucasians (89.4%) and Hispanics (84.7%) with African Americans persisting at the lowest rate (79.0%). Additionally, the NCES (2021) showed that 2019 graduation rates at four-year postsecondary institutions saw Asians at 73.8%, Caucasians at 63.7%, Hispanics at 52.9%, and African Americans at 40%.

Chen et al. (2014) looked at African American student engagement and satisfaction at both Historically Black Colleges and Universities and predominately White institutions through student responses on the National Survey of Student Engagement (NSSE). Their results found the one engagement measure, of the five provided through the NSSE, that strongly correlated with African American student satisfaction was a supportive campus environment. Their findings support previous literature which found African American students are more satisfied with an institution that provides both specific support programs and welcoming campus climate for underrepresented students (Chen et al., 2014). Yan et al. (2021) studied 2791 undergraduate students from 19 colleges and schools in the southeastern United States on satisfaction and sense of belonging between underrepresented groups and majority groups. They reported that White students scored higher, with a difference that was statistically significant, on a satisfaction survey but were also the largest population in the study. Similarly, White students had a stronger sense of belonging on campus than non-White students, which also had statistically significant results. They found that students with a stronger sense of belonging within the campus environment had a higher satisfaction with the institution, which tended to be White students (Yan et al., 2021).

Recent studies continue to show that underrepresented students are not satisfied with their institutions (Chen et al., 2014; Duran et al., 2020; Einarson & Matier, 2005; Harper & Hurtado, 2007; Lamber et al., 2013; Lin et al., 2019; Milem et al., 2005; Yan et al., 2021). Based upon this literature, it appears underrepresented students' lower satisfaction with higher education is associated with lower enrollment nationwide. In fall 2019, a total of 16.6 million students were enrolled in undergraduate higher education (ED, 2021a). Of those enrolled, 49% were underrepresented students, or non-White, with 21% being Hispanic, 12% being Black, 6% being Asian, and Pacific Islander, American Indian/Alaska Native, and two or more races making up less than 5%. Over a ten-year period, White enrollment decreased by 22% and Black enrollment decreased by 17%, while Hispanic enrollment increased by 48%. During this same time, full-time enrollment decreased by 7% and part-time decreased by 1% (ED, 2021a). While enrollment demographics have shifted slightly over a ten-year period, the majority of enrollment continues to be White students with disproportionate racial and ethnic representation in both enrollment and graduation numbers. Based upon this information, it appears campuses are not adequately addressing the needs and concerns of underrepresented students (Case & Ngo, 2017; Telles & Mitchell, 2018).

Retention and Satisfaction Concerns

There are real and systemic concerns with underrepresented groups not graduating from college, which widens the achievement gap and results in issues with income inequality and workplace diversity (Theobald et al., 2020). Poorer and underrepresented students are often disproportionately burdened with college debt and are more likely to default on loans than wealthy or White students (Glater, 2016; Tran et al., 2018). College tuition and fees have continued to rise over the years but scholarships, grant aid, and family income have not

increased. Recent studies have shown that rising costs and financial literacy deficits have negatively affected underrepresented students (Artavanis & Karra, 2020; Lusardi et al., 2010; Lusardi & Tufano, 2015). College graduates on average earn a considerably larger income over their lifespan than those who graduate with only a high school diploma. While there is still the burden of college debt upon graduation, on average a college graduate's income is more than \$2 million higher or almost double that of a high school graduate (Glater, 2016). Despite the high price tag of a college degree, the financial benefits of having earned a college degree continues to increase and proves to be a good investment for those who persist and graduate (Glater, 2016; Nam, 2021). Colleges and universities need to focus on student satisfaction, retention, and graduation to serve an increasingly more diverse country, as earning a college degree is associated with social mobility, increased earning potential, active citizenship, and a healthier lifestyle (Ma et al., 2019).

Campus Climate

While each institution of higher learning has a unique history and clearly defined mission that is specific to the individual institution, the field of higher education requires both diversity and inclusion to enrich and serve society (Ncube et al., 2018). A campus climate should ideally be one that is accepting and supportive of all students. This is not necessarily the case, however, as student perceptions, experiences, and satisfaction on campus diversity issues vary (Hurtado et al., 1998). While there has been much research on racial and ethnic minorities in higher education, little has historically been conducted on campus racial climates (Hurtado, 1992).

Student retention models have often been limited by their focus on the individual and less on the situation or circumstances of their environment (Llamas et al., 2021; Ishitani & Flood, 2018; Rhee, 2008; Xu & Weber, 2018). Campus climate plays an integral part in college student

achievement and success and requires both research and attention (Karkouti, 2016; Mwangi et al., 2018; Soria, 2018). Peterson and Spencer (1990) developed a framework to examine higher education climate and culture based upon their understanding of organizational theory and concepts. They interpreted culture as the dominate assumptions and ideologies that bring an institution together and climate as common attitudes and opinions held by members of the academic community (Peterson & Spencer, 1990). It is through the culture and climate of a college or university that students find themselves feeling either accepted or rejected. Peterson and Spencer (1990) encouraged institutions to conduct internal research to better understand their culture and climate, how it affects students both positively and negatively, and to use that research to build supportive institutional structures for systematic success.

One cannot evaluate campus climate today and not consider or research the issues of campus diversity. Those with privilege or power, unfortunately, tend to view campus climate in a positive light while those who are underrepresented have a more negative view (Harper & Hurtado, 2007). Research over the past few decades has shown that underrepresented groups are less likely to find college campuses as welcoming environments which influences their success (Buck & Patel, 2016; Crosson, 1988; Edgert, 1994; Hall & Sandler, 1984; Hart & Fallabaum, 2008; Hurtado & Carter, 1997; Telles & Mitchell, 2018). Despite positive changes in legislation, institutional rhetoric, and public opinion, underrepresented students continue to express feelings of being marginalized on a college campus (Harper et al., 2008; Harper & Hurtado, 2007; Telles & Mitchell, 2018; Rodríguez et al., 2018).

Campus Racial Climate Framework

Hurtado's (1992) seminal work on the topic is frequently cited and used as a reference when studying campus climate. At the time of Hurtado's (1992) study, little research had been

conducted on campus climate and race relations in terms of underrepresented student persistence, academic achievement, and social involvement. While Title IV, the civil rights movement, *Brown v. the Board of Education*, affirmative action, and social movements have sought to increase underrepresented student enrollment in education, institutions have not necessarily cultivated a campus climate or provided support services that are conducive to diverse student groups. This has been reflected in past and current higher education enrollment, retention, and graduation numbers. Hurtado (1992) suggested that campus climate issues are not merely infrequent occurrences or abnormalities across college and university campuses, but a broader systemic issue of unresolved racial conflict, as higher education has sought to admit more underrepresented students but done little to provide targeted support services for a more diverse student body.

It was not until a few years later that Hurtado et al. (1998) developed a framework for understanding and enhancing campus climate to aid in educational policy and practice. The authors originally identified four specific dimensions to their campus climate framework; institutional context and historical legacy of inclusion or exclusion; structural diversity and its impact on students; a psychological dimension of climate and its impact on students; and a behavioral dimension of climate and its impact on students. An additional dimension, compositional diversity, was later added to the framework after further research was conducted by Milem et al. (2004), Milem et al. (2005), and Hurtado et al. (2008) and it was determined there was a need for understanding on-campus numerical and proportional representation of various racial and ethnic groups. Through this framework, it is believed colleges and universities can act after better understanding their campus diversity and its impact on students. While diversifying enrollment is important, it should not be the only diversity initiative. Hurtado et al.

(1998) stressed the importance of increasing underrepresented groups at all levels to shift the psychological and behavioral climate structurally and culturally toward more inclusive practices while emphasizing the value of racial and ethnic diversity.

The first dimension of Hurtado et al.'s (1998) framework, institutional context and history legacy of inclusion or exclusion, focused on the historical segregation of higher education institutions and the settings and policies that exist and still benefit, though not always recognized, some students and not others. Historically Black Colleges and Universities (HBCUs), American Indian colleges (AICs), and Hispanic-serving institutions (HSIs) have worked to serve underrepresented groups or those previously excluded from admissions and fair better with student success and satisfaction (Hurtado et al., 1998). The intent and purpose behind desegregation, however, was to improve campus diversity and composition while affording greater opportunities through inclusion at all institutions, primarily predominantly White institutions (PWIs), which tend to serve and educate most underrepresented students. This piece of the framework requires institutions to look at their history considering current objectives through the lens of increasing underrepresented students' representation (Hurtado et al., 1998).

The second dimension of the framework presented by Hurtado et al. (1998), structural diversity and its impact on students, encourages colleges and universities to take active steps to place diversity initiatives at the center of the institution's campus climate. A campus that is predominately one race reasonably has fewer socially diverse groups, which can result in underrepresented students' being stereotyped or certain social stigmas increased causing those in the minority varying levels of stress and anxiety (Hurtado et al., 1998). By increasing diversity enrollment and prioritizing diversity initiatives, institutions can show the importance of multiculturalism, which in turn helps support current underrepresented students while recruiting

more. Simply increasing representation of diversity on campus alone, however, is not enough. Institutions must also promote structural diversity through inter-racial dialogue, collaboration, and socialization to foster a campus climate that is conducive and demonstrative of the people they are trying to serve (Hurtado et al., 1998).

The third aspect of the campus climate framework authored by Hurtado et al. (1998), a psychological dimension of climate and its impact on students, looks at individual views and perceptions of relationships between diverse groups. This dimension includes all stakeholders from an institution including students, staff, faculty, and administrators. An individual's position within an institution and what they are exposed to will influence their perceptions of the campus climate (Hurtado et al., 1998). It is these perceptual differences that affect student success and have some of the greatest consequences on underrepresented students, especially views of discriminatory or hostile environments. If the perceptions of a campus climate are negative for certain groups of students, it will likely result in underrepresentation in the demographics of student enrollment and graduation rates. Peer group interactions, influences, and racial attitudes have the greatest impact on underrepresented student socialization and retention (Hurtado et al., 1998).

The fourth aspect of Hurtado et al.'s (1998) framework, a behavioral dimension of climate and its impact on students, includes the general social interaction of students, interactions between groups of different racial and ethnic backgrounds, and the overall intergroup relationships on campus. If a campus has poor race relations, limited social interactions, and racial/ethnic groups separate themselves from each other, it fosters a negative campus racial climate. Institutions that foster diversity and create a multicultural campus see better student performance. This can often be done using racial/ethnic organizations where students find

community and socialize leading to greater student support on campus and the awareness or desire to engage with others such groups (Hurtado et al., 1998).

The added fifth dimension by Milem et al. (2005), compositional diversity, refers to the different groups of people that make up a campus environment. It looks at the structural breakdown of diversity within student enrollment and employee representation across racial and ethnic groups. It is believed that as students from different racial and ethnic groups engage with other students, faculty, and staff from different backgrounds, the compositional diversity of the campus increases. The importance of compositional diversity is not just to create a strong internal environmental through policies and programs that improve the climate, but to serve as an external indicator that an institution prioritizes diversity and fosters a healthy campus racial climate (Milem et al., 2005).

Summary

It has been decades since Hurtado's (1992) original work on campus climate and racial conflicts from the 1980s, but similar tensions remain on today's college campuses, meaning more work needs to be done (Abrica et al, 2023; Alvarado & Hurtado, 2021; Puntí & Dingle, 2021; Wright-Mair & Museus, 2021). According to the National Association for College Admission Counseling (NACAC), while higher education seeks to increase diversity, professionals working the field are still predominantly White with administrators at 86%, chief enrollment officers at 82%, chief admissions officers at 81%, NACAC members at 73%, and college admissions officers at 71% (Jaschik, 2022). This has not gone unnoticed. The appointment of chief diversity officers in higher education has significantly grown in recent years as colleges and universities place more resources and attention on the need to address and advocate for diversity, equity, and inclusion on campuses across the country (Parker, 2020). This

position is considered the most important role in shaping the vision and culture of campus climate in terms of issues on race and diversity. By the 2019-20 academic year, 68.7% of major higher education institutions had someone in this position, showing the need and attention placed on underrepresented students on college campuses (Bradley et al., 2022).

The literature shows the importance of a positive campus racial climate and need for higher education administrators to focus on policies and programs that will benefit underrepresented student groups and their ability to graduate. As racial and ethnic populations continue to increase and diversify within the United States and in postsecondary enrollment, ongoing research must be conducted on underrepresented students and on what benefits their enrollment and helps them earn a college degree. Since a college degree is a means to more financial wealth and social mobility, and online higher education and enrollment in online courses and programs has continued to increase, research is needed on whether the absence of traditional campus climate barriers through an online program delivery model may positively affect underrepresented student satisfaction, retention, and graduation rates.

Chapter 3: Research Methods

In response to a lack of data and research that examines underrepresented student perceptions and success between instructional modalities (on-campus and online), specifically for undergraduate students at a single four-year, non-profit private institution, the purpose of this research was to study whether the absence of traditional on-campus climate barriers through asynchronous online education help underrepresented students in increased college satisfaction, retention, and obtaining a college degree. If enrollment in online degree programs is shown to be associated with higher satisfaction, retention, and graduation rates for underrepresented groups, it could provide new direction for postsecondary institutions, promote equitable access for all students, and open employment opportunities for students who may have otherwise struggled to do so through a traditional college campus. Chapter Three provides an overview and description of the research questions, research design, population and selection of the sample, data collection process, instruments used, and proposed data analyses.

Research Questions

To examine student satisfaction, retention, and graduation rates across instructional modalities and for student racial/ethnic groups at the single institution being studied, the following six research questions were asked.

Research Question 1: To what extent does instructional modality predict undergraduate students' reports of satisfaction with the institution?

Research Question 2: To what extent does instructional modality predict undergraduate students' retention year-over-year?

Research Question 3: To what extent does instructional modality predict undergraduate students' graduation rates?

Research Question 4: To what extent does instructional modality based on race/ethnicity predict undergraduate students' reports of satisfaction with the institution?

Research Question 5: To what extent does instructional modality based on race/ethnicity predict undergraduate students' retention year-over-year?

Research Question 6: To what extent does instructional modality based on race/ethnicity predict undergraduate students' graduation rates?

Research Design

This research followed a non-experimental, descriptive research design that utilized archived web-based survey results and institutional data on retention and graduation for underrepresented students. Information for each research question were requested from and gathered by the participating institution and data provided to the researcher through Microsoft Excel. To analyze the coded data and conduct statistical tests for each research question, the most current version of the software product IBM® Statistical Package for the Social Sciences (SPSS) was employed. This software is widely used and accepted within the social sciences and educational research. It aids in complex analyses and produces necessary results, charts, and graphs for researcher interpretation (Rahman & Muktadir, 2021). Results provide descriptive statistics, charts, and visuals to help the researcher explore potential predictions between and among the predictive independent variables and outcome dependent variables and whether there are any statistically significant differences.

Population and Sample

The population for this study is confined to those students who were enrolled in either exclusively on-campus or exclusively asynchronous online degree programs at a single, regionally accredited, predominantly White institution of higher education located in the

southeastern United States. According to Carnegie Classification, the institution's size and setting is a private, not-for-profit, four-year, large, and primarily nonresidential university (Carnegie, n.d.). For research question one, the sample contained the set of students enrolled in traditional on-campus and asynchronous online degree programs between academic years 2014-2015 through 2021-2022 and who voluntarily completed the institutionally administered surveys during the fall semesters of 2014, 2017, and 2020. For research questions two and three, the sample contained all students enrolled in traditional on-campus and asynchronous online degree programs between academic years 2014-2015 through 2021-2022. For research question four, the sample contained only the set of students, coded by race/ethnicity, enrolled in traditional on-campus and asynchronous online degree programs between academic years 2014-2015 through 2021-2022 and who voluntarily completed the institutionally administered surveys during the fall semesters of 2014, 2017, and 2020. For research questions five and six, the sample contained all students, coded by race/ethnicity, enrolled in traditional on-campus and asynchronous online degree programs between academic years 2014-2015 through 2021-2022.

To study student satisfaction, the sample included only those students who completed one of two institutional surveys. Two survey instruments, both designed by the Ruffalo Noel Levitz organization which fall under their Satisfaction-Priorities Surveys (SPS) category, were administered during the fall semester in 2014, 2017, and 2020 with one completed by exclusively on-campus students and the other by exclusively online students to measure student perceptions on importance of and satisfaction with institutional performance. To accommodate students in either instructional modality, the SSI is administered to students in traditional on-campus degree programs and the PSOL is administered to students in online or distance education degree programs.

To study student retention and graduation rates, the sample included students enrolled in either traditional on-campus or asynchronous online degree programs enrolled from the 2014-2015 to 2021-2022 academic years. Retention is designated as continued enrollment year-over-year at one institution (enrolling fall-to-fall, spring-to-spring, or summer-to-summer). Graduation rates, defined as outcome measures for this study, refer to a degree-seeking undergraduate students who are either first-time, full-time, or part-time, non-first time (transfer-in) who started and finished at an institution within an 8-year award rate (ED, n.d.). The purpose for the outcome measures definition is to expand, capture, and accommodate the collection of data on students by including transfer, part-time, and non-traditional students. Outcome measures, as means for graduation rates, were developed in a response to the ED's desire to broaden the coverage of data that reflect the more diverse student population of higher education that are often unobserved by traditional graduation rate definitions and provide a more accurate picture of college students today (Bransberger & Falkenstern, 2018; Juszkievicz, 2020).

Data Collection

For research questions one and four, the SSI and PSOL surveys were administered through the institution's Office of Institutional Effectiveness. Completed survey responses and student information were collected and stored by this same office. For research questions two, three, five, and six undergraduate degree instructional modality, retention, graduation rate data, and student racial/ethnic group information are stored and housed through the institution's Banner student information system and maintained by the Office of the University Registrar.

After Institutional Review Board (IRB) approval, the researcher completed an information services data request form that involved the Office of Institutional Effectiveness for survey results, the Office of the Registrar for student racial/ethnic group, retention, and

graduation rates, and the institution's Department of Analytics and Decision Support which worked with the other two offices to align survey results with student files and retention and graduation rate per definitions. The Department of Analytics and Decision Support collected and compiled the information, deidentify and coded student data Microsoft Excel, and emailed documents to the researcher. The Excel contained SSI and PSOL survey data from the fall 2014, 2017, and 2020 academic semesters administered (21 survey question with total scores per student and dichotomized with 0 = low satisfaction and 1 = high satisfaction) that are aligned with student racial/ethnic group information (1 = White, 2 = Black or African American, 3 = Hispanic or Latino, 4 = Asian, 5 = Two [*sic*] or more races , 6 = American Indian or Alaska Native, and 7 = Native Hawaiian or Other Pacific Islander), undergraduate degree instructional modality (0 = Online and 1 = on-campus), retention status (0 = did not retain year-over-year at the institution, 1 = did retain year-over-year at the institution), and graduation based upon outcome measures (0 = did not graduate, 1 = did graduate). The timeframe of collecting eight academic years' worth of data is used in this study to accommodate three cycles of the Ruffalo Noel Levitz Satisfaction-Priorities Surveys (SSI and PSOL) data in connection with retention rates and student graduation cohorts using the accepted Integrated Postsecondary Education Data System (IPEDS) definition of outcome measures for graduation rates.

Instrumentation

Two Ruffalo Noel Levitz survey instruments (SSI and PSOL) were used in this study to collect student satisfaction based upon their perceptions on institutional performance by instructional modality and racial/ethnic groups. Only the 21 comparable survey questions across the SSI and PSOL, with student responses, have been used for this study. The additional questions on each survey that are specific and unique to instructional modality were not used for

this study due to the exclusive nature of their content. Retention and graduation data did not require an instrument and were collected directly from the participating institution.

According to Ruffalo Noel Levitz (2019a), the SSI is a reliable instrument with a Cronbach's coefficient alpha of .98 on satisfaction scores, with a three-week test-retest reliability coefficient of .84 for satisfaction. The PSOL was developed from the SSI and contains acceptable reliability as well. In their pilot study, the PSOL showed an acceptable reliability through a Cronbach alpha coefficient of 0.77. Both the SSI and PSOL show acceptable validity in comparison to the College Student Satisfaction Questionnaire (CSSQ) with a Pearson correlation of $r = .71$; $p < .00001$ (Ruffalo Noel Levitz, 2019b).

The SSI and PSOL were both administered as completely online, digital surveys and were emailed with multiple reminders to eligible students through an institution-wide campaign during the fall semester in 2014, 2017, and 2020 with the request for enrolled students to complete them on a volunteer basis. Students were able to complete their surveys anywhere internet access was available. Datasets from both surveys were collected and stored by the institution's Office of Institutional Effectiveness for cohort and longitudinal assessment.

The SPS surveys' goal was to measure student reports of instructional performance on academic and institutional services, student experiences inside and outside the classroom, and student institutional attitudes to provide data for colleges and universities to assess and take steps towards continuous improvement. For each survey, students were asked a series of questions with response items containing a Likert-scale (e.g., Very Satisfied = 7, Satisfied = 6, Somewhat Satisfied = 5, Neutral = 4, Somewhat Dissatisfied = 3, Not Very Satisfied = 2, and Not Satisfied at All = 1). A low score consisted of ratings within the Neutral = 4, Somewhat Dissatisfied = 3, Not Very Satisfied = 2, and Not Satisfied at All = 1 category and a high score consisted of

ratings within the Very Satisfied = 7, Satisfied = 6, and Somewhat Satisfied = 5 category. This grouping into low/high rankings created a dichotomous dependent variable for research questions one and four.

Data Analysis

Data on student satisfaction, retention, graduation, instructional modality, and race/ethnicity were stored by and collected through the participating institution using Microsoft Excel. The data were provided to the researcher and analyzed using Statistical Package for the Social Sciences (SPSS) software. Analysis of the quantitative data and research method relied upon a binomial logistic regression for each research question to determine whether potential predictions can be determined between different variables.

Chapter 4: Findings

This study sought to understand what relationships, if any, exist in undergraduate student satisfaction, retention, and graduation rates across the instructional modalities of fully on-campus and fully online degree programs, as well as whether these three rates differ based upon racial and ethnic groups. Success for each rate included high satisfaction scores, first year retention year-over-year, and degree completion within an eight-year award rate. This study sought to answer the following research questions.

Research Question 1: To what extent does instructional modality predict undergraduate students' reports of satisfaction with the institution?

Research Question 2: To what extent does instructional modality predict undergraduate students' retention year-over-year?

Research Question 3: To what extent does instructional modality predict undergraduate students' graduation rates?

Research Question 4: To what extent does instructional modality based on race/ethnicity predict undergraduate students' reports of satisfaction with the institution?

Research Question 5: To what extent does instructional modality based on race/ethnicity predict undergraduate students' retention year-over-year?

Research Question 6: To what extent does instructional modality based on race/ethnicity predict undergraduate students' graduation rates?

Data Collection

Data for this study were collected using archived information through institutional databases between the academic years 2014-15 through 2021-22 by means of set parameters and definitions. Each of the data points was collected, matched, and recorded on Microsoft Excel

with student identifiers removed and provided to the researcher by the participating institution.

The data provided conformed to the following:

- Responses from two separate satisfaction surveys, developed by Ruffalo Noel Levitz Satisfaction-Priorities Surveys, that were administered three times during the prescribed academic years were gathered in Microsoft Excel which contained student demographic information, instructional modality, survey questions, and Likert scale responses on 21 comparable questions across the two surveys that were coded as low or high satisfaction.
- Retention rate, based upon a definition of retained year-over-year from one semester and continued to the same semester the following academic year, by first-time enrolled at the institution between the prescribed academic years were gathered on Microsoft Excel which contained student demographic information, instructional modality, and coded by did not retain (year-over-year) or did retain (year-over-year).
- Graduation rate, based upon the IPEDS definition of Outcome Measures, by student that enrolled anytime during the prescribed academic years were gathered on Microsoft Excel which contained student demographic information, instructional modality, and coded by did not graduate or did graduate.

The timeframe of data collection was determined by the participating institution and occurred after a data request was submitted, reviewed, and prioritized based upon time of year and other institutional needs or demands. The range of time from data request to data received by the researcher was two months. Upon collection by the researcher, the data were analyzed using the IBM Statistical Package for the Social Sciences (SPSS®) Version 29 by correlating data points from Microsoft Excel with each of the corresponding research question variables. A logistic regression was used for each research question to determine whether relationships existed

between and/or among the selected variables. For the first three research questions, the data on students' reports of satisfaction with the institution, student retention, and student graduation were divided out and analyzed by instructional modality. For the last three research questions, the data on students' reports of satisfaction with the institution, student retention, and student graduation were divided out and analyzed by instructional modality and student racial/ethnic group respectively.

Population and Sample

The population of interest for this research contained undergraduate students admitted and enrolled in either a fully on-campus or online academic degree program at a single, four-year, private institution during the academic years 2014-15 through 2021-22. The datasets included undergraduate student survey completers, their retention year-over-year, and whether they graduated within an eight-year award rate across two instructional modalities by racial/ethnic groups at a single institution. Descriptive statistics for each research question are included in the results section.

The survey instruments were designed with the goal of measuring students' levels of importance and levels of satisfaction on academic and institutional services, student experiences inside and outside the classroom, and student institutional perceptions. The study measured student retention as defined by the National Center for Educational Statistics (NCES), described as continued enrollment year-over-year at one institution. Graduation rate, defined as outcome measures for this study, refers to a degree-seeking undergraduate student who is either first-time, full- or part-time, non-first time (transfer-in) who started and finished at an institution within an eight-year award rate (United States Department of Education, n.d.). Participants were included in this study if they were enrolled at the institution during the prescribed academic years.

Data Analysis

Data were collected, stored, and archived by the participating institution over the eight academic year timeframe for this study and were queried and provided to the research within two months their request. Multiple dependent and independent variables, some of which were recoded once obtained by the research through Microsoft Excel, were requested using prescribed definitions for data analysis. Once recoded, data were analyzed via binomial logistic regression analyses to determine the predictive value of the independent variables of instructional modality of online and on-campus and racial/ethnic groups on the dependent variables of satisfaction, retention, and graduation at a single institution.

Variables

The dataset included instructional modality and racial/ethnic groups as independent predictor variables and student satisfaction, retention, and graduation as dependent outcome variables. The independent variables were classified as categorical and consisted of the instructional modalities of online or on-campus for research questions one through three and racial/ethnic groups across instructional modality of online or on-campus for research questions four through six. For research questions one through three, the selected reference variable for the analysis on the independent variable of instructional modality was online students due to having a higher student population. For research questions four through six, the selected reference variable for analysis on the independent variable of race/ethnicity was students who identified as White due to having a higher student population. Each variable was coded as shown in Table 1.

Table 1*Independent Variable Names and Categories by Codes*

| INSTRUCTIONAL MODALITY | | RACE/ETHNICITY | |
|-----------------------------|------|-------------------------------------|------|
| Category | Code | Category | Code |
| Online (Reference Variable) | 0 | White (Reference Variable) | 1 |
| On-campus | 1 | Black or African American | 2 |
| | | Hispanic or Latino | 3 |
| | | Asian | 4 |
| | | Two [<i>sic</i>] or more | 5 |
| | | American Indian or Alaskan Native | 6 |
| | | Native Hawaiian or Pacific Islander | 7 |

The dependent variables were classified as dichotomous and consisted of satisfaction level of low/high for research questions one and four; did not retain (year-over-year)/did retain (year-over-year) for research questions two and five; and did not graduate/did graduate for research questions three and six. Each variable was coded accordingly as shown in Table 2.

Table 2*Dependent Variable Names by Codes*

| Variable Name | SATISFACTION | | RETENTION | | GRADUATION | |
|-------------------|--------------|------|----------------|------------|------------------|--------------|
| | Low | High | Did Not Retain | Did Retain | Did Not Graduate | Did Graduate |
| Student Indicator | | | | | | |
| Code | 0 | 1 | 0 | 1 | 0 | 1 |

For data preparation of both Research Questions One and Four, the dependent variable or original 7-point Likert scale of student satisfaction with institution was first trichotomized by collapsing the 1-3 responses for low satisfaction and 5-7 responses for high satisfaction, resulting in a 3-point response scale of 1 = low satisfaction, 2 = neutral, and 3 = high satisfaction. The data were further collapsed by merging the low satisfaction and neutral responses into a single category resulting in the dichotomized satisfaction scale of 0 = low and 1 = high, as shown in

Table 3. This method of collapsing or rescaling data points of a Likert scale into dichotomous data for statistical analysis has been utilized in numerous preceding studies (Ayres et al., 2019; Grimbeek et al., 2005; Jeong & Lee, 2016; Khalafallah et al., 2020; Masselink et al., 2020; VanLangen et al., 2019).

Table 3

Collapsing Likert Scale into Dichotomous Response Data

| | | | | | | | |
|-------------------|----|----|----|----|-----|-----|-----|
| Original 7-Point | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Total Score Range | 21 | 42 | 63 | 84 | 105 | 126 | 147 |
| Trichotomized | | 1 | | 2 | | 3 | |
| Dichotomized | | | 0 | | | 1 | |

The two surveys that were employed measured students' reports of satisfaction with the institution based upon instructional modality. The surveys were paired with 21 similar items on each. The survey questions had a high level of internal consistency, as determined by a Cronbach's alpha of 0.948 for just the online survey, 0.916 for just the on-campus survey, and 0.932 for the comparable online and on-campus survey questions combined. This is based upon the recommended values of 0.7 or higher serving as a good level of internal consistency (DeVillis, 2003; Kline, 2005).

Binomial Logistic Regression

To answer each research question, the data were analyzed using a binomial logistic regression to predict potential relationships between the categorical independent variables and the dichotomous dependent variables. This statistical analysis was appropriate as it investigated all research questions with a dependent variable that was binary and included one or more independent variables that were categorical (Warner, 2013). The following assumptions (Laerd, 2018) for each research question were met by the researcher when conducting the study:

- The one dependent variable was dichotomous.
- One or more independent variables were nominal or categorical.
- There was independence of observations, and the dichotomous dependent variable and nominal independent variables were mutually exclusive and exhaustive.
- A minimum of 15 cases per independent variable was met.
- There were no continuous independent variables, resulting in no need to test for the assumption of linearity through log odds transformation (logit).
- There was no multicollinearity as only one independent variable was used.
- There were no significant outliers.

Findings

The findings from the statistical analysis discussed above are arranged and presented below for each research question.

Research Question One

The first research question was designed to examine students' reports of satisfaction with the institution through two 7-point Likert scale surveys administered three separate times over eight academic years. The surveys were given to students enrolled at one institution based upon their instructional modality of either fully on-campus and fully online. A single binomial logistic regression was run to test the predictive value of the independent variable of instructional modality on the dependent variable of students' reports of satisfaction with the institution.

Data Screening

The researcher sorted the data and scanned for inconsistencies on each variable. No data errors or inconsistencies were identified. Casewise diagnostics were used to examine for extreme

outliers, which are cases with standardized residuals greater than 2.5. No outliers were identified, as indicated in Table 4, so all data were retained.

Table 4

Casewise diagnostics: RQ1

Casewise List^a

a. The casewise plot is not produced because no outliers were found.

Descriptive Statistics

Descriptive statistics were obtained for the independent variable revealed a sample of 15,006 participants and a breakdown of the frequency count and percentage for each category is shown in Table 5.

Table 5

Descriptive Statistics: RQ1

| | <i>N</i> | % |
|-----------|----------|------|
| Online | 8173 | 54.5 |
| On-campus | 6833 | 45.5 |
| Total | 15006 | 100 |

Results

A binomial logistic regression was conducted to determine whether students’ reports of satisfaction with the institution can be predicted by instructional modality. The logistic regression model was statistically significant, $\chi^2(1) = 14.571, p = <.001$ as shown in Table 6.

Table 6*Omnibus Tests of Model Coefficients: RQ1*

| | | Chi-square | df | Sig. |
|--------|-------|------------|----|-------|
| Step 1 | Step | 14.571 | 1 | <.001 |
| | Block | 14.571 | 1 | <.001 |
| | Model | 14.571 | 1 | <.001 |

The Hosmer and Lemeshow Test was run but provided results ($p = .$), as shown in Table 7. When only one categorical predictor variable is used in a binomial logistic regression, this test is not valid (Hosmer et al., 2013).

Table 7*Hosmer and Lemeshow Test: RQ1*

| Step | Chi-square | df | Sig. |
|------|------------|----|------|
| 1 | .000 | 0 | . |

The model was weak and explained only .1% (Nagelkerke R^2) of the variance in students' reports of satisfaction with the institution, as shown in Table 8, and correctly classified 73.8% of cases.

Table 8*Model Summary: RQ1*

| Step | -2 Log likelihood | Cox & Snell R Square | Nagelkerke R Square |
|------|------------------------|----------------------|---------------------|
| 1 | 17243.228 ^a | .001 | .001 |

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Sensitivity, which is the percentage of cases correctly predicted to have the observed characteristic (high satisfaction) in the model (Laerd, 2018), was 100%, specificity, which is the percentage of cases correctly predicted to not have the observed characteristic (low satisfaction)

in the model (Laerd, 2018), was 0% (as shown in Table 9), positive predictive value was 73.8%, and negative predictive value was 0%.

Table 9

Classification Table^a: RQ1

| Observed | | Predicted | | Percentage Correct |
|--------------------|------------------|--------------|-------|--------------------|
| | | Satisfaction | | |
| | | Low | High | |
| Step 1 | Satisfaction Low | 0 | 3930 | .0 |
| | High | 0 | 11076 | 100.0 |
| Overall Percentage | | | | 73.8 |

a. The cut value is .500

The predictor variable of instructional modality was statistically significant as shown in Table 10 below. Students in the online instructional modality were 1.15 times more likely to report high satisfaction with the institution when compared to students in the on-campus instructional modality.

Table 10

Logistic Regression Predicting Students' Reports of Satisfaction with Institution by Instructional Modality

Variables in the Equation

| | | | | | | | 95% C.I. for EXP(B) | | |
|---------------------|--------------------|-------|------|----------|----|-------|---------------------|-------|-------|
| | | B | S.E. | Wald | df | Sig. | Exp(B) | Lower | Upper |
| Step 1 ^a | On-campus Modality | -.142 | .037 | 14.585 | 1 | <.001 | .868 | .807 | .933 |
| | Constant | 1.102 | .026 | 1857.945 | 1 | <.001 | 3.010 | | |

a. Variable(s) entered on step 1: Modality.

Research Question Two

The second research question was designed to examine year-over-year retention at the institution which offered academic programs in the fully on-campus and fully online instructional modalities. A single binomial logistic regression was run to test the predictive value of the independent variable of instructional modality on the dependent variable of year-over-year retention.

Data Screening

The researcher sorted the data and scanned for inconsistencies on each variable, and no data errors or inconsistencies were identified. Casewise diagnostics were used to examine for extreme outliers, which are cases with standardized residuals greater than 2.5. No outliers were identified, as indicated in Table 11, so all data were retained.

Table 11

Casewise diagnostics: RQ2

Casewise List^a

a. The casewise plot is not produced because no outliers were found.

Descriptive Statistics

Descriptive statistics were obtained on the independent variable. The sample consisted of 116,589 participants and a breakdown of the frequency count and percentage for each category is found in Table 12.

Table 12*Descriptive Statistics: RQ2*

| | <i>N</i> | % |
|-----------|----------|------|
| Online | 86535 | 72.2 |
| On-campus | 30054 | 25.8 |
| Total | 116589 | 100 |

Results

A binomial logistic regression was conducted to determine whether year-over-year retention can be predicted by instructional modality. The logistic regression model was statistically significant, $\chi^2(1) = 7573.271, p = <.001$, as shown in Table 13.

Table 13*Omnibus Tests of Model Coefficients: RQ2*

| | | Chi-square | df | Sig. |
|--------|-------|------------|----|-------|
| Step 1 | Step | 7573.271 | 1 | <.001 |
| | Block | 7573.271 | 1 | <.001 |
| | Model | 7573.271 | 1 | <.001 |

The Hosmer and Lemeshow Test was run but did not provide results ($p = .$), as shown in Table 14. When only one categorical predictor variable is used in a binomial logistic regression, this test is not valid (Hosmer et al., 2013).

Table 14*Hosmer and Lemeshow Test: RQ2*

| Step | Chi-square | df | Sig. |
|------|------------|----|------|
| 1 | .000 | 0 | . |

The model explained 8.6% (Nagelkerke R^2) of the variance in year-over-year retention, as shown in Table 15, and correctly classified 63.2% of cases.

Table 15

Model Summary: RQ2

| Step | -2 Log likelihood | Cox & Snell R Square | Nagelkerke R Square |
|------|-------------------------|----------------------|---------------------|
| 1 | 145809.113 ^a | .063 | .086 |

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Sensitivity was 100%, specificity was 0%, as shown in Table 16, positive predictive value was 63.2%, and the negative predictive value was 0%.

Table 16

Classification Table^a: RQ2

| | | Predicted | | | |
|--------------------|--------|------------|------------------|--------------------|--------------|
| | | Graduation | | Percentage Correct | |
| Observed | | | Did Not Graduate | | Did Graduate |
| | Step 1 | Retained | Did Not Retain | 0 | 42885 |
| Next Year | | Did Retain | 0 | 73704 | 100.0 |
| Overall Percentage | | | | | 63.2 |

a. The cut value is .500

The predictor variable of instructional modality was statistically significant as shown in Table 17. Students in the on-campus instructional modality were 3.85 times more likely to retain year-over-year than students in the online instructional modality.

Table 17*Logistic Regression Predicting Year-Over-Year Retention by Instructional Modality**Variables in the Equation*

| | | B | S.E. | Wald | df | Sig. | Exp(B) | 95% C.I. for EXP(B) | |
|---------------------|-----------------------|-------|------|----------|----|-------|--------|------------------------|-------|
| | | | | | | | | Lower | Upper |
| Step 1 ^a | On-campus Modality | 1.347 | .017 | 6368.763 | 1 | <.001 | 3.847 | 3.721 | 3.976 |
| | Constant | .252 | .007 | 1356.946 | 1 | <.001 | 1.287 | | |

a. Variable(s) entered on step 1: Modality.

Research Question Three

The third research question was designed to examine graduation outcome measures of an eight-year award rate at one institution which offered academic programs in the fully on-campus and fully online instructional modalities. A single binomial logistic regression was run to test the predictive value of the independent variable of instructional modality on the dependent variable of graduation outcome measures.

Data Screening

The researcher sorted the data and scanned for inconsistencies on each variable, and no data errors or inconsistencies were identified. Casewise diagnostics were used to examine for extreme outliers, which are cases with standardized residuals greater than 2.5. No outliers were identified, as indicated in Table 18, so all data were retained.

Table 18

Casewise diagnostics: RQ3

Casewise List^a

a. The casewise plot is not produced because no outliers were found.

Descriptive Statistics

Descriptive statistics were obtained on the categorical independent variable. The sample consisted of 103,241 participants and a breakdown of the frequency count and percentage of each category is found in Table 19.

Table 19

Descriptive Statistics: RQ3

| | <i>N</i> | % |
|-----------|----------|------|
| Online | 76056 | 73.7 |
| On-campus | 27185 | 26.3 |
| Total | 103241 | 100 |

Results

A binomial logistic regression was conducted to determine whether graduation outcome measures can be predicted by instructional modality. The logistic regression model was statistically significant, $\chi^2(1) = 5565.706, p = <.001$, as shown in Table 20.

Table 20*Omnibus Tests of Model Coefficients: RQ3*

| | | Chi-square | df | Sig. |
|--------|-------|------------|----|-------|
| Step 1 | Step | 5565.706 | 1 | <.001 |
| | Block | 5565.706 | 1 | <.001 |
| | Model | 5565.706 | 1 | <.001 |

The Hosmer and Lemeshow Test was run but did not provide results ($p = .$), as shown in Table 21. When only one categorical predictor variable is used in a binomial logistic regression, this test is not valid (Hosmer et al., 2013).

Table 21*Hosmer and Lemeshow Test: RQ3*

| Step | Chi-square | df | Sig. |
|------|------------|----|------|
| 1 | .000 | 0 | . |

The model explained 7.2% (Nagelkerke R^2) of the variance in graduation outcome measures, as shown in Table 22, and correctly classified 66.9% of cases.

Table 22*Model Summary: RQ3*

| Step | -2 Log likelihood | Cox & Snell R Square | Nagelkerke R Square |
|------|-------------------------|----------------------|---------------------|
| 1 | 128506.934 ^a | .052 | .072 |

a. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Sensitivity was 40.4%, specificity was 81.3% (as shown in Table 23), positive predictive value was 54.1%, and negative predictive value was 71.4%.

Table 23*Classification Table^a: RQ3*

| | | Predicted | | |
|--------------------|------------------|--------------|-------|--------------------|
| | | Graduation | | Percentage Correct |
| Observed | Did Not Graduate | Did Graduate | | |
| Step 1 | Graduation | 54324 | 12467 | 81.3 |
| | OM | 21732 | 14718 | 40.4 |
| Overall Percentage | | | | 66.9 |

a. The cut value is .500

The predictor variable of instructional modality was statistically significant as shown in Table 24. Students in the on-campus instructional modality were 2.95 times more likely to graduate within an eight-year award rate when compared to students in the online instructional modality.

Table 24*Logistic Regression Predicting Graduation Outcome Measures by Instructional Modality**Variables in the Equation*

| | | | | | | | 95% C.I. for EXP(B) | |
|---|-------|------|-----------|----|-------|--------|------------------------|-------|
| | B | S.E. | Wald | df | Sig. | Exp(B) | Lower | Upper |
| Step 1 ^a On-campus Modality | 1.082 | .015 | 5508.936 | 1 | <.001 | 2.951 | 2.868 | 3.037 |
| Constant | -.916 | .008 | 13029.260 | 1 | <.001 | .400 | | |

a. Variable(s) entered on step 1: Modality.

Research Question Four

The fourth research question was designed to examine the relationship of students' reports of satisfaction with the institution through two 7-point Likert scale surveys administered three separate times over eight academic years. The surveys were given to students enrolled at

one institution based upon their enrollment in an undergraduate degree program by instructional modality of fully on-campus or fully online. Two separate binomial logistic regressions were run for this research question to test the predictive value of the independent variable of instructional modality for (1) on-campus students by racial/ethnic groups and (2) online students by racial/ethnic groups on the dependent variable of students' reports of satisfaction with the institution.

Data Screening Test One

The researcher sorted the data and scanned for inconsistencies on each variable and no data errors or inconsistencies were identified. Casewise diagnostics were used to examine for extreme outliers, which are cases with standardized residuals greater than 2.5. No outliers were identified, as indicated in Table 25, so all data were retained.

Table 25

Casewise diagnostics: RQ4.1

Casewise List^a

a. The casewise plot is not produced because no outliers were found.

Descriptive Statistics Test One

Descriptive statistics were obtained on the categorical independent variable of students in the on-campus instructional modality by race/ethnicity. The sample consisted of 6,542 on-campus participants and a breakdown of the frequency count and percentage of each category is found in Table 26. Due to the low *N* count of two of the categories within the independent variable, on-campus American Indian or Alaska Native and on-campus Native Hawaiian or Pacific Islander were removed from the logistic regression analysis.

Table 26*Descriptive Statistics: RQ4.1*

| | <i>N</i> | % |
|---|----------|------|
| On-campus White | 5337 | 81.6 |
| On-campus Black or African American | 319 | 4.9 |
| On-campus Hispanic or Latino | 287 | 4.4 |
| On-campus Asian | 288 | 4.4 |
| On-campus Two [<i>sic</i>] or more | 253 | 3.9 |
| On-campus American Indian or Alaska Native | 42 | .6 |
| On-campus Native Hawaiian or Pacific Islander | 16 | .2 |
| Total | 6542 | 100 |

Results Test One

A binomial logistic regression was conducted to determine whether students' reports of satisfaction with the institution can be predicted through the on-campus instructional modality by racial/ethnic group. The logistic regression model was statistically significant, $\chi^2(4) = 12.934, p = .012$, as shown in Table 27.

Table 27*Omnibus Tests of Model Coefficients: RQ4.1*

| | | Chi-square | df | Sig. |
|--------|-------|------------|----|------|
| Step 1 | Step | 12.934 | 4 | .012 |
| | Block | 12.934 | 4 | .012 |
| | Model | 12.934 | 4 | .012 |

The Hosmer and Lemeshow Test results were not statistically significant ($p = 1.00$), as shown in Table 28, indicating that the model is not a poor fit.

Table 28*Hosmer and Lemeshow Test: RQ4.1*

| Step | Chi-square | df | Sig. |
|------|------------|----|-------|
| 1 | .000 | 1 | 1.000 |

The model was weak and explained .03% (Nagelkerke R^2) of the variance in students' reports of satisfaction with the institution, as shown in Table 29, and correctly classified 73.0% of cases.

Table 29*Model Summary: RQ4.1*

| Step | -2 Log likelihood | Cox & Snell R Square | Nagelkerke R Square |
|------|-----------------------|----------------------|---------------------|
| 1 | 7547.423 ^a | .002 | .003 |

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Sensitivity was 100%, specificity was 0% (as shown in Table 30), positive predictive value was 73.0%, and negative predictive value was 0%.

Table 30*Classification Table^a: RQ4.1*

| | | Predicted | | Percentage Correct |
|--------------------|--------------|--------------|------|--------------------|
| | | Satisfaction | | |
| Step 1 | Observed | Low | High | |
| | Satisfaction | Low | 0 | 1749 |
| High | | 0 | 4735 | 100.0 |
| Overall Percentage | | | | 73.0 |

a. The cut value is .500

Only one category (Two [sic] or more) within the independent variable was statistically significant as shown in Table 31. This indicated that those on-campus students who identified as White were 1.52 times more likely to report high satisfaction with the institution compared to those who identified as Two [sic] or more.

Table 31

Logistic Regression Predicting Students' Reports of Satisfaction with the Institution by On-Campus Instructional Modality and Racial/Ethnic Groups

Variables in the Equation

| | | | | | | | 95% C.I. for | |
|---------------------------|-------|------|----------|----|-------|--------|--------------|-------|
| | | | | | | | EXP(B) | |
| | | | | | | | Lower | Upper |
| | B | S.E. | Wald | df | Sig. | Exp(B) | | |
| Step 1 ^a White | | | 13.353 | 4 | .010 | | | |
| Black or African American | -.125 | .127 | .962 | 1 | .327 | .883 | .687 | 1.133 |
| Hispanic or Latino | .066 | .140 | .222 | 1 | .637 | 1.068 | .812 | 1.404 |
| Asian | -.240 | .131 | 3.354 | 1 | .067 | .787 | .609 | 1.017 |
| Two or more | -.417 | .135 | 9.499 | 1 | .002 | .659 | .506 | .859 |
| Constant | 1.028 | .031 | 1094.712 | 1 | <.001 | 2.796 | | |

a. Variable(s) entered on step 1: On-campus Race Ethnicity.

Data Screening Test Two

The researcher sorted the data and scanned for inconsistencies on each variable, and no data errors or inconsistencies were identified. Casewise diagnostics were used to examine for extreme outliers, which are cases with standardized residuals greater than 2.5. No outliers were identified, as indicated in Table 32, so all data were retained.

Table 32

Casewise diagnostics: RQ4.2

Casewise List^a

a. The casewise plot is not produced because no outliers were found.

Descriptive Statistics Test Two

Descriptive statistics were obtained on the categorical independent variable of students in the online instructional modality by race/ethnicity. The sample consisted of 7,933 online participants and a breakdown of the frequency count and percentage of each category is found in Table 33. Due to the low and zero *N* counts of two of the categories within the independent variable, online American Indian or Alaska Native and online Native Hawaiian or Pacific Islander were removed from the logistic regression analysis.

Table 33

Descriptive Statistics: RQ4.2

| | <i>N</i> | % |
|--|----------|------|
| Online White | 5111 | 64.4 |
| Online Black or African American | 1775 | 22.4 |
| Online Hispanic or Latino | 607 | 7.7 |
| Online Asian | 194 | 2.4 |
| Online Two [<i>sic</i>] or more | 159 | 2.0 |
| Online American Indian or Alaska Native | 87 | 1.1 |
| Online Native Hawaiian or Pacific Islander | 0 | 0 |
| Total | 7933 | 100 |

Results Test Two

A binomial logistic regression was conducted to determine whether students' reports of satisfaction with the institution can be predicted through the online instructional modality by racial/ethnic group. The logistic regression model was statistically significant, $\chi^2(4) = 15.472, p = .004$, as shown in Table 34.

Table 34

Omnibus Tests of Model Coefficients: RQ4.2

| | | Chi-square | df | Sig. |
|--------|-------|------------|----|------|
| Step 1 | Step | 15.472 | 4 | .004 |
| | Block | 15.472 | 4 | .004 |
| | Model | 15.472 | 4 | .004 |

The Hosmer and Lemeshow Test results were not statistically significant ($p = 1.00$), as shown in Table 35, indicating that the model is not a poor fit.

Table 35

Hosmer and Lemeshow Test: RQ4.2

| Step | Chi-square | df | Sig. |
|------|------------|----|-------|
| 1 | .000 | 2 | 1.000 |

The model was weak and explained .03% (Nagelkerke R^2) of the variance in students' reports of satisfaction with the institution, as shown in Table 36, and correctly classified 75.7% of cases.

Table 36*Model Summary: RQ4.2*

| Step | -2 Log likelihood | Cox & Snell R Square | Nagelkerke R Square |
|------|-----------------------|----------------------|---------------------|
| 1 | 8693.720 ^a | .002 | .003 |

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Sensitivity was 100%, specificity was 0% (as shown in Table 37), positive predictive value was 75.7%, and the negative predictive value was 0%.

Table 37*Classification Table^a: RQ4.2*

| | | Predicted | | | |
|--------------------|--------------|--------------|------|--------------------|------|
| | | Satisfaction | | Percentage Correct | |
| Observed | | Low | High | | |
| Step 1 | Satisfaction | Low | 0 | 1910 | 0 |
| | | High | 0 | 5936 | 100 |
| Overall Percentage | | | | | 75.7 |

a. The cut value is .500

Two categories (i.e., Black or African American and Two [*sic*] or more) within the independent variables were statistically significant as shown in Table 38. This indicated that those online students who identified as Black or African American were 1.18 times more likely to report high satisfaction with the institution compared to those who identified as White. Those online students who identified as White, however, were 1.43 times more likely to report high satisfaction with the institution compared to those who identified as Two [*sic*] or more.

Table 38*Logistic Regression Predicting Students' Reports of Satisfaction with the Institution by Online**Instructional Modality and Racial/Ethnic Groups**Variables in the Equation*

| | B | S.E. | Wald | df | Sig. | Exp(B) | 95% C.I. for EXP(B) | |
|---------------------------|-------|------|----------|----|-------|--------|------------------------|-------|
| | | | | | | | Lower | Upper |
| Step 1 ^a White | | | 15.728 | 4 | .003 | | | |
| Black or African American | .164 | .066 | 6.188 | 1 | .013 | 1.178 | 1.035 | 1.340 |
| Hispanic or Latino | .089 | .101 | .765 | 1 | .382 | 1.093 | .896 | 1.333 |
| Asian | -.279 | .159 | 3.064 | 1 | .080 | .757 | .554 | 1.034 |
| Two or more | -.356 | .173 | 4.246 | 1 | .039 | .700 | .499 | .983 |
| Constant | 1.107 | .032 | 1169.000 | 1 | <.001 | 3.024 | | |

a. Variable(s) entered on step 1: Online Race Ethnicity.

Research Question Five

The fifth research question was designed to examine year-over-year retention at one institution which offered academic programs in the fully on-campus and fully online instructional modalities by student racial/ethnic groups. Two separate binomial logistic regressions were run for this research question to test the predictive value of the independent variable of instructional modality for (1) on-campus students by racial/ethnic groups and (2) online students by racial/ethnic groups on the dependent variable of year-over-year retention.

Data Screening Test One

The researcher sorted the data and scanned for inconsistencies on each variable and no data errors or inconsistencies were identified. Casewise diagnostics were used to examine for

extreme outliers, which are cases with standardized residuals greater than 2.5. No outliers were identified, as indicated in Table 39, so all data were retained.

Table 39

Casewise diagnostics: RQ5.1

Casewise List^a

a. The casewise plot is not produced because no outliers were found.

Descriptive Statistics Test One

Descriptive statistics were obtained on the categorical independent variable of students in the on-campus instructional modality by race/ethnicity. The sample consisted of 27,320 on-campus participants and a breakdown of the frequency count and percentage of each category is found in Table 40. Due to the low *N* count of two of the categories within the independent variable, on-campus American Indian or Alaska Native and on-campus Native Hawaiian or Pacific Islander were removed from the logistic regression analysis.

Table 40

Descriptive Statistics: RQ5.1

| | <i>N</i> | % |
|---|----------|-------|
| On-campus White | 21667 | 79.30 |
| On-campus Black or African American | 1679 | 6.10 |
| On-campus Hispanic or Latino | 1783 | 6.50 |
| On-campus Asian | 1028 | 3.80 |
| On-campus Two [<i>sic</i>] or more | 976 | 3.60 |
| On-campus American Indian or Alaska Native | 148 | 0.50 |
| On-campus Native Hawaiian or Pacific Islander | 39 | 0.10 |
| Total | 27320 | 100 |

Results Test One

A binomial logistic regression was conducted to determine whether year-over-year retention can be predicted through the on-campus instructional modality by racial/ethnic groups. The logistic regression model was statistically significant, $\chi^2(4) = 43.486, p = <.001$ as shown in Table 41.

Table 41

Omnibus Tests of Model Coefficients: RQ5.1

| | | Chi-square | df | Sig. |
|--------|-------|------------|----|-------|
| Step 1 | Step | 43.486 | 4 | <.001 |
| | Block | 43.486 | 4 | <.001 |
| | Model | 43.486 | 4 | <.001 |

The Hosmer and Lemeshow Test results were not statistically significant ($p = 1.00$), as shown in Table 42, indicating that the model is not a poor fit.

Table 42

Hosmer and Lemeshow Test: RQ5.1

| Step | Chi-square | df | Sig. |
|------|------------|----|-------|
| 1 | .000 | 1 | 1.000 |

The model was weak and only explained .3% (Nagelkerke R^2) of the variance in year-over-year retention, as shown in Table 43, and correctly classified 83.5% of cases.

Table 43*Model Summary: RQ5.1*

| Step | -2 Log likelihood | Cox & Snell R Square | Nagelkerke R Square |
|------|------------------------|----------------------|---------------------|
| 1 | 24267.225 ^a | 0.002 | 0.003 |

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Sensitivity was 100%, specificity was 0% (as shown in Table 44), positive predictive value was 83.5%, and the negative predictive value was 0%.

Table 44*Classification Table^a: RQ5.1*

| | | Predicted | | |
|--------------------|---------------------|---------------------|-------|--------------------|
| | | Retention Next Year | | Percentage Correct |
| Observed | Did Not Retain | Did Retain | | |
| Step 1 | Retention Next Year | 0 | 4479 | .0 |
| | Year | 0 | 22654 | 100.0 |
| Overall Percentage | | | | 83.5 |

a. The cut value is .500

Two categories (Black or African American and Hispanic or Latino) within the independent variables were statistically significant as shown in Table 45. This indicated that those on-campus students who identified as White were 1.43 times more likely to retain year-over-year compared to those who identified as Black or African American and were 1.28 times more likely to retain year-over-year compared to those who identified as Hispanic or Latino.

Table 45

Logistic Regression Predicting Year-Over-Year Retention by On-campus Instructional Modality and Racial/Ethnic Groups

Variables in the Equation

| | B | S.E. | Wald | df | Sig. | Exp(B) | 95% C.I. for EXP(B) | |
|---------------------------|-------|------|----------|----|-------|--------|------------------------|-------|
| | | | | | | | Lower | Upper |
| Step 1 ^a White | | | 45.320 | 4 | <.001 | | | |
| Black or African American | -.355 | .063 | 32.150 | 1 | <.001 | .701 | .620 | .793 |
| Hispanic or Latino | -.247 | .063 | 15.560 | 1 | <.001 | .781 | .691 | .883 |
| Asian | -.101 | .085 | 1.422 | 1 | .233 | .904 | .766 | 1.067 |
| Two or more | -.129 | .086 | 2.252 | 1 | .133 | .879 | .742 | 1.040 |
| Constant | 1.671 | .019 | 8061.630 | 1 | <.001 | 5.319 | | |

a. Variable(s) entered on step 1: On-campus Race Ethnicity.

Data Screening Test Two

The researcher sorted the data and scanned for inconsistencies on each variable and no data errors or inconsistencies were identified. Casewise diagnostics were used to examine for extreme outliers, which are cases with standardized residuals greater than 2.5. No outliers were identified, as indicated in Table 46, so all data were retained.

Table 46

Casewise diagnostics: RQ5.2

Casewise List^a

a. The casewise plot is not produced because no outliers were found.

Descriptive Statistics Test Two

Descriptive statistics were obtained on the categorical independent variable of students in the online instructional modality by race/ethnicity. The sample consisted of 57,927 online participants and a breakdown of the frequency count and percentage of each category are found in Table 47. Due to the low *N* count of two of the categories within the independent variable, online American Indian or Alaska Native and online Native Hawaiian or Pacific Islander were removed from the logistic regression analysis.

Table 47

Descriptive Statistics: RQ5.2

| | <i>N</i> | % |
|--|----------|-------|
| Online White | 38352 | 66.20 |
| Online Black or African American | 10735 | 18.50 |
| Online Hispanic or Latino | 4626 | 8.00 |
| Online Asian | 1052 | 1.80 |
| Online Two [<i>sic</i>] or more | 2530 | 4.40 |
| Online American Indian or Alaska Native | 433 | 0.70 |
| Online Native Hawaiian or Pacific Islander | 199 | 0.30 |
| Total | 57927 | 100 |

Results Test Two

A binomial logistic regression was conducted to determine whether year-over-year retention can be predicted through the instructional modality of online students by racial/ethnic groups. The logistic regression model was statistically significant, $\chi^2(4) = 296.136$, $p = <.001$ as shown in Table 48.

Table 48*Omnibus Tests of Model Coefficients: RQ5.2*

| | | Chi-square | df | Sig. |
|--------|-------|------------|----|-------|
| Step 1 | Step | 296.136 | 4 | <.001 |
| | Block | 296.136 | 4 | <.001 |
| | Model | 296.136 | 4 | <.001 |

The Hosmer and Lemeshow Test results were not statistically significant ($p = 1.00$), as shown in Table 49, indicating that the model is not a poor fit.

Table 49*Hosmer and Lemeshow Test: RQ5.2*

| Step | Chi-square | df | Sig. |
|------|------------|----|-------|
| 1 | .000 | 2 | 1.000 |

The model was weak and explained .7% (Nagelkerke R^2) of the variance in year-over-year retention, as shown in Table 50, and correctly classified 57.4% of cases.

Table 50*Model Summary: RQ5.2*

| Step | -2 Log likelihood | Cox & Snell R Square | Nagelkerke R Square |
|------|------------------------|----------------------|---------------------|
| 1 | 77873.973 ^a | 0.005 | 0.007 |

a. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Sensitivity was 100%, specificity was 0% (as shown in Table 51), positive predictive value was 57.4% and the negative predictive value was 0%.

Table 51*Classification Table^a: RQ5.2*

| | | Predicted | | Percentage Correct | |
|--------------------|---------------------|---------------------|------------|--------------------|-------|
| | | Retention Next Year | | | |
| Observed | | Did Not Retain | Did Retain | | |
| Step 1 | Retention Next Year | Did Not Retain | 0 | 24411 | .0 |
| | | Did Retain | 0 | 32884 | 100.0 |
| Overall Percentage | | | | | 57.4 |

a. The cut value is .500

Each of the categories within the independent variables were statistically significant as shown in Table 52. This indicated that those online students who identified as White were 1.45 times more likely to retain year-over-year compared to those who identified as Black or African American, were 1.11 times more likely to retain year-over-year compared to those who identified as Hispanic or Latino, were 1.17 times more likely to retain year-over-year compared to those who identified as Asian, and were 1.21 more likely to retain year-over-year compared to those who identified as Two [*sic*] or more.

Table 52

Logistic Regression Predicting Year-Over-Year Retention by Online Instructional Modality and Racial/Ethnic Groups

Variables in the Equation

| | | | | | | | 95% C.I. for | |
|---------------------------|-------|------|----------|----|-------|--------|--------------|-------|
| | | | | | | | EXP(B) | |
| | B | S.E. | Wald | df | Sig. | Exp(B) | Lower | Upper |
| Step 1 ^a White | | | 296.594 | 4 | <.001 | | | |
| Black or African American | -.372 | .022 | 287.990 | 1 | <.001 | .689 | .660 | .720 |
| Hispanic or Latino | -.103 | .031 | 10.750 | 1 | .001 | .902 | .848 | .959 |
| Asian | -.160 | .063 | 6.432 | 1 | .011 | .852 | .754 | .964 |
| Two or more | -.194 | .041 | 22.004 | 1 | <.001 | .824 | .760 | .893 |
| Constant | .389 | .010 | 1395.537 | 1 | <.001 | 1.475 | | |

a. Variable(s) entered on step 1: Online Race Ethnicity.

Research Question Six

The final research question was designed to examine graduation outcome measures of an eight-year award rate at one institution which offered academic programs in the fully on-campus and fully online instructional modalities by student racial/ethnic groups. Two separate binomial logistic regressions were run for this research question to test the predictive value of the independent variable of instructional modality for (1) on-campus students by racial/ethnic groups and (2) online students by racial/ethnic groups on the dependent variable of graduation outcome measures of an eight-year award rate.

Data Screening Test One

The researcher sorted the data and scanned for inconsistencies on each variable. No data errors or inconsistencies were identified. Casewise diagnostics were used to examine for extreme

outliers, which are cases with standardized residuals greater than 2.5. No outliers were identified, as indicated in Table 53, so all data were retained.

Table 53

Casewise diagnostics: RQ6.1

Casewise List^a

a. The casewise plot is not produced because no outliers were found.

Descriptive Statistics Test One

Descriptive statistics were obtained on the categorical independent variable of students in the on-campus instructional modality by race/ethnicity. The sample consisted of a total of 24,586 on-campus participants and a breakdown of the frequency count and percentage of each category are found in Table 54. Due to the low *N* count of two of the categories within the independent variable, on-campus American Indian or Alaska Native and on-campus Native Hawaiian or Pacific Islander were removed from the logistic regression analysis.

Table 54

Descriptive Statistics: RQ6.1

| | <i>N</i> | % |
|---|----------|------|
| On-campus White | 19434 | 79.0 |
| On-campus Black or African American | 1546 | 6.30 |
| On-campus Hispanic or Latino | 1583 | 6.40 |
| On-campus Asian | 962 | 3.90 |
| On-campus Two [<i>sic</i>] or more | 885 | 3.60 |
| On-campus American Indian or Alaska Native | 140 | 0.60 |
| On-campus Native Hawaiian or Pacific Islander | 36 | 0.10 |
| Total | 24,586 | 100 |

Results Test One

A binomial logistic regression was conducted to determine whether graduation outcome measures can be predicted through the on-campus instructional modality by racial/ethnic groups. The logistic regression model was statistically significant, $\chi^2(4) = 226.433, p = <.001$ as shown in Table 55.

Table 55

Omnibus Tests of Model Coefficients: RQ6.1

| | | Chi-square | df | Sig. |
|--------|-------|------------|----|-------|
| Step 1 | Step | 226.433 | 4 | <.001 |
| | Block | 226.433 | 4 | <.001 |
| | Model | 226.433 | 4 | <.001 |

The Hosmer and Lemeshow Test results were not statistically significant ($p = 1.00$), as shown in Table 56, indicating that the model is not a poor fit.

Table 56

Hosmer and Lemeshow Test: RQ6.1

| Step | Chi-square | df | Sig. |
|------|------------|----|-------|
| 1 | .000 | 1 | 1.000 |

The model was weak and explained 1.2% (Nagelkerke R^2) of the variance in graduation outcome measures, as shown in Table 57, and correctly classified 56.0% of cases.

Table 57

Model Summary: RQ6.1

| Step | -2 Log likelihood | Cox & Snell R Square | Nagelkerke R Square |
|------|------------------------|----------------------|---------------------|
| 1 | 33448.303 ^a | .009 | .012 |

a. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Sensitivity was 82.9%, specificity was 24.3% (as shown in Table 58), positive predictive value was 56.3%, and the negative predictive value was 54.7%.

Table 58

Classification Table^a: RQ6.1

| | | Predicted | | |
|--------------------|--|------------------|---------------|--------------------|
| | | Graduation OM | | Percentage Correct |
| Observed | | Did Not Graduate | Did Graduate | |
| | | Step 1 | Graduation OM | 2720 |
| | | 2256 | 10951 | 82.9 |
| Overall Percentage | | | | 56.0 |

a. The cut value is .500

Each of the categories within the independent variables were statistically significant as shown in Table 59. This indicated that those on-campus students who identified as White were 1.98 times more likely to graduate within an eight-year award rate compared to those who identified as Black or African American, were 1.38 times more likely to graduate within an eight-year award rate compared to those who identified as Hispanic or Latino, were 1.34 times more likely to graduate within an eight-year award rate compared to those who identified as Asian, and were 1.52 times more likely to graduate within an eight-year award rate compared to those who identified as Two [*sic*] or more.

Table 59*Logistic Regression Predicting Graduation Outcome Measure by On-campus Instructional**Modality and Racial/Ethnic Groups**Variables in the Equation*

| | B | S.E. | Wald | df | Sig. | Exp(B) | 95% C.I. for EXP(B) | |
|---------------------------|-------|------|---------|----|-------|--------|------------------------|-------|
| | | | | | | | Lower | Upper |
| Step 1 ^a White | | | 222.571 | 4 | <.001 | | | |
| Black or African American | -.684 | .054 | 160.170 | 1 | <.001 | .505 | .454 | .561 |
| Hispanic or Latino | -.320 | .052 | 37.349 | 1 | <.001 | .726 | .655 | .805 |
| Asian | -.289 | .066 | 19.071 | 1 | <.001 | .749 | .658 | .853 |
| Two or more | -.416 | .069 | 36.398 | 1 | <.001 | .660 | .576 | .755 |
| Constant | .255 | .014 | 311.723 | 1 | <.001 | 1.291 | | |

a. Variable(s) entered on step 1: On-campus Race Ethnicity.

Data Screening Test Two

The researcher sorted the data and scanned for inconsistencies on each variable. No data errors or inconsistencies were identified. Casewise diagnostics were used to examine for extreme outliers, which are cases with standardized residuals greater than 2.5. No outliers were identified, as indicated in Table 60, so all data were retained.

Table 60*Casewise diagnostics: RQ6.2**Casewise List^a*

a. The casewise plot is not produced because no outliers were found.

Descriptive Statistics Test Two

Descriptive statistics were obtained on the categorical independent variable of students in the online instructional modality by race/ethnicity. The sample consisted of a total of 50,414 online participants and a breakdown of the frequency count and percentage of each category is found in Table 61. Due to a low *N* count for two of the categories within the independent variable, on-campus American Indian or Alaska Native and on-campus Native Hawaiian or Pacific Islander were removed from the logistic regression analysis.

Table 61

Descriptive Statistics: RQ6.2

| | <i>N</i> | % |
|--|----------|-------|
| Online White | 32973 | 65.40 |
| Online Black or African American | 9781 | 19.40 |
| Online Hispanic or Latino | 4020 | 8.00 |
| Online Asian | 895 | 1.80 |
| Online Two [<i>sic</i>] or more | 2191 | 4.30 |
| Online American Indian or Alaska Native | 376 | 0.70 |
| Online Native Hawaiian or Pacific Islander | 178 | 0.40 |
| Total | 50414 | 100 |

Results Test Two

A binomial logistic regression was conducted to determine whether graduation outcome measures can be predicted through the online instructional modality by racial/ethnic groups. The logistic regression model was statistically significant, $\chi^2(4) = 666.537, p = <.001$ as shown in Table 62.

Table 62*Omnibus Tests of Model Coefficients: RQ6.2*

| | | Chi-square | df | Sig. |
|--------|-------|------------|----|-------|
| Step 1 | Step | 666.537 | 4 | <.001 |
| | Block | 666.537 | 4 | <.001 |
| | Model | 666.537 | 4 | <.001 |

The Hosmer and Lemeshow Test results were not statistically significant ($p = 1.00$), as shown in Table 63, indicating that the model is not a poor fit.

Table 63*Hosmer and Lemeshow Test: RQ6.2*

| Step | Chi-square | df | Sig. |
|------|------------|----|-------|
| 1 | .000 | 2 | 1.000 |

The model was weak and explained 1.9% (Nagelkerke R^2) of the variance in graduation outcome measures, as shown in Table 64, and correctly classified 70.0% of cases.

Table 64*Model Summary: RQ6.2*

| Step | -2 Log likelihood | Cox & Snell R Square | Nagelkerke R Square |
|------|------------------------|----------------------|---------------------|
| 1 | 60208.126 ^a | .013 | .019 |

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Sensitivity was 0%, specificity was 100% (as shown in Table 65), positive predictive value was 0%, and the negative predictive value was 70.0%.

Table 65*Classification Table^a: RQ6.2*

| | | Predicted | | | |
|--------------------|------------|------------------|--------------|--------------------|-------|
| | | Graduation OM | | Percentage Correct | |
| Observed | | Did Not Graduate | Did Graduate | | |
| Step 1 | Graduation | Did Not Graduate | 34926 | 0 | 100.0 |
| | OM | Did Graduate | 14934 | 0 | .0 |
| Overall Percentage | | | | | 70.0 |

a. The cut value is .500

Each of the categories within the independent variables was statistically significant as shown in Table 66. This indicated that those online students at this institution who identified as White were 1.89 times more likely to graduate within an eight-year award rate compared to those who identified as Black or African American, were 1.50 times more likely to graduate within an eight-year award rate compared to those who identified as Hispanic or Latino, were 1.36 times more likely to graduate within an eight-year award rate compared to those who identified as Asian, and were 1.49 times more likely to graduate within an eight-year award rate compared to those who identified as Two [*sic*] or more.

Table 66

Logistic Regression Predicting Graduation Outcome Measure by Online Instructional Modality and Racial/Ethnic Groups

Variables in the Equation

| | B | S.E. | Wald | df | Sig. | Exp(B) | 95% C.I. for EXP(B) | |
|---------------------------|-------|------|----------|----|-------|--------|------------------------|-------|
| | | | | | | | Lower | Upper |
| Step 1 ^a White | | | 632.750 | 4 | <.001 | | | |
| Black or African American | -.639 | .027 | 543.855 | 1 | <.001 | .528 | .500 | .557 |
| Hispanic or Latino | -.404 | .038 | 111.911 | 1 | <.001 | .668 | .620 | .720 |
| Asian | -.304 | .076 | 15.952 | 1 | <.001 | .738 | .636 | .857 |
| Two or more | -.398 | .050 | 62.092 | 1 | <.001 | .672 | .608 | .742 |
| Constant | -.683 | .012 | 3431.414 | 1 | <.001 | .505 | | |

a. Variable(s) entered on step 1: Online Race Ethnicity.

Summary

Through the data analysis of each research question presented in this chapter, the researcher was able to determine that undergraduate student characteristics within instructional modality and racial/ethnic groups were predictive of success in students' reports of satisfaction with the institution, retention year-over-year, and graduation outcome measures. A further interpretation with implications of these findings is discussed in the next chapter.

Chapter 5: Conclusions And Recommendations

This chapter contains discussion, conclusions, and recommendations associated with the findings from this study and its relationship to existing research. The purpose of this study was to add to the current body of literature on higher education attainment and completion by analyzing undergraduate student satisfaction, retention, and graduation across instructional modalities and racial/ethnic groups. The results and the implications they raise are reported herein.

Purpose of the Study

A college degree continues to provide graduates with an opportunity to climb the economic ladder and earn more money over their lifetimes despite increasing college tuition costs and mounting debt from student loans (Haigh & Clifford, 2011; Oreopoulos & Petronijevic, 2013; Perna, 2005; Williams & Wolniak, 2020; Yoon et al., 2021). Despite increased college accessibility and financial aid assistance, however, underrepresented student groups in undergraduate programs continue to show disproportionately lower rates in enrollment, retention, graduation, and high rates of student loan default (Banks & Dohy, 2019; De Brey et al., 2019; Monarrez & Washington, 2020; Nichols & Anthony Jr., 2020). Online education, undertaken by most institutions to increase accessibility, has continued to increase in popularity, respectability, and accessibility over the past decade. Though not without its own concerns or disadvantages, online education can afford some students the opportunity to obtain a college education without the typical barriers of a traditional on-campus degree program (Francis et al., 2019; Hurtado et al., 1998; Hurtado et al., 1999; Milem et al., 2004; Milem et al., 2005; Ortagus & Tanner, 2019; Seaman et al., 2018; Wavle & Ozogul, 2019).

Current research in the field has shown that student satisfaction, sense of community, and active engagement are indicators of student success and the attainment of a college degree

(Bowman & Culver 2018; Burke, 2019; Forrester et al., 2018; Grier-Reed et al., 2016; Kampf et al., 2018; Murphy et al., 2020; Sithole et. al. 2017; Rezaei & Mousanezhad-Jeddi, 2020; Weaver et al. 2017). This holds true for both traditional on-campus learning and non-traditional online learning, although online students do tend to have higher attrition rates due to various factors outside of the institutions' control (e.g., fulltime job, family obligations, etc.) (Bickle et al., 2019; Cole et al., 2014; Lu, 2020; Martin & Bolliger; 2018; Page & Kulick, 2016). While research shows positive relationships between student integration and student success (Bowden et al., 2021; Farrell & Brunton, 2020; Lancaster & Lundberg, 2019; Schreiner et al., 2020), a longstanding concern in higher education are the negative perceptions held by underrepresented groups regarding the institutions inability to meet their unique needs (e.g., representation, financial support, sense of belonging, etc.) represented by their lower satisfaction, enrollment, retention, and graduation numbers (Duran et al., 2020; Fan et al., 2021; Samura, 2016; Strayhorn, 2018; Wolf et al., 2017). If more than one instructional modality can support some students with earning a college degree, higher education leaders should research and embrace it as an opportunity to meet a need while helping a more diverse student population receive an education for good paying jobs.

While much research has focused on race and ethnicity in higher education, there have been few studies that focus on racial and ethnic student group satisfaction with their institution, retention, and graduation across instructional modalities at a single institution over multiple academic years. This descriptive, non-experimental study centered on student racial/ethnic groups enrolled at a single, predominantly White institution in either an exclusively on-campus or exclusively online academic degree program to better understand if any relationships occurred. This research spanned across eight consecutive academic years and the parameters

consisted of satisfaction data from surveys administered three separate times, year-over-year retention rates, and graduation outcomes measures per IPEDS definition. In this study, the researcher answered the following questions:

Research Question 1: To what extent does instructional modality predict undergraduate students' reports of satisfaction with the institution?

Research Question 2: To what extent does instructional modality predict undergraduate students' retention year-over-year?

Research Question 3: To what extent does instructional modality predict undergraduate students' graduation rates?

Research Question 4: To what extent does instructional modality based on race/ethnicity predict undergraduate students' reports of satisfaction with the institution?

Research Question 5: To what extent does instructional modality based on race/ethnicity predict undergraduate students' retention year-over-year?

Research Question 6: To what extent does instructional modality based on race/ethnicity predict undergraduate students' graduation rates?

Population and Sample

Based upon the survey data collected for research questions one and three, there were more online participants who completed the satisfaction survey than on-campus participants, but this was likely due to the online instructional modality's having a larger enrollment population with 19,999 students randomly selected to complete their survey each time it was administered. Despite having a smaller enrollment population, all enrolled students in the on-campus instructional modality were sent the survey (approximately 15,000) each time it was administered. Completed on-campus surveys only fell short by 1,340 completers for research

question one and 1,391 for research question four, as not all respondents chose to identify their race/ethnicity.

The remaining research questions utilized student enrollment data from eight consecutive academic years for any student who enrolled for the first-time at the institution for retention and any student enrolled during the same timeframe for graduation. The retention dataset for research question two contained 116,589 total first-time enrolled undergraduate students in either an on-campus or online four-year degree program, with 56,481 less on-campus students than online students. Those who had less than one year enrollment status were removed from the analysis. The graduation dataset for research question three contained 103,241 undergraduate students who were enrolled in either an on-campus or online four-year degree program during the eight academic years, with 48,871 less on-campus students than online students. Those who were still enrolled at the institution and pursuing their degree within the award rate were removed from the analysis.

When dividing out the on-campus and online students by racial/ethnic groups in research questions five and six, the overall numbers decreased from the previous research questions due to students having the option to not identify with any racial/ethnic group. Those students who did not identify their race/ethnicity were excluded from these research questions. The retention dataset for research question five had 27,320 total on-campus students for which 79.3% were White and 57,927 total online students for which were 66.2% White. The graduation data set for research question six had 24,586 total on-campus students for which 79.0% were White and 50,414 total online students for which were 65.4% White.

Despite the large enrollment numbers in both instructional modalities, students who identified as American Indian or Alaska Native and Native Hawaiian or Pacific Islander were

excluded from the statistical analysis of research questions four, five, and six due to low counts. The overall breakdown across research questions and between on-campus and online students does show large enrollment in both modalities, with online having a higher enrollment, and the racial/ethnic breakdown showing the institution as predominantly White.

Interpretation of Findings

The findings of this research show that both instructional modality and race/ethnicity were strong predictors of students' satisfaction with the institution, retention year-over-year, and graduation outcome measures.

Institutional Satisfaction

The findings for research question one (i.e., does instructional modality predict student satisfaction?) were significant, demonstrating that online students, over eight academic years and through satisfaction surveys administered three times, were 1.15 times more likely to report high satisfaction with the institution than on-campus students. The findings for both statistical analyses run for research question four (i.e., do race or ethnicity by instructional modality predict student satisfaction?) were also significant. For on-campus students, those who identified as White were 1.52 times more likely to report high satisfaction with the institution than those who identified as Two [*sic*] or more. Of those on-campus students who identified as Black or African American, Hispanic or Latino, and Asian, the results were not statistically significant, and a predictive relationship could not be established. For online students, who collectively reported high levels of satisfaction with the institution per the results of research question one, those who identified as Black or African American were 1.18 times more likely to report high satisfaction with the institution than those who identified as White; but those who identified as White were 1.43 times more likely to report high satisfaction with the institution than those who identified as

Two [*sic*] or more. Of those online students who as identified either Hispanic/Latino or Asian, the results were not statistically significant, and a predictive relationship could not be made. This showed that on-campus White students had higher odds of reporting high satisfaction with the institution for on-campus students, but online Black or African American students had higher odds of reporting high satisfaction with the institution for online students.

Retention Year-Over-Year

The findings of research question two (i.e., does instructional modality predict retention year-over-year?) were significant, showing that on-campus students, over eight academic years at a single institution, were 3.85 times more likely to retain year-over-year than online students. The findings of both statistical analyses run for research question five (i.e., do race or ethnicity by instructional modality predict retention year-over-year?) were also significant. For on-campus students, those who identified as White were more likely to retain year-over-year than those who identified as Black or African American (1.43 times higher) and Hispanic or Latino (1.28 times higher). Of those on-campus students who identified as Asian or Two [*sic*] or more, the results were not statistically significant, and a predictive relationship could not be established.

For online students, those who identified as White had higher odds of retaining year-over-year when compared to those who identified as Black or African American (1.45 times higher), as Hispanic or Latino (1.11 times higher), as Asian (1.17 times higher), and as Two [*sic*] or more (1.21 times higher). This showed that online students who identified as White had higher odds of retaining year-over-year than all other identified racial/ethnic participant groups in this study regardless of instructional modality.

Graduation Rates

The findings for research question three (i.e., does instructional modality predict graduation?) were significant, finding that on-campus students enrolled in an undergraduate degree program, over eight academic years at a single institution, were almost three times more likely to graduate within an eight-year award rate than online students enrolled in an undergraduate degree program. The findings of both statistical analyses run for research question six (i.e., do race or ethnicity by instructional modality predict graduation?) were also significant. For on-campus students, those who identified as White were more likely to graduate within an eight-year award rate than those who identified as Black or African American (1.98 times higher) and Hispanic or Latino (1.38 times higher). Of those on-campus students who identified as Asian or Two [*sic*] or more, the results were not statistically significant, and a predictive relationship could not be made. These are consistent with the results of research questions two and four on retention year-over-year which had similar odds when comparing on-campus students with online students, and when comparing on-campus students who identified as White with on-campus students who identified as Black or African American and Hispanic or Latino.

For online students, those who identified as White had higher odds graduating within an eight-year award rate when compared to those who identified as Black or African American (1.45 times higher), as Hispanic or Latino (1.11 times higher), as Asian (1.17 times higher), and as Two [*sic*] or more (1.21 times higher). This showed that online students who identified as White had higher odds of graduating within an eight-year award rate than all other online students who identified as another racial/ethnic group regardless of instructional modality. These results are consistent with research four on retention year-over-year and found similar odds when

comparing online students who identified as White with online students who identified as another racial/ethnic group.

Additional Interpretations

Though responses to each of the research questions were statistically significant, the Nagelkerke R^2 values were low; each was less than 2%, aside from research question two which was 8.9%. While these low values do not negate the significance of the results, their values should be noted as a unique output of these binomial logistic regressions. These results may have occurred because while the tests were able to predict the occurrence of the outcome variables with a certain degree of accuracy, it may not be able to explain large variations within the selected dependent variables. This may mean other variables or factors could play an important role in predicting students' reports of satisfaction with the institution, retention year-over-year, and graduation outcomes outside of instructional modality and racial/ethnic groups.

Research questions one and four (i.e., students' reports of satisfaction with the institution) and two and five (i.e., retention year-over-year) each had 0% negative predictive value. This meant for research questions one and four that of all cases predicted as having low reports of student satisfaction, 0% were correctly predicted and for research questions two and five that of all cases predicted as not retaining year-over-year, 0% were correctly predicted. These four research questions, conversely, had 100% positive predictive value, showing that of all cases predicted as having reports of high satisfaction and retaining year-over-year, 100% were correctly predicted. This shows the model was overfitted or bias towards predicting the positive outcome. Another unique finding was for research question six on the analysis of online student racial/ethnic groups graduating within an eight-year award rate. This analysis had a 0% positive predictive value, meaning of all cases predicted as graduating, 0% were correctly predicted and

of all cases predicted as not graduating, 100% were correctly predicted. This shows the model was overfitted or bias towards predicting the negative outcome. These statistical results show that additional or further research through a similar model should consider ways to correct potential data imbalances or select differing relevant variables.

Implications of Findings

Higher education practitioners and researchers who are in a unique position to identify barriers, enact policies, and increase student success can benefit from these findings, similar studies, and future research. By using this information, educational leaders can develop and implement evidence-based policies and programs that address potential barriers (e.g., accessibility, tuition costs, campus climate, support services, etc.) and promote student success. As experts in the field of education, higher education practitioners and researchers have the credibility and influence to advocate for changes that can make a significant positive impact on student outcomes. Being at the forefront of these efforts, these leaders can help to create a more equitable and effective higher education system for all students and work to increase student satisfaction, retention, and graduation at an institution.

As previously noted, the predictor variables of instructional modality and race/ethnicity were statistically significant with the outcome variable of students' reports of satisfaction with the institution in research questions one and four. These significant findings, however, require further discussion. Research question one found that online students had higher odds of reporting high satisfaction with the institution than on-campus students. This is an important finding and should be further studied as current literature lacks a full understanding of students' reports of satisfaction with an institution across instructional modalities. While research question four found that on-campus students who identified as White had higher odds of reporting high

satisfaction with the institution than other on-campus students, which replicates similar research (Lewis et al., 2021; Lewis and Shah, 2021; Mwangi et al., 2018), online students who identified as Black or African American had higher odds of reporting high satisfaction with the institution than online students who identified as White. This is a potentially consequential result and may show, with additional research, that the online instructional modality can present fewer negative climate barriers than the traditional on-campus instructional modality for certain underrepresented student groups, which has not been a finding in numerous other studies regarding on-campus climate (Buck & Patel, 2016; Crosson, 1988; Edgert, 1994; Fan et al., 2021; Foste, 2019; Franklin, 2019; Hall & Sandler, 1984; Hart & Fallabaum, 2008; Hurtado & Carter, 1997; Karkouti, 2016; Mwangi et al., 2018; Soria, 2018; Telles & Mitchell, 2018). These results mean higher education leaders and researchers should focus resources on better understanding students' reports of satisfaction with instructional modalities and why online students collectively and online Black or African American students specifically reported higher odds.

The predictor variables of instructional modality and race/ethnicity were also statistically significant with the outcome variable of retention year-over-year in research questions two and five. The significant results of research question two, which presented the highest odds between categories of a single independent variable within this study, are consistent with other studies showing on-campus students retain in higher education at a higher rate than online students (Bawa, 2016; Bettinger et al., 2017; Glazier, 2016; Mubarak et al., 2022; Simplicio, 2019; Sorensen & Donovan, 2017; Stoebe & Grebing, 2020). Research question five found that on-campus students who identified as White had higher odds of retaining year-over-year than those who identified as Black or African American and Hispanic or Latino, but no predictive

relationship was found for those who identified as Asian or Two [*sic*] or more. The higher odds of retention for White students in the on-campus instructional modality, especially when compared to Black or African American and Hispanic or Latino students, is consistent with current research in the field (Banks & Dohy, 2019; Duranczyk et al., 2004; Luciano-Wong & Crowe, 2019; Morley, 2019, Salvo et al., 2019). Research question five found that online students who identified as White had higher odds of retaining year-over-year than all other students who identified with another racial/ethnic groups. These results are also consistent with current retention data (National Student Clearinghouse, 2022). The lower odds of retention for underrepresented students continue to be a major concern for higher education, as shown through this study, and have been demonstrated in the results of numerous other studies (Camera, 2015; Daniels et al., 2019; Knaggs, Sondergeld, & Schardy, 2015; Loeb & Hurd, 2019; Musu-Gillette et al., 2016). These results mean higher education leaders and researchers should focus resources on implementing better ways to retain both online students collectively and online underrepresented students individually. They should also seek to understand why online students reported higher odds of satisfaction with the institution but did not retain year-over-year with similar odds, and similarly, why online Black or African American students specifically reported higher odds of satisfaction with the institution but did not retain at similar odds.

The predictor variables of instructional modality and race/ethnicity were also statistically significant with the outcome variable of graduating (within an eight-year award rate) in research questions three and six. The significant results of research question three are consistent with other studies showing on-campus students graduate at a higher rate than online students (Allen & Seaman, 2015; Bolliger & Halupa, 2018; Hart et al., 2015; Jagers & Xu, 2010; Shea & Bidjerano, 2014; Xu & Jagers, 2011). Research question six also found that both on-campus and

online students who identified as White had higher odds of graduating than all other on-campus and online students who identified with another racial/ethnic group. These results are also consistent with current graduation data (Baumen et al., 2019; Hernández & Villodas, 2019; Hutt et al, 2019; Shapiro et.al., 2017). It should be noted that these previous studies used the traditional six-year award rate including only first-time full-time students, meaning the use of an eight-year award rate of graduation outcome measures – which also included transfer and part-time students in this study – produced similar results for both online students and underrepresented students. This means that even with a broader definition for graduation used and an additional two years for students to graduate, White students in both instructional modalities still had higher odds of graduating than underrepresented students. These lower odds of graduation and retention for underrepresented students, except for on-campus Asian students which is consistent with other studies, are a major concern for higher education. These results mean higher education leaders and researchers should focus resources on implementing better ways to help both online students collectively and online underrepresented students individually graduate from college. They should also seek to understand why online students reported higher odds of satisfaction with the institution, but did not graduate with similar odds, and similarly, why online Black or African American students specifically reported higher odds of satisfaction with the institution but did not graduate at similar odds.

It is worth noting that the number of participants in each research question demonstrated a large online student population at the institutional setting, following the trend of higher education with the increasing availability, interest, and creditability of the online instructional modality (Castro & Tumibay, 2021; Cheslock & Jaquette, 2022; Gonzalez-Gonzalez et al., 2020; Guppy et al., 2022; Kane & Dahlvig, 2022; Ortagus & Derreth, 2020). An additional noteworthy

finding was that no predictive relationships, across each research question on race and ethnicity, was found for on-campus students who identified as Asian when compared to on-campus students who identified as white for satisfaction, retention, and graduation, which is consistent with other findings (Banks & Dohy, 2019; Barbera et al., 2020; Duranczyk et al., 2004; Shapiro et al., 2017). There has also been a lack of research on underrepresented students in online education on satisfaction, retention, and graduation (Bosch et al., 2018; Joosten & Cusatis, 2020; Salvo et al., 2019; Yeboah & Smith, 2016), so the results of this study now add to the literature and highlight the need for additional research.

Limitations of Research

A limitation of this study was the uneven sample sizes across instructional modality (e.g., research question two had 86,535 online students, but 30,054 on-campus students) and racial/ethnic groups (e.g., research question five had 21,667 on-campus White students, with 4,490 making up the remaining three racial/ethnic groups collectively) in the single institutional setting. While evenly distributed sample sizes across all groups is desirable, they are unlikely to occur naturally in descriptive, non-experimental research. An additional limitation was only one institution was used for this study. The sample size was large enough to meet assumptions testing and allow for statistical significance but the use of a single, four-year private institution that was predominantly White, limits the generalizability of the results.

Another limitation of this study was the use of data from archived surveys which were optional for students to complete. This research used and analyzed comparable questions from two separate surveys that were developed by one organization. Each survey contained additional satisfaction questions that were omitted from the analysis because they focused on specific instructional modality differences not relevant to students enrolled in the opposing instructional

modality. This removal of some instructional modality specific survey questions may have hindered the overall results of students' report of satisfaction with the institution as the addition of these responses may or may not have switched a student's satisfaction category of low or high.

While the institution sent the on-campus survey to all on-campus students, the institution limited online student participating in the survey due to its larger enrollment and associated costs. The institution instead randomly selected a convenience sample of up to 19,999 online students out of the existing almost 60,000 online undergraduate student population, limiting online student participation and the ability to gather more responses from enrolled students or even those who might be more inclined to complete the survey. This may have limited data accuracy due to self-reporting survey contamination and participant subjectivity (Johnson & Christensen, 2000; Kerlinger, 1966).

The use of the IPEDS definition of graduation outcome measures at an eight-year award rate was also a limitation, as the traditional six-year award rate of first-time, first-year students is typically used in similar research. This was, however, one of the unique aspects of this study since more undergraduate students are transferring between institutions and enrolling part-time, which the traditional six-year award rate omits. This newer definition provided by IPEDS makes this study one of the first to utilize it through data analysis across two instructional modalities.

Participants in this study were undergraduate on-campus and online students who were enrolled in a four-year bachelor's degree program. Online students are more likely to transfer to another institution, enroll at an institution with the purpose of only taking a few courses for different reasons with no plans of graduating, or take courses at an online institution for convenience with the intent to transfer them into a degree program elsewhere (Henderikx et al.,

2017; Lee et al., 2017; Mann & Henneberry, 2012; Marling, 2013; Schlusmans & Winkels, 2017). As this study did not interview or survey students on their purpose for enrollment, a limitation of this study regarding the retention and graduation data is some participants may have enrolled with no intention of persisting or graduation from the degree program in which they enrolled and subsequently were not removed from the sample.

Recommendations for Future Research

The purpose of this study was to gather multiple data points on undergraduate student success through satisfaction surveys, retention rates, and graduation outcome measures that span eight academic years by instructional modality and race/ethnicity. The research was designed to capture a large sample size so results could inform higher education leaders and add to literature on undergraduate student success, specifically regarding underrepresented student groups. From these findings, the following recommendations are made to further this area of study and add to the existing body of literature.

1. The study gathered quantitative data and information on a large group of students during a specific timeframe using convenience sampling, and the researcher was unable to interact with the participants. Future research could employ a qualitative case study model that follows a prescribed number of students through their college career (e.g., from college admission to graduation) to collect a more in-depth and thorough understanding of the complexity of campus climate across instructional modalities and its potential impact on underrepresented student satisfaction, retention, and graduation.
2. This study utilized two different surveys, though created by the same organization, with the aim of assessing student satisfaction with their institution. The surveys were

designed separately, however, for two different student populations based upon instructional modality. Future research could implement an existing single survey for both instructional modalities or create a new valid and reliable survey to help better target campus racial climate perceptions and satisfaction based upon relevant research and the literature.

3. This study examined currently enrolled undergraduate student data outside of an individual's rationale for enrolling at the participating institution. Future research could focus on high school students' perceptions of higher education campus climate and their opinions regarding where they choose to apply to college or not based upon those perceptions.
4. This study was limited to students enrolled at a single, private institution. Future research could include a multi-college and university study that comprises public, private, non-profit, and/or for-profit institutions to provide a broader, more diverse student sample and help make results generalizable.
5. This study looked at student satisfaction with a single institution using instructional modality and racial/ethnic groups as potential indicators for student success. Future research could examine levels of academic preparation prior to postsecondary education and/or first-year college preparation courses across instructional modality and racial/ethnic groups as a potential indicator for predicting college success and degree attainment.
6. This study looked solely at satisfaction, retention, and graduation at the institution, but did not consider other student success measures (e.g., course grades, grade point average, time to completion, gainful employment, professional exams, etc.) or the

- amount of accumulated student loans and debt during enrollment and their potential relationships with earning a college degree. An additional study could add and compare data pertaining to additional student success measures and student debt by instructional modality and racial/ethnic groups.
7. This study found that online students who identified as Black or African American reported higher odds of high satisfaction with the institution but did not show similar odds of retention or graduation. Future research could focus on online students who identify as Black or African American and their satisfaction, retention, and graduation in higher education.
 8. This study found low survey completion and enrollment for on-campus and online students who identified as American Indian or Alaska Native and Native Hawaiian or Pacific Islander, resulting in their removal from statistical analysis. Future research should be conducted on these two underrepresented groups and their satisfaction, retention, and graduation in higher education.
 9. This study could be replicated at another institution or a variety of other institutions that use the same Ruffalo Noel Levitz Satisfaction-Priorities Surveys and the definitions of year-over-year retention and IPEDS graduation outcome measures to add to this research and assist with generalizability of results.
 10. This study could be replicated but designed with a broader focus by using additional variables such as age, sex, socio-economic status, major, transfer credit, enrollment status, first generation college student, etc., to research potential relationships with satisfaction, retention, and graduation across modality and racial/ethnic groups.

Summary

A few of the most interesting results of this study warrant direct reference and consideration for practitioners and researchers. Online education continues to grow as a more diverse student body seeks opportunities in this instructional modality and as colleges and universities are focusing on and increasing resources to offer such programs, meaning further attention needs to be placed upon research that focuses on instructional modality and underrepresented students. Students in the online instructional modality reported higher odds of high satisfaction with the institution but had lower odds of retaining year-over-year and graduating within an eight-year award rate. Online students who identified as Black or African American reported higher odds of high satisfaction than online students who identified as White students but had lower odds of retaining and graduating. This foundational research should be built upon to better understand what support services online students and online underrepresented students need to persist and graduate at comparable rates.

If a college degree increases financial means, social mobility, and helps secure wealth, but college campuses foster environmental barriers for underrepresented groups, then structural changes should take place as well as other opportunities explored for receiving a college degree. While the results of these research questions do not necessarily appear to show instructional modality can limit barriers or provide a more equitable service for helping underrepresented students obtain a college degree, additional research is still needed to better understand why and how higher education can meet their needs. Conducting research on underrepresented students across instructional modalities is important for educational leaders because it provides critical insights into the challenges and opportunities faced by these students as they navigate higher education. By understanding the relationship between instructional modality and student

outcomes such as satisfaction, retention, and graduation rates, educational leaders can develop more effective strategies to support underrepresented students in achieving their academic goals. Continued research is needed as it can help identify disparities in access to quality educational experiences and resources, which in turn can inform policy and practice to address existing systemic barriers and promote greater equity in higher education.

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Appendix A: Approval Letter



Office of Research Integrity

January 6, 2023

Kevin Struble
[REDACTED]

Dear Kevin:

This letter is in response to the submitted dissertation abstract entitled "*An Analysis of Undergraduate Student Satisfaction, Retention, and Graduation by Instructional Modality and Racial/Ethnic Groups*." After assessing the abstract, it has been deemed not to be human subject research and therefore exempt from oversight of the Marshall University Institutional Review Board (IRB). The Code of Federal Regulations (45CFR46) has set forth the criteria utilized in making this determination. Since the study does not involve human subjects as defined in DHHS regulation 45 CFR §46.102(e) it is not considered human subject research. If there are any changes to the abstract you provided then you would need to resubmit that information to the Office of Research Integrity for review and determination.

I appreciate your willingness to submit the abstract for determination. Please feel free to contact the Office of Research Integrity if you have any questions regarding future protocols that may require IRB review.

Sincerely,

A handwritten signature in blue ink that reads "Bruce F. Day".

Bruce F. Day, ThD, CIP
Director

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