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Comparison of Course Grades Among Learning Modalities in Historically Black College and Universities

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Walden University
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Abstract

Comparison of Grades Among Learning Modalities in Historically Black Colleges and Universities

by

Murdell McFarlin

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

The growth of online courses in higher education, combined with the distinct situational identity of historically Black colleges and universities (HBCUs) and their continued emphasis on face-to-face (F2F) instruction, provided an opportunity to learn more about learning modalities and student grades at HBCUs. The problem was previous research findings are contradictory regarding grades among modalities at HBCUs. The purpose of this study was to compare differences in grades among three learning modalities (F2F, hybrid, and online) for three student groups (African American, non-African American, and all students) at three public, 4-year HBCUs in one U.S. state. This cross-sectional, ex post facto, nonexperimental, comparative study was guided by the learning environment, learning processes, and learning outcomes framework. Secondary data consisting of 348,631 course grades were analyzed using Kruskal-Wallace *H* and Dunns statistics to test hypotheses. Very small statistically significant differences were found in mean rank student grades across the three modalities for all student groups. For the African American and all student groups, the mean rank for grades in hybrid courses was significantly higher than the mean rank in F2F and online courses. The mean rank for non-African American students' course grades in online courses was significantly higher than the mean rank in F2F and hybrid courses. This study contributes to social change by showing that grades are not different among HBCU students who take courses in various modalities; thus, HBCU stakeholders can support course delivery among various modalities and increase educational access among diverse and traditionally marginalized students.

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Dedication

This dissertation is dedicated to my parents, the late Floyd B. Walker, Sr., and Tomasena Gupple Walker, for the many years of focused parenting they afforded me and the legacy of education they left me. Their gifts of extraordinary educational opportunities and learning explorations guided the course and successes of my personal and professional life. I equally dedicate this body of work to my granddaughter, Reign C.S Buie, for whom I pray to leave an educational pathway that she may one day choose to follow.

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I thank God for providing me with the opportunity, resources, strength, and guidance to earn my Ph.D. I salute my husband, William C. McFarlin, Jr., for his commitment to me intellectually, financially, and emotionally.

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Chapter 1: Introduction to Study

Historically Black colleges and universities (HBCUs) are important institutions in higher education (Harper, 2018; Office for Civil Rights, 2018). HBCUs serve communities of various ethnic and racial identities of domestic and foreign origin in the United States by educating students through mainly traditional face-to-face (F2F) modalities (Andrews Graham, 2019; Jones & Davenport, 2018). Limited literature regarding the use of hybrid and online course modalities in HBCUs is available (Andrews Graham, 2019; Buzzetto-More, 2015). This study helped fill a gap in the literature about how grades among learning modalities may have differed in HBCUs. Data concerning the various learning modalities and grades in HBCUs are necessary to manage enrollment and finances that affect the viability of the schools (Jones & Davenport, 2018; Neelakantan, 2020). The findings of this study contribute to positive social change by providing new data about grades among students in F2F, hybrid, and online modalities at HBCUs. In Chapter 1, I introduce the study and discuss the background, problem statement, purpose of the study, research questions (RQs) and hypotheses, framework, definitions, assumptions, scope and delimitations, and limitations before concluding with the summary.

Background

According to Harasim (2000), the online learning modality originated in 1992, and digital learning technology increased in popularity at colleges and universities worldwide in 2000. Throughout the world, public and private 4-year higher learning institutions rapidly added online curricula to academic program offerings (Jin & Shang,

2019). Hybrid learning modalities combined traditional and online learning praxis (Garrison & Kanuka, 2004; Jin & Shang, 2019).

Harper (2018) said that in 1837 Cheyney State Teachers College in Pennsylvania became the first HBCU in the United States. While both non-African American people of color and White students attended HBCUs, history illustrated that the HBCUs' purpose was to educate students in African American communities. These colleges became essential to supporting advanced learning for students in communities of color who were not allowed to enroll in traditional universities. According to Harper (2018), The Civil Rights Act of 1964 changed the educational landscape for African American students by providing them access to predominantly White colleges and universities (Office for Civil Rights, 2018).

Authors have pointed out that the combination of growth in online courses in higher education, the unique situational identity of HBCUs, and HBCUs' continued reliance on the F2F course modality provided an opportunity to discover more about the learning modalities and student grade performance in HBCUs (see Andrews Graham, 2019; Bandara & Wijekularathna, 2017; Crews et al., 2015; Jones & Davenport, 2018). These conditions allowed for further research to determine if, and to what degree, grades differed among learning modalities at HBCUs. Filling the gaps in the literature could provide HBCU stakeholders with the information necessary to align organizational goals with teaching and learning strategies that affect grades (Thurgood Marshall College Fund [TMCF], 2019; United Negro College Fund [UNCF], 2021).

Problem Statement

The problem was previous research findings are contradictory regarding grades among modalities at HBCUs (Bourdeau et al., 2018; Cavanaugh & Jacquemin, 2016). The findings of previous scholarly literature justified the exploration of grades in F2F, hybrid, and online learning modalities at HBCUs to assess any differences in the evaluation of student learning (see Bandara & Wijekularathna, 2017; Larson & Sung, 2019; Panigraphi et al., 2016). According to Pascarella and Terenzini (2005), persistence is predicted by college performance and persistence is best predicted by college grades.

Researchers have agreed that by applying verified teaching best practices and learning principles to student performance, instructors influenced grades in F2F, hybrid, and online modalities (Andrews Graham, 2019; Burgess, 2015; Crews et al., 2015). However, Cavanaugh and Jacquemin (2016) recommended that researchers conduct large comprehensive studies to investigate differences in learning environments by including multiple colleges, diverse student populations, and nonrandom course selections in different learning modalities. HBCU administrators and course designers responsible for delivering rigorous educational content to their students need solid information by which to make decisions about modalities. This study could fill gaps in research and literature by studying three historically Black institutions with large, diverse student populations to discover differences in grades among F2F, hybrid, and online learning modalities (see Bourdeau et al., 2018; Cavanaugh & Jacquemin, 2016; Crews et al., 2015).

Purpose of the Study

The purpose of this nonexperimental, quantitative study was to compare differences in grades among three learning modalities at three public, 4-year HBCUs in the United States for three student groups. The independent variable was nominal and represented three course modalities: F2F, hybrid, and online. The dependent variable measured grades on an ordinal scale: A = 4.0, B = 3.0, C = 2.0, D = 1.0, and F = 0. The demographic groups were all students, African American students, and non-African American students.

Research Questions and Hypotheses

The following three RQs and corresponding hypotheses guided this study:

RQ1: Is there a statistically significant difference in the mean ranks for five ordinal grades earned by all students among three nominal student learning modalities in three public, 4-year HBCUs?

$H_0$1: There is no statistically significant difference in the mean ranks for five ordinal grades earned by all students among three nominal student learning modalities in three public, 4-year HBCUs.

$$Mean\ rank_{F2F} = Mean\ rank_{hybrid} = Mean\ rank_{online}$$

H_A1: There is a statistically significant difference in the mean ranks for five ordinal grades earned by all students among three nominal student learning modalities in three public, 4-year HBCUs.

$$Mean\ rank_{F2F} \neq Mean\ rank_{hybrid/} \neq Mean\ rank_{online}$$

RQ2: Is there a statistically significant difference in the mean ranks for five ordinal grades earned by African American students among three nominal student learning modalities in three public, 4-year HBCUs?

$H_0$2: There is no statistically significant difference in the mean ranks for five ordinal grades earned by African American students among three nominal student learning modalities in three public, 4-year HBCUs.

$Mean\ rank_{F2F} = Mean\ rank_{hybrid} = Mean\ rank_{online}$

H_A2: There is a statistically significant difference in the mean ranks for five ordinal grades earned by African American students among three nominal student learning modalities in three public, 4-year HBCUs.

$Mean\ rank_{F2F} \neq Mean\ rank_{hybrid} \neq Mean\ rank_{online}$

RQ3: Is there a statistically significant difference in the mean ranks for five ordinal grades earned by non-African American students among three nominal student learning modalities in three public, 4-year HBCUs?

$H_0$3: There is no statistically significant difference in the mean ranks for five ordinal grades earned by non-African American students among three nominal student learning modalities in three public, 4-year HBCUs.

$Mean\ rank_{F2F} = Mean\ rank_{hybrid} = Mean\ rank_{online}$

H_A3: There is a statistically significant difference in the mean ranks for five ordinal grades earned by non-African American students among three nominal student learning modalities in three public, 4-year HBCUs.

$Mean\ rank_{F2F} \neq Mean\ rank_{hybrid} \neq Mean\ rank\ online$

Theoretical Framework

The learning environment, learning processes, and learning outcomes (LEPO) framework guided this study. The LEPO framework is based on Biggs's (1993) presage-process-product model, Laurillard's (2002) conversational framework, and the learning-centered evaluation framework developed by Bain (1999). The LEPO framework supports teacher-designed learning environments, implements innovative learning processes, and evaluates learning outcomes. In the LEPO framework, students work in interactive learning environments that align with ways to demonstrate outcomes within learning environments (Phillips et al., 2010).

The LEPO framework places teachers and students in an interactive framework that includes three major components of learning: learning environments, learning process, and learning outcomes. The LEPO was a compatible framework because two of its facets aligned with this study's variables. Course modality, the independent grouping variable of this study, was a learning environment that influenced the learning process. Grades, the dependent variable in this study, was a learning outcome. This study was limited by not addressing the second component of the framework: learning process.

Nature of the Study

This nonexperimental, quantitative, comparative, ex post facto study addressed three RQs about the differences in grades among learning modalities. The study was nonexperimental because there was no random assignment into groups or manipulation of variables (see Allen, 2017). The quantitative method was used in the study because I analyzed numbers and not words (see Creswell & Creswell, 2018). The study was

comparative because I compared three groups on a dependent variable (see McMillan & Schumacher, 2010). I used the ex post facto design because data were collected before the study was executed and appropriate for comparison among groups without using a pretest (see Allen, 2017). Grades are a valid, common, and widely accepted outcome measure (Durham & Cook, 2017; Pascarella & Terenzini, 2005).

I requested and was authorized to use numeric archived data from the state agency that archives grades and other data submitted by institutions throughout the state. The unit of observation and analysis was individual grades, which were analyzed for differences among modalities taught at three public, 4-year HBCUs. All student information was de-identified except for race because it was the criterion needed to filter for the examination of RQ2, which included only African American students.

Definitions

F2F learning modality: The traditional classroom learning where students and teachers actively engage in learning activities, instant verbal feedback, and social-emotional interaction (Llego, 2020).

Grades: A system used to assess accountability by producing quantifiable outcomes represented by a letter and numeric label (Lynch & Hennessy, 2017).

Hybrid learning modality: A combination of F2F learning and online learning experiences (Garrison & Kanuka, 2004). Hybrid learning is also referred to as blended learning in the literature.

Online learning modality: Technology-mediated instruction that occurs exclusively via the internet (Broadbent, 2017; Jones & Davenport, 2018).

Assumptions

Four assumptions were inherent in this quantitative study. The first assumption was ontological regarding the nature of reality (see Hathaway, 1995). Reality was examined from an objective perspective, apart from me. The second assumption was epistemological in terms of the relationship between me and the study (see Hathaway, 1995). I was independent from the research, not interacting with what was studied. The third assumption was axiological concerning the role of values regarding the research (see Biedenbach & Jacobsson, 2016). I approached the research in an unbiased and value-free way. The fourth assumption was methodological and dealt with the process of the research. I took a deductive approach to compare three demographic groups for differences in ordinally measured grades among three nominally measured modalities.

Scope and Delimitations

This study was delimited in scope by geography, institutional status, time, and racial groups studied. Three public, 4-year HBCUs located in the United States were the only institutions included in the study. According to the National Center for Education Statistics (2020a), in 2018 101 HBCUs were operational in 19 states, the District of Columbia, and the U.S. Virgin Islands, and of the 101 HBCUs, 51 were public, 4-year, historically Black institutions, and 50 were historically Black, private, nonprofit institutions. Available data about grades and modalities in the three public, 4-year HBCUs included thousands of individual student records. Data were delimited to the three most recent years of data available from the three participating HBCUs.

Limitations

This study was limited in terms of content and external validity. Content validity is the extent to which a measure is relevant for measuring the underlying construct (Moss, 2007). Content validity was limited in terms of the independent and dependent variables. In this study, I used only grades to measure learning outcomes and studied only three delivery modalities. Learning assessment occurs in many ways, but grades are frequently used to measure learning outcomes (Goslin & Lamb, 2008; Lynch & Hennessy, 2017; Pascarella & Terenzini, 2005). The lack of assessment using multiple learning outcomes is a limitation I accepted for this study.

Content validity was also limited to studying differences in grades among F2F, hybrid, and online course modalities. These three modalities represent broad categories of course delivery but do not consider the wide variation that may be present in real course delivery. I accepted the limitation of studying only three general categories of course delivery modality.

External validity is the degree to which results of the research can be applied to other contexts (McMillan & Schumacher, 2010). External validity was limited to other public, 4-year HBCUs and institutions with similar populations. I accepted the limitation of external validity because I understood that HBCUs enroll similar populations and operate similarly across the United States (see TMCF, 2019; UNCF, 2021). More detail regarding validity is explained in Chapter 3.

Significance

The study findings could be significant to HBCU administrators and faculty, students and their parents, and capacity-building organizations. The findings could inform how HBCU administrators make budgetary decisions about which learning modalities should be supported financially (see Jones & Davenport, 2018). Budgeting decisions involve the acquisition of learning management systems, the hiring of technology staff, and the funding of faculty retraining, both during and after unforeseen institutional changes such as COVID-19 pandemic transitions and restrictions.

The study findings may also be significant for faculty at HBCUs who are responsible for developing curriculum, managing student learning modalities, selecting material, and assessing grades (see Andrews Graham, 2019; Nemec, 2018). Pascarella and Terenzini (2005) purported that persistence is predicted by college performance and persistence is best predicted by college grades. Therefore, if small or no differences are found among student grades among F2F, hybrid, and online modalities, faculty may feel less averse to teaching courses using hybrid and online learning modalities.

The study findings could be significant to students as well as their parents. Students select courses to satisfy major requirements as well as to fit their lifestyles, personal interests, and responsibilities; however, parents exert the most influence over their children's college selections (Cole Martin, 2017). The study could provide students and parents with information about how student grades compare across the groups of all students, African American students, and non-African American students in F2F, hybrid,

and online modalities. This information may be useful as students choose courses and decide whether to enroll in an HBCU.

The study could have significance for capacity-building organizations like the UNCF and TMCF. These organizations assist HBCUs in developing their financial and programmatic capacity (TMCF, 2019; UNCF, 2021). Capacity-building organizations may be more inclined to fund curricula and programs delivered in various modalities given the findings of the study. If grades are not different among students who take courses in various modalities, HBCU stakeholders can support course delivery among various modalities and increase access to courses among diverse and traditionally marginalized students.

Summary

In Chapter 1, I introduced the study. The introduction and background sections included outlines of the F2F, hybrid, and online course modalities and HBCUs' historical significance. The problem of previous research findings being contradictory regarding grades among modalities at HBCUs was also presented. I provided the purpose statement described the intent of the study; described the RQs and framework of the study; and explained I requested numeric archived data from the state custodian of student records for this study. The nonexperimental, quantitative, ex post facto research design. Key terms were defined in the Definitions section. The assumptions of the study were presented as inherent aspects of the study that cannot be evidenced. The scope and delimitations, which include the internal and external validity of the study, and the limitations of the study were explained. In the significance section, I aligned the

relationships of crucial HBCU stakeholders to the purpose of the study with the potential to advance knowledge and inspire social change at HBCUs. Chapter 2 contains the literature review of the essential components of the study.

Chapter 2: Literature Review

Differences among the three learning modalities (i.e., F2F, hybrid, and online) and student grades were found in some previous studies (Athens, 2018; Gundlach et al., 2015; Harrington et al., 2016). Other studies found no differences among the three learning modalities and student grades (Ellegood et al., 2019; Fischer et al., 2019; Stack, 2015). The problem was previous research findings were contradictory regarding student grades among modalities at HBCUs. The purpose of this nonexperimental, quantitative study was to compare differences in student grades among three learning modalities at three public, 4-year HBCUs in the United States for three student groups. I examined grades among learning modalities in HBCUs to discover potential differences that may affect similarity in grades. In Chapter 2, I present a review of the literature. The major sections of the literature review are the history, purpose, importance, and challenges of HBCUs; seminal and current literature about F2F, hybrid, and online learning modalities; differences related to grades among the three modalities; and a summary of the literature review.

Literature Search Strategy

The studies presented in this chapter are research articles reflecting the study's focus on the connection between learning modalities and grades in HBCUs. Articles included in this literature review resulted from initial searches made between 2018 and 2020. I searched the following databases: Education Source, Elsevier, ERIC, the National Research Center for Distance Education and Technological Advancements, Google Scholar, MERLOT Journal of Online Learning, JOLT-the Journal of Online Learning and

Teaching, ProQuest, SAGE Journals, and Thoreau. Search terms included *modalities*, *traditional or face-to-face (F2F) learning*, *blended learning*, *online learning*, *grades, hybrid*, *Historically Black Colleges and Universities (HBCUs)*, *higher education*, *education theories*, *environmental learning theories*, and *student achievement*.

This literature review includes seven research studies (see Appendix A) about the connection between learning modalities and grades in HBCUs. Select seminal and recent research studies about learning modalities and grades as outcomes included a comparative sample of the larger volume of literature in the higher education community. I found two dissertations (i.e., Cole Martin, 2017; Sudarsanan, 2015) and one conference report (i.e., Jin & Shang, 2019) in the literature that addressed the topic. Both were cited in this literature review. Neither document was a quantitative study that compared student grades earned in courses taught in the three course modalities at HBCUs as examined in this study.

Theoretical Foundation

I selected the LEPO framework as the theoretical foundation for this study. The LEPO development included a review of scholarly research studies in educational technology and higher education policy (Phillips, 2011b). The LEPO connects the relationship between students and teachers with three elements of teaching and learning environments (i.e., F2F, hybrid, online), processes (i.e., learning activities), and outcomes (i.e., grades, evaluations, or assessments; Phillips et al., 2010).

According to Phillips et al. (2010), three scholarly works informed the LEPO framework: Biggs's (1993) presage-process-product model, Laurillard's (2002)

conversational framework, and Bain's (1999) learning-centered evaluation framework. The LEPO framework is "pedagogically neutral and includes an expansive range of contexts, and other accepted frameworks of learning" (Phillips et al., 2010, p. 10). The LEPO framework supports improvements in learning environments and frames the evaluation of innovative educational environments and processes.

According to Sumanasiri et al. (2015), the LEPO framework integrated multiple learning components into a singular framework. The LEPO framework is compatible with novel learning environments and methods that include F2F, hybrid, and online learning modalities. The LEPO framework is an effective framework to assess differentiated approaches to teaching and learning in grade-level curricula (Msimanga, 2020; Phillips, 2011b).

Researchers have recommended using the LEPO framework to implement learning in universities (Phillips, 2011b; Sumanasiri et al., 2015). The LEPO framework is recommended for developing a university-wide academic curriculum policy (Sumanasiri et al., 2015). The learning environments and learning outcomes of LEPO align with the modality and grade variables in this study. By understanding if differences are present in grades for three student learning modalities in HBCUs, curriculum policy can be considered and adjusted. The sustainability of HBCUs fosters continual service to graduate students and develops their social capital.

Literature Review Related to Key Variables

In this section, I present literature related to key variables in the study, including the history, purpose, enrollment characteristics, and challenges of HBCUs. Seminal and

current literature about F2F, hybrid, and online learning modalities as well as the differences between modalities and grades are also included. A summary of literature concludes Chapter 2.

HBCUs

In this literature review, I focus on HBCUs, the characteristics of the institutions studied, a brief history, the purpose, importance, and challenges these universities face. This review provides data and information about mainstream higher education institutions to provide a context for examining the relationship among learning modalities and grades in HBCUs. I found more than 500 research studies, peer-reviewed articles, and book chapters about the differences among student learning modalities and grades in mainstream institutions of higher education when searching the literature. However, there were limited studies about the differences among F2F, online, and hybrid learning modalities and student grades in HBCUs (Bandara & Wijekularathna, 2017; Buzzetto-More, 2015; Kang & Yang, 2016).

History

HBCUs were founded during Reconstruction following the Civil War (Allen, 2017). The U.S. Department of Education (2020), in The Higher Education Act of 1965 under Section 322 (a) defined HBCUs as "any historically black college or university that was established before 1964, whose principal mission was, and is, the education of black Americans, and that is accredited by a nationally recognized accrediting agency" (p. 125). Arroyo and Gasman (2014) produced the first known theoretical model that documented the role of HBCUs in the academic success of its students and alumni.

Purpose

In the movement to diversify higher education in the United States, HBCUs are the bearers of a vital legacy (Arroyo & Gasman, 2014; Redd, 1998; U.S. Department of Education, 2020). While struggling to survive under difficult circumstances, HBCUs offer opportunities for self-actualization and social mobility (Carson & Lewis, 2020; Jewell, 2002; Redd, 1998). HBCUs teach racial tolerance and produce alumni like the Reverend Dr. Martin Luther King, Jr., who distinguish themselves as tireless workers for social justice.

Enrollment Characteristics

The 2014 study brief, *Doing More with Less*, found that students of color comprised nearly 3.5 million minority-serving institutions' (MSIs) undergraduate enrollment in the United States (Cunningham et al., 2014). The National Center for Education Statistics (2020a) said that by the Fall of 2015, MSIs had enrollments equaling over 5 million undergraduate students. HBCUs were the first MSIs, followed by Hispanic-serving institutions, tribal colleges and universities, and predominantly Black institutions. Among all colleges and universities in the United States, 1 in 5 White undergraduate students and 2 in 5 undergraduate students of color attend MSIs (Cunningham et al., 2014).

According to the National Center for Education Statistics (2020a), in 2017 total student enrollment at all HBCUs was 25% non-Black and in 2018, non-Black students made up 24% of enrollment at HBCUs, compared with 15% in 1976. The number of full-

time students in the three public, 4-year HBCUs that participated in the current study comprise the fourth largest population of students attending public, 4-year HBCUs in the nation. The gap in research and literature about the difference among student learning modalities and grades in HBCUs is critical to understand because HBCUs educate 14% of the undergraduate student population in the United States (see National Center for Education Statistics, 2020b). The 101 public, 4-year HBCUs, and private HBCUs collectively awarded 24% of all baccalaureate degrees earned in the United States (UNCF, 2020)

Challenges

The rapid evolution of educational technology in the 21st century has brought new challenges and threats to the future of HBCUs (Jones & Davenport, 2018; Samayoa et al., 2016; Tennessee State University, 2014). Some of these challenges and threats include:

- Operational costs and technological challenges increased (Cunningham et al., 2014; Samayoa et al., 2016; Tennessee State University, 2014).
- Competition with for-profit institutions (Jones & Davenport, 2018; Samayoa et al., 2016).
- Faculty resistance to adopting educational technology (Andrews Graham, 2019; Burgess, 2015).
- Reduced federal funding caused slow implementation of hybrid and online modalities in HBCUs (Jones & Davenport, 2018; Samayoa et al., 2016).

- Financial restraints delayed the installation of learning management systems at HBCUs (Samayoa et al., 2016; Tennessee State University, 2014).
- The proliferation of for-profit colleges and universities with online degree programs was attractive to ethnic minority students who cannot afford to attend residential HBCUs that do not offer online degree programs (Jones & Davenport, 2018; Samayoa et al., 2016).

HBCU faculties include tenured members who often have little respect for online learning modalities (Andrews Graham, 2019). These instructors are accustomed to F2F teaching and fear that their tenured positions will become unprotected in online teaching environments (Andrews Graham, 2019; Burgess, 2015). MSIs regularly face more financial challenges than predominantly White institutions (Cunningham et al., 2014).

Grades as Learning Outcomes

This study addressed whether differences in learning outcomes were present in F2F, online, and hybrid course modalities at the three public, 4-year HBCUs under studies. I found few studies in the literature focused on differences among learning modalities and learning outcomes in HBCUs; however, none of the studies included large numbers of HBCU students (Buzzetto-More, 2015; Kang & Yang, 2016; Samayoa et al., 2016).

Student learning outcomes are measurable in several ways. According to Inman and Powell (2020), achievement measures success. Qualitative student learning outcomes at the course level include written narratives, such as written evaluations, term papers, essays, or end-of-course written comments. Quantitative learning outcomes at the course

level include quiz scores and course test scores. Grades are calculated cumulatively and presented as grade point averages (GPAs; Bailey et al., 2014). Persistence in college is best determined by grades (Pascarella & Terenzini, 2005). Quantitative learning outcomes are interpretations of numerical calculations represented by alphanumerical metrics in most higher education institutions in the United States. The A = 90–100, B = 80–89, C = 70–79, D = 60–69, and F = below 60 scale (potentially with + or - modifiers) has been the standard grading system used in U.S. higher education for more than 100 years (Borghans et al., 2016; Durham & Cook, 2017; Inman & Powell, 2020). Grades were the dependent variable in this study.

Learning Modalities

This section of the literature review contains seminal and current literature related to this study's three learning modalities: F2F, hybrid, and online learning.

Seminal Literature

Kiser (1999) established the initial framework for an online teaching modality. This framework included 10 suggestions on how to teach online courses:

- Secure technical support.
- Develop a learning plan.
- Avoid teaching hard skills.
- Provide technical training during work hours.
- Make coursework brief.
- Avoid downtime during course time.
- Use the technology without plug-ins.

- Provide fundamental instruction.
- Teach with compassion.
- Be confident that the worldwide web is not an occupational threat to trainers.

Gundlach et al. (2015) and Roscoe (2012) said that although student attitudes in some studies indicated that students preferred F2F to online learning, between 2008 and 2015 there were inconclusive findings concerning the differences among learning modalities and grades in HBCUs. Pascarella and Terenzini (2005) stated that college grades indicated how engaged students were in earning good grades. The Tennessee State University (2014) HBCU outlined approaches for using the internet for teaching and learning, including leadership, costs, managing resources, student access, and the evaluation of new technologies for HBCUs. Buzzetto-More (2015) found that students performed better in course assessments when YouTube was the primary teaching tool instead of F2F lecture formats. Seaman et al. (2018) said that between 2012 and 2016, the number of distance learning students rose by 337,016, a 6% increase nationwide.

Current Literature

The growing number of online modalities in colleges and universities has increased interest in grade-based learning outcomes. Cavanaugh and Jacquemin (2016) found that learning modalities significantly affected grade distributions using the traditional letter grades of A, B, C, D, and Bourdeau et al. (2018) evaluated learning modalities and grades in English composition courses to determine why student grades varied in different learning modalities. Bourdeau et al. (2018) found a link between learning modalities and failing grades. Students in F2F classes were more likely to fail

than students in online classes. The distribution of grades differed significantly among learning modalities in Bourdeau et al.'s (2018) study. In comparison to F2F students, online and hybrid students scored more Bs and fewer Cs, Ds, and Fs.

Improving the understanding of the relationship between student access and success through evidence-based, cross-institutional, online learning practices and technologies could help improve student learning outcomes. The literature included 400 studies about the differences among learning modalities, grades, and other mainstream U.S. higher education outcomes. Most of the research findings indicated that there was no significant difference among course modalities with grades as outcomes (Distance Education and Technological Advancements, 2019).

F2F

F2F or traditional classroom instruction operates within a synchronous offline learning environment (Llego, 2020). Learning modalities evolved from centuries of the traditional F2F modality to correspondence (by mail) courses in the 20th century (Ebner & Gegenfurtner, 2019). F2F modality is a trending terminology used to describe traditional instruction environments without using an internet teaching platform (Llego, 2020).

Hybrid

Hybrid learning is a commonly used modality in which learning occurs through a combination of F2F and online instruction. The online components of blended modality let the student choose when and where to participate in course activities, complete assignments, or communicate with faculty and classmates. The instructor has the

flexibility to teach in a brick and mortar and online environment, simultaneously or independently in each environment. Grades are a measurement of learning outcomes in hybrid modalities (Asarta & Schmidt, 2020).

Online

Kiser (1999) said that in 1993, the world wide web, titled *Mosaic*, launched at the University of Illinois, becoming the first web browser used in any distance learning modality in the United States. Harasim (2000) observed that in 2000, online education was distinguished by three types of delivery: adjunct mode, augmented conventional F2F, or distance education by using networking. Networking was used as a significant part of a typical classroom or distance course in mixed mode. For an entire course or program, fully online mode relies on networking as the primary teaching tool. Today, online modalities continue to flourish because internet-based learning is increasingly popular, and programs are manageable with digital tools from remote locations worldwide (Asarta & Schmidt, 2020). Students appreciate that learning materials and activities are always available online. Neelakantan (2020) said the COVID-19 pandemic relegated nearly all student learning to the online modality.

Learning Outcomes by Modality

This section includes subsections that list studies with learning outcomes among modalities that found no significant difference, concurrent courses with no difference, or significant difference. Learning outcomes among modalities are readily available in the literature for mainstream populations. Literature about modalities and grades in HBCUs was scant in the literature.

No Significant Difference

Fischer et al. (2019), Larson and Sung (2019), and Roberts et al. (2019) found no significant difference among student grade outcomes and learning modalities. Gundlach et al. (2015) found that changes in student attitudes about course modalities do not affect learning outcomes in HBCUs. Distance Education and Technological Advancements (2019) has a database of more than 300 studies with findings of no significant difference and significant difference among F2F, hybrid, and online learning modalities attributed to student grades. This organization's objective is to understand distance education outcomes and identify instructional and institutional practices that impact student learning outcomes.

Concurrent Course Sections

The concurrent-course literature includes studies that indicated no difference in student grades among learning modalities taught in different course sections of the same course in each of the three modalities (Larson & Sung, 2019; Souza et al., 2018). Studies housed at the National Research Center for Distance Education and Technological Advancements (2019) showed differences in student grades among learning modalities in different course sections. A consensus on differences between student grades among learning modalities appeared to be inconsistent in the literature.

Significant Difference

Larson and Sung (2019) and Harrington et al. (2016) conducted quantitative studies that examined the differences among F2F, hybrid, and online learning modalities with mixed results.

Learning Modalities and Outcomes in HBCUs

Few quantitative studies found in the literature showed differences among student learning modalities and student grades in HBCUs (Bandara & Wijekularathna, 2017; Buzzetto-More, 2015; Kang & Yang, 2016). Buzzetto-More (2015) conducted a study on YouTube's influence as a teaching tool in a business course at a mid-Atlantic HBCU and found that students in the F2F course section received higher grades on course tests that required analytical responses than students in the online course section. Students in the online course section achieved higher scores on course tests that required essay responses than students in the F2F course section.

Kang and Yang (2016) conducted a small ex post facto quantitative study about African American student relationships to course modalities at one of the three public 4-year HBCUs used in this study. Kang and Yang examined students' interaction with learner to learner, learner to content, and learner to instructor learning modalities in F2F and online sections of the same courses. The researchers found that students related to F2F more positively than to online course content. Bandara and Wijekularathna (2017) conducted a quantitative study that compared student grades as outcomes between F2F and online modalities in a required operations management course at the same HBCU as Kang and Yang in different academic years. Both studies showed no difference in student grades between F2F and online student grades in some courses. There was a difference between online students and F2F students in other courses (Bandara & Wijekularathna, 2017; Kang & Yang, 2016).

Summary and Conclusion

Research about the differences among learning modalities and grades is contradictory (Asarta & Schmidt, 2020; Bandara & Wijekularathna, 2017). Some studies showed a difference among learning modalities and grades (Ellegood et al., 2019; Gundlach et al., 2015; Harrington et al., 2016). Other researchers found no difference (Larson & Sung, 2019). Cavanaugh and Jacquemin (2016) reported that students of color comprised nearly 3.5 million of MSI undergraduate student enrollment across the United States. Conducting large studies to investigate differences in learning environments that include several colleges, diverse student populations, and nonrandom course selections in different learning modalities is recommended in the literature.

Two dissertations and one conference report explicitly focused on the differences between learning modalities and grades in HBCUs were found during the literature search (Cole Martin, 2017; Kuo & Kuo, 2013; Sudarsanan, 2015). Although students, parents, and administrators need current data and information to make decisions about using new technologies in academic course delivery in HBCUs in the modern educational environment, non-contradictory research is lacking. The UNCF (2020); the TMCF; (2019); and other HBCU stakeholders; including accreditation agencies need this information to address financial, programmatic, and sustainability issues that affect HBCUs (Southern Association of Colleges and Schools, 2017). This study could add data and knowledge to the literature about the relationship among learning modalities and grades as outcomes in HBCUs called for by Cavanaugh and Jacquemin (2016), Filak and Nicolini (2018), and Kang and Yang (2016).

A wealth of data about learning modalities and grades pertinent to mainstream higher education were available in scholarly literature. In contrast, literature about learning modalities and grades in HBCUs was minimal in quantity and narrow in content. This study could fill the gap in the literature about learning modalities and grades in HBCUs. These two variables are described as are other methodological elements in Chapter 3.

Chapter 3: Research Method

The purpose of this nonexperimental, quantitative study was to compare differences in student grades among three learning modalities at three public, 4-year HBCUs in the United States for three student groups. In Chapter 3, I describe the research design and rationale, methodology, threats to validity, and ethical procedures. The chapter concludes with a summary.

Research Design and Rationale

In this study, I used a nonexperimental, quantitative, comparative, ex post facto approach to address three RQs about the differences in grades among learning modalities at three public, 4-year HBCUs in the United States. An ex post facto research design was used because data were collected before the study was conducted (see Allen, 2017). The use of this research design was consistent with research studies that used archived data to address differences among groups (see Riffe et al., 2019). In the current study, I compared the differences among one independent variable with three nominal groups and one dependent variable with five levels of an ordinal scale. The three groups of the independent variables were F2F, hybrid, and online learning modalities. The dependent variable was grades measured as A, B, C, D, and F. The study was nonexperimental because there were no random assignments into groups or manipulation of variables (see Allen, 2017). I employed the quantitative approach because I analyzed numbers and not words (see Creswell & Creswell, 2018).

The findings of this study could advance knowledge of the discipline as called for by Cavanaugh and Jacquemin (2016), who recommended the need for large studies to

investigate differences in learning environments. This study included several colleges, diverse student populations, and courses in different learning modalities. The findings could help fill a gap in research in the education discipline by contributing quantitative research about the differences in grades among learning modalities at three public, 4-year HBCUs (see Bandara & Wijekularathna, 2017; Fischer et al., 2019; Jones & Davenport, 2018).

Methodology

In this section, I described the population, sampling and sampling methods, archival data, operationalization of variables, and statistical assumptions. A quantitative, ex post facto, nonparametric, research design was used in this study. The data set used in this analysis was nonrandomized, archival student grades.

Population

The target population was all undergraduate student courses taken at public, 4-year HBCUs in the United States during the three academic years of 2017–2019 (National Center for Education Statistics, 2020a). The target population size of courses was unknown; however, sampled data comprised 348,631 course grades.

Sampling and Sampling Procedures

For this study, I sampled a census of all students attending three public, 4-year HBCUs in one state during the three academic years of 2017–2019. All students who took F2F, hybrid or partial online, and online courses during the 2017–2019 academic years were included (National Center for Education Statistics, 2020a). Courses taken during spring, summer, and fall terms of these three academic years were included.

Students who took eCore (i.e., correspondence) courses were excluded. eCore courses were not offered at all three of the universities in the study during the 3 years of data collected for the study. An a priori power analysis was not relevant because thousands of records were included in the data set.

Archival Data

Procedure for Gaining Access to the Data Set

The use of archived numeric data was approved for this study by Walden University's Institutional Review Board (Approval No. 12-16200978319). The official state agency for the research site also approved the data usage. The state office of research retrieved redacted data from the state archive. The office also checked data for outliers before sending the data to me.

Operationalization of Variables

One independent and one dependent variable were measured in this study. The dependent variable was grades, while the independent variable was learning modalities.

Dependent Variable. The dependent variable measured student grades in all courses taught in the three modalities: F2F, hybrid, and online on an ordinal scale. The categories of A, B, C, D, and F indicated grades earned. Lipnevich et al. (2020) affirmed that grades are a valid, standard, and widely accepted outcome measure.

Independent Variable. The independent variable was a nominal variable with three groups: F2F, hybrid, and online course learning modalities. The learning modalities measured were the most common and current delivery modes in higher education at the time of the study. F2F instruction took place in a traditional classroom where students

and teachers actively engage in learning activities, instantaneous verbal feedback, and social-emotional interaction (see Garrison & Kanuka, 2004). The hybrid learning modality included courses that were 50% to 94% online. The state agency that maintains grade records defined a hybrid learning modality as a combination of up to 50% F2F learning and 51% to 94% online learning as a partial online course modality. I collapsed the partial online category into the hybrid category. Online learning modality was defined as digital technology instruction that occurred from 95% to 100% online.

Other Variables. The Data Sharing Agreement confirmed that student-course level data for undergraduates enrolled in learning modalities were available in the Data Element Dictionary and Data Element Dictionary Variable Selection spreadsheet. Data included course enrollment information (i.e., acronym, number, grade, Classification of Instructional Program, and a series of online/F2F indicators) and student-level information (i.e., student level, race/ethnicity, and cumulative GPA). I used student demographics to describe participants. The variables indicated race in the Integrated Postsecondary Education Data System Race Ethnicity Codebook as Black or African American; Hispanic, or Latino; Native Hawaiian or Other Pacific Islander; two or more races; Unknown; and White.

Data Analysis Plan

I tested three null hypotheses using Kruskal-Wallis *H* and Dunns post-hoc procedures. Data were analyzed using IBM Statistical Package for Social Sciences Version 25. Redacted data were initially cleaned by a representative in the state office of research. The data cleaning process included two actions. First, frequency distributions

were calculated to identify any outliers for each variable within the data set. Second, cases that contained outliers for any of the variable categories were excluded from the data set. I tested null hypotheses that corresponded to the three RQs using the Kruskal-Wallis *H* statistical procedures. For significant three-group comparisons, Dunn-Bonferroni post hoc pairwise comparisons were made.

The following three RQs and corresponding hypotheses guided this investigation:

RQ1: Is there a statistically significant difference in the mean ranks for five ordinal grades earned by all students among three nominal student learning modalities in three public, 4-year HBCUs?

$H_0$1: There is no statistically significant difference in the mean ranks for five ordinal grades earned by all students among three nominal student learning modalities in three public, 4-year HBCUs.

$Mean\ rank_{F2F} = Mean\ rank_{hybrid} = Mean\ rank_{online}$

H_A1: There is a statistically significant difference in the mean ranks for five ordinal grades earned by all students among three nominal student learning modalities in three public, 4-year HBCUs.

$Mean\ rank_{F2F} \neq Mean\ rank_{hybrid} \neq Mean\ rank_{online}$

RQ2: Is there a statistically significant difference in the mean ranks for five ordinal grades earned by African American students among three nominal student learning modalities in three public, 4-year HBCUs?

$H_0$2: There is no statistically significant difference in the mean ranks for five ordinal grades earned by African American students among three nominal student learning modalities in three public, 4-year HBCUs.

$Mean\ rank_{F2F} = Mean\ rank_{hybrid} = Mean\ rank_{online}$

H_A2: There is a statistically significant difference in the mean ranks for five ordinal grades earned by African American students among three nominal student learning modalities in three public, 4-year HBCUs.

$Mean\ rank_{F2F} \neq Mean\ rank_{hybrid} \neq Mean\ rank_{online}$

RQ3: Is there a statistically significant difference in the mean ranks for five ordinal grades earned by non-African American students among three nominal student learning modalities in three public, 4-year HBCUs?

$H_0$3: There is no statistically significant difference in the mean ranks for five ordinal grades earned by non-African American students among three nominal student learning modalities in three public, 4-year HBCUs.

$Mean\ rank_{F2F} = Mean\ rank_{hybrid} = Mean\ rank_{online}$

H_A3: There is a statistically significant difference in the mean ranks for five ordinal grades earned by non-African American students among three nominal student learning modalities in three public, 4-year HBCUs.

$Mean\ rank_{F2F} \neq Mean\ rank_{hybrid} \neq Mean\ rank_{online}$

Kruskal-Wallis H

I tested the null hypotheses with the Kruskal-Wallis *H* test. The Kruskal-Wallis *H* test is a nonparametric test appropriately used when there are three nominal categories of

one independent variable and an ordinally ranked dependent variable (Wallace, 1959). The Kruskal Wallis *H* test is "the nonparametric equivalent of a one-way analysis of variance (ANOVA) and tests whether several independent samples (groups) are from the same population" (Leech et al., 2015, p. 338). The Kruskal Wallis *H* test was more appropriate than a one-way ANOVA because the data are ordinal and one or more assumptions of the one-way ANOVA, such as homogeneity of variances, was met (see Glen, 2016; Richardson, 2018).

Statistical Assumptions of Kruskal-Wallis H

Kruskal-Wallis *H* testing requires three assumptions (Morgan et al., 2020). The study design met all three assumptions.

Assumption #1: One dependent variable is measured at the ordinal level. The first assumption was met by design because the dependent variable, grades, was measured at the ordinal level.

Assumption #2: One independent variable that consists of three categorical, independent groups. The second assumption was met because the independent variable consisted of three course modality categories: F2F, hybrid, and online.

Assumption #3: Independence of observations is an assumption of Kruskal-Wallis *H*. There was no relationship between the observations in each group of the independent variable or between the groups themselves. The third assumption was met because each value of both the dependent and independent variables was made individually.

Significance Level and Interpretation

The level of significance used to either reject or retain the null hypothesis was an alpha probability, p value, of $\leq .05$, as is typical within the social sciences (see Rovai et al., 2014). If the null hypothesis was rejected statistically, pair-wise post hoc comparisons were made using the Dunn-Bonferroni test to determine differences among multiple pairs of samples while minimizing the overall Type I error rate by dividing the alpha by the number of iterations made. (American Psychological Association, 2020). I reported descriptive statistics and H test results. If H was statistically significant, the Dunn-Bonferroni test value was reported**.**

Effect Size

I measured effect size by eta-squared based on the value of H calculated as $(H - k + 1) / (n - k)$. H was the value obtained in the Kruskal-Wallis test, k was the number of groups, and n was the total number of observations (Maciej & Tomczax, 2014; Wallace, 1959). The resulting value was between 0 and 1 and multiplied by 100 to indicate the percentage of variance in the dependent variable that was explained by the independent variable (Morgan et al., 2020). Interpretation was based upon Leech et al.'s (2015) values of strength of a relationship measured by eta-squared: .21 = much larger than typical, .14 = large or larger than typical, .06 = medium or typical, and .01 = small or smaller than typical.

Threats to Validity

Validity and reliability of methods and measurements are important to consider in a quantitative study (Bhandari, 2020). External validity measures the extent to which the

study results reflected the general behavior, characteristics, or outcomes of populations similar to the sample population of the study. Internal validity means that there is confidence that other factors were not reasons for the cause-and-effect relationship between variables in a study. Population validity and ecological are two kinds of external validity. These types of external validity are discussed in the following subsections, along with internal validity, construct validity, and statistical conclusion validity.

Population Validity

Bhandari (2020) defined population validity by whether the findings of the sample can be generalized to a larger population. The generalization of this study's findings is limited to other HBCUs or colleges or universities with student populations similar to the populations represented in this sample. The student population size studied was 23,790. Population validity was threatened by the limited groups selected for this study. Only three racial groups were selected for study among several races and ethnic group categories. African American students were overrepresented at HBCUs compared to other groups. Students had a maximum of 3 years of a learning experience in undergraduate F2F, hybrid, and online modality course options. All students in the study attended F2F, hybrid, or online course sections during every academic period between 2017 and 2019.

Ecological and Internal Validity

Ecological validity indicates whether the findings of a study can be applied in the real world (Bhandari, 2020). Internal validity existed in this study when a trustworthy causal relationship was confirmed between modality, the independent variable, and

grades the dependent variable (see Bhandari, 2020). In general, a variety of factors influenced students' grades and were not accounted for in this study, which posed threats of ecological and internal validity (see Andrade, 2018).

Construct and Face Validity

In this study, the threat to construct validity for the dependent variable, grades, was low because grades were measured on a standard 4-point scale. According to Lipnevich et al. (2020), student grades are measured on an ordinal five-category grade: A= 4.0, B = 3.0, C = 2.0, D = 1.0, and F = 0. Grades offer face validity because they are a valid, standard, and widely accepted outcome measure (Lipnevich et al., 2020).

Statistical Conclusion Validity

Statistical conclusion validity referred to the reasonableness of statistical interpretations. A nonparametric statistic was selected to mitigate the threat of statistical conclusion validity in the study. Kruskal-Wallis *H* was selected because it was an appropriate method to test hypotheses posed by this study. The dependent variable in this study was measured on an ordinal scale and did not meet the stringent statistical assumptions of one-way ANOVA. Statistical conclusion validity remained because census sampling was used and not random sampling, as is called for in all inferential statistical testing. Randomization is often violated in applied research (Knief & Forstmeier, 2021) and I accepted this violation related to statistical conclusion validity.

Statistical conclusion validity regarding the reliability of the data was strong. Random data entry error and recoding error were mitigated by policy followed by institutions submitting data. According to a general education statute for the research

state, institutions must certify that the data are correct. Data were entered into the student information system by campus personnel, and responsibility for the fidelity of that data rested with the data stewards on campuses. During the data collection process, an Extraction Transfer Load software package collected information from the student information system and reviewed certain data elements for valid values. Cross-checks were done during the Extraction Transfer Load so that conflicting values were identified, and institutions revised their information before final submission. The validity of the study was strong through a combination of population, ecological, internal, construct, and statistical conclusion validity.

Ethical Procedures

I received approval from Walden University's Institutional Review Board (Approval No. 12-16-20-0978319) and I submitted the approval information to the research state before data were released for use in this research study. Data will be destroyed after 5 years as required by Walden University. All data provided for research studies must be maintained in a secure environment. Data included anonymous de-identifiers of all student demographics and individual grades. Data were maintained in a password-protected file in my home computer in a locked office.

Summary

The research design and methodology were developed to reveal information about grades among learning modalities in HBCUs. In Chapter 3 the rationale for this non-experimental quantitative comparative ex post facto study and variables of the study are presented to address the three RQs by testing corresponding null hypotheses. The

connection between the research design and the RQs was explained. The population of all HBCUs was presented. The study population was described as three public 4-year HBCUs. Data collection procedures were listed to obtain archival data. The independent variable course modality and the dependent variable grades were operationalized. The rationale for selecting Kruskal-Wallis *H* as the inferential statistical test and the test's statistical assumptions were presented. Threats to validity and procedures for ethical protection were presented. Chapter 4 follows with the results of the research based on research procedures outlined in Chapter 3.

Chapter 4: Results

The purpose of this nonexperimental, quantitative study was to compare differences in grades among three learning modalities at three public, 4-year HBCUs in the United States for three student groups. In Chapter 4, I provide an overview of the data collection processes, present the results of the study, and summarize the results. The following three RQs and corresponding hypotheses were investigated in this study:

RQ1: Is there a statistically significant difference in mean ranks for five ordinal grades earned by all students among three nominal student learning modalities in three public, 4-year HBCUs?

$H_0$1: There is no statistically significant difference in the mean ranks for five ordinal grades earned by all students among three nominal student learning modalities in three, public 4-year HBCUs.

$Mean\ rank_{F2F} = Mean\ rank_{hybrid} = Mean\ rank_{online}$

H_A1: There is a statistically significant difference in the mean ranks for five ordinal grades earned by all students among three nominal student learning modalities in three public, 4-year HBCUs.

$Mean\ rank_{F2F} \neq Mean\ rank_{hybrid} \neq Mean\ rank_{online}$

RQ2: Is there a statistically significant difference in mean ranks for five ordinal grades earned by African American students among three nominal student learning modalities in three public, 4-year HBCUs?

$H_0$2: There is no statistically significant difference in the mean ranks for five ordinal grades earned by African American students among three nominal student learning modalities in three public, 4-year HBCUs.

$Mean\ rank_{F2F} = Mean\ rank_{hybrid} = Mean\ rank_{online}$

H_A2: There is a statistically significant difference in the mean ranks for five ordinal grades earned by African American students among three nominal student learning modalities in three public, 4-year HBCUs.

$Mean\ rank_{F2F} \neq Mean\ rank_{hybrid} \neq Mean\ rank_{online}$

RQ3: Is there a statistically significant difference in the mean ranks for five ordinal grades earned by non-African American students among three nominal student learning modalities in three public, 4-year HBCUs?

$H_0$3: There is no statistically significant difference in the mean ranks for five ordinal grades earned by non-African American students among three nominal student learning modalities in three public, 4-year HBCUs.

$Mean\ rank_{F2F} = Mean\ rank_{hybrid} = Mean\ rank_{online}$

H_A3: There is a statistically significantly difference in the mean ranks for five ordinal grades earned by non-African American students among three nominal student learning modalities in three public, 4-year HBCUs.

$Mean\ rank_{F2F} \neq Mean\ rank_{hybrid} \neq Mean\ rank_{online}$

Data Collection

Data collection proceeded as described in Chapter 3. A census of grades earned in all courses by students attending the three public, 4-year HBCUs in the United States

(i.e., University 1, University 2, and University 3) between academic years 2017-2019 was represented in the data set (National Center for Education Statistics, 2020a). All 348,631 course grades that students took in F2F, hybrid, and online formats during the 3-year period were included. Terms included spring, summer, and fall. A descriptive profile of the population data is presented next in the Results section.

Results

In this section, I first present a description of the sample. As possible, the sample is compared to the population of HBCUs nationally. Results of hypotheses testing are then presented for the three RQs. I also provide an evaluation of assumptions along with the results.

Descriptive Comparisons with Population Proportions

Descriptive statistics are presented for demographic variables. I provide sample proportions for academic term and institutional representation first before presenting sample and population proportions, when available, for institutional control, head count, course count, racial composition, grades, and modalities. National comparative data for grades and modalities were not available.

Headcount and Institutional Control

Currently, there are 101 HBCUs located in 19 states in the United States and the Virgin Islands (National Center for Education Statistics, 2020a). HBCUs are comprised of public 4-year and 2-year HBCUs, and private 4-year and 2-year HBCUs. North Carolina has funded the most HBCUs, 11 out of 101. The states of Georgia and Texas have each funded nine HBCUs.

In terms of head count, 21 public, 4-year historically Black universities represented 20.8% of all HBCUs. According to the National Center for Education Statistics (2020b), the data from the Integrated Postsecondary Education Data System, indicated that 84% of all students at the 21 public, 4-year historically Black universities were African American in 2018, while 16% were non-African American. Combined, head count at the three institutions in the study comprised 8.5% of the 162,703 HBCU student head count for 2018 (National Center for Education Statistics, 2020b). Further headcount data were not yet available nationally.

Table 1 presents data from 2018 for public, 4-year historically Black universities comparable to the study universities.

Table 1

Public 4-Year HBCU Head Count Comparisons

HBCUs in Study	Head Count	Similar Size HBCUs	Head Count
University 1	2,776	Southern University of New Orleans	1,949
		University of Arkansas Pine Bluff	2,579
		Coppin State University	2,738
		South Carolina State University	3,022
		University of Maryland Eastern Shore	3,193
		Alcorn State University	3,658
		West Virginia State University	3,692
University 2	4,079	University of the District of Columbia	4,244
		Virginia State University	4,385
		Delaware State University	4,586
		Winston Salem University	5,190
		Norfolk State University	5,204
		Grambling State University	5,205
University 3	6,371	Alabama State University	5,701
		Alabama A & M University	6,106
		Fayetteville State University	6,318
		Bouie State University	6,320
		Southern A & M University	6,693

From "*Integrated Postsecondary Education Data System (IPEDS),"* by National Center for Education Statistics, 2020b.

https://nces.ed.gov/programs/digest/d19/tables/dt19_313.10.asp

Course Count

University 1 represented 23.3% of course grades in the sample, whereas University 2 represented 34.3% of course grades and University 3 represented 42.4% (see Table 2). University 3 had the most number of course grades in the study, while University 1 had the least number of course grades in the study.

Table 2

Student Course Grades in Study Institutions

Institution	Percentage of Course Grades	Number of Student Course Grades
University 1	23.3%	81,101
University 2	34.3%	119,572
University 3	42.4%	147,958
Total	100.0%	348,631

Racial Composition

The UNCF (2020) reported that HBCU student bodies comprised 10% of all African American college and university students in the United States. The National Center for Education Statistics (2020b) reported that 18% of the total students enrolled at HBCUs were non-African American. The Digest of Education Statistics (2019) said that in 2018 African Americans represented 76% of students enrolled in HBCUs, and non-African Americans represented 24% of students enrolled at HBCUs.

Table 3 presents percentages of students by race in sampled schools and the population. The percentage in sampled schools represents the average percentage of

enrollments across the three schools in the sample for the academic year of 2018. As noted, African Americans were overrepresented by 6% and non-African Americans were underrepresented by 6%. Population validity was threatened by these differences and by the limited number of racial groups selected for this study.

Table 3

Frequency and Percentage of 2018 Enrollment by Race in Sampled Schools and Population

Student race	Percentage in sampled schools	Percentage in population	Difference
African American	82	76	+6%
Non-African American	18	24	-6%
Total	100	100	

Grades and Modalities

Tables 4 through 7 present percentages of grades earned by students in the sample for all students (Table 4), by modality for all students (Table 5), African American students (Table 6), and non-African American students (Table 7). Comparison data were not readily available for GPAs (see Table 8). National Center for Education Statistics (2020b) only reported percentages of students taking all courses online, some online courses, and no courses online.

Table 4

Percentage of Course Grades by Groups for All Students

Course Grade	Percentage	Number
A = 4	28.6	99,671
B = 3	26.6	92,864
C = 2	19.4	67,734
D = 1	5.8	20,057
F = 0	9.1	31,557
Other = 98	10.5	36,748
Total	100.0	348,631

Note. Other grades account for 10.5 of the total number of grades.

The percentage of grade values with an A was the highest. The fact that the study sample consisted mostly of As and Bs reflects national grade distribution trends (see Rojstaczer, 2016). The percentages of modalities by grades shown in Table 5 are for all students in the sample, which is the population represented in RQ1. The F2F modality had the highest student enrollment of the three, with 72,021 students.

Table 5

Grade Categories by Modalities for All Students

Grade	F2F		Hybrid		Online		Total	
	N	%	*N*	%	*N*	%	*N*	%
A = 4.0	72,021	27.7	7,035	33.2	20,615	34.0	99,671	28.6
B = 3.0	69,427	26.7	6,583	31.1	16,854	25.0	92,864	26.6
C = 2.0	53,383	20.5	3,526	16.7	10,825	16.0	67,734	19.4
D = 1.0	15,229	5.9	969	4.6	3859	5.8	20,057	5.8
F = 0	21,468	8.3	1,619	7.7	8,470	12.5	31,557	9.1
Total	231,528	89.1	19,732	93.3	60,623	89.8	311,883	89.5
Other	28,418	10.9	1,428	6.7	6,902	10.2	36,748	10.5
Grand Total	259,946	100.0	21,160	100.0	67,525	100.0	348,631	100.0

Note. Other grades account for 10.5 of the total number of grades.

The percentages of student grades in modalities among African American students in the sample HBCUs, the subgroup compared for RQ2, are shown in Table 6. With 32.6% of A course grades, the hybrid modality category had the highest percentage of A course grades. The online modality group course grades had the highest percentage of F grades (13.7%). In the F2F modality group, (8.5%) students received F grades.

Table 6

Grade Categories by Modalities for African American Students

	F2F		Hybrid		Online		Total	
Grade	*N*	%	*N*	%	*N*	%	*N*	%
A = 4	58,603	26.7	5,730	32.6	13,158	26.7	77,491	27.1
B = 3	57,982	26.4	5,388	30.7	12,531	25.5	75,901	26.5
C = 2	46,560	21.2	3,064	17.4	8,679	17.6	58,303	20.4
D = 1	13,470	6.1	833	4.7	3,129	6.4	17,432	6.1
F = 0	18,609	8.5	1,401	8.0	6,719	13.7	26,729	9.3
Total	195,224	88.9	16,416	93.4	44,216	89.9	255,856	89.1
Other	24,162	11.0	1,146	6.5	4,973	10.1	30,281	10.6
Grand Total	219,386	99.9	17,562	99.9	49,189	100.0	286,137	99.9

Note. Other grades account for 10.5 of the total number of grades.

The subgroup addressed by RQ3 is represented by the data in Table 7. Non-African American students' modalities and grades were compared in RQ3. Among the three modality groups, the online modality had the highest percentage of A grades (40.7%), and the F2F modality had the lowest percentage of A grades (33.1%). Students in the hybrid modality group had the lowest percentage of F grades (6.1%).

Table 7

Grade Categories by Modalities for Non-African American Students

Modality	F2F		Hybrid		Online		Total	
Grade	*N*	%	*N*	%	*N*	%	*N*	%
A = 4	13,418	33.1	1,305	36.3	7,457	40.7	22,180	35.5
B = 3	11,445	28.2	1,195	33.2	4,323	26.3	16,963	27.1
C = 2	6,823	16.8	462	12.8	2,146	11.7	9,431	15.1
D = 1	1,759	4.3	136	3.8	730	4.0	2,625	4.2
F = 0	2,859	7.0	218	6.1	1,751	9.5	4,828	7.7
Total	36,304	89.4	3,316	92.2	16,407	90.2	56,027	89.6
Other	4,256	10.5	282	7.8	1,929	10.5	6,467	10.3
Grand Total	40,560	100.0	3,598	100.0	18,336	100.0	62,494	100

Note. Other grades account for 10.5 of the total number of grades.

Like African American students, non-African American students enrolled in more F2F modality course groups than in hybrid and online modality groups. Similar to African American students, a large number of students earned more failing D grades in Online modality course groups than in the F2F and hybrid modality groups. National comparative data for modality were not available.

The mean grade by institution is presented in Table 8. University 1 students earned the highest mean course grade at 2.75 between academic years 2017 and 2019 (National Center for Education Statistics, 2020a). University 2 students earned the lowest average grade, 2.58, between academic years 2017 and 2019 (National Center for

Education Statistics, 2020a). University students earned a mean grade of 2.71. National comparative data for grade averages by institution were not available.

Table 8

Grade Point Averages by Institution

		m
University 1	67,008	2.75
University 2	110,270	2.58
University 3	134,605	2.71

From "Table 313.10 Fall Enrollment, Degrees Conferred, and Expenditures in degree-granting historically Black colleges and universities, by institution: 2017, 2018, and 2017-18." Integrated Postsecondary Education Data System (IPEDS) by National Center for Education Statistics (2020b). https://nces.ed.gov/programs/digest/d19/tables/dt19_313.10.asp

Representativeness

The generalization of this study was limited to HBCUs with characteristics similar to those represented by this study. The sample represented 8.5% of students at HBCUs. Headcounts at the three institutions were similar to comparative public 4-year HBCUs. Grades were representative of national trends and were comprised of mostly As and Bs.

Assessment of Assumptions for Hypotheses Testing

Three statistical assumptions of the Kruskal-Wallis *H* test were met by design. The dependent variable, grades, was measured at the ordinal level: A, B, C, D, and F. The

one independent variable consisted of three categorical, independent groups: F2F, hybrid, and online. Each observation was independent. Results of hypothesis testing for the three RQs are presented next.

Research Question 1

A Kruskal-Wallis *H* nonparametric test was conducted to test for statistically significant differences among all students' course grades for three modalities. The test indicated that grades differed among modalities among all students, $\dot{X}^2$ (2, N = 311,883), p = .000. Therefore, I rejected the null hypothesis of no difference. Although course grades among modalities were different, the effect size was negligible ($\dot{\eta}^2$ = .001).

A post hoc Dunn's test compared the three pairs of modalities on grades. The mean rank for all students' course grades in hybrid courses (167,347, n = 19,732, p = .000) was significantly higher than the mean rank of grades in F2F courses. The mean rank for all students' course grades in hybrid courses (167,347, n = 19,732, p = .000) was also significantly higher than online courses. However, effect sizes for these combinations were very small at r_{pb} = .04 and -.06, respectively.

Medians and means by modality confirm these findings. The median grade among all modalities was 3.0. The mean grade for hybrid courses was slightly greater (2.83) than for F2F (2.67) or online (2.62) modalities for all students.

Table 9

Hypothesis Test for Research Question 1

	N	*MR*	*MRD*	*SE*	*Dunn*	*Md.*	*M*	*Sig.*	*H*	*df*
KW	311,883							.000	364	2
F2F	231,528	155,134	-12,213	396	-.456	3.00	2.67	.000		
Hybrid	19,732	167,347	12,032	644	-18.98	3.00	2.83	.000		
Online	60,623	155,315	-181	711	-16.914	3.00	2.62	1.00		

Research Question 2

A Kruskal-Wallis *H* nonparametric test was conducted to test for statistically significant differences among African American students' course grades for three modalities. The test indicated that grades differed among modalities among African Americans, $\dot{X}^2$ (2, N = 255,856), p = .000. Therefore, I rejected the null hypothesis of no difference. Although course grades among modalities were different, the effect size was very weak ($\dot{\eta}^2$ = .002).

The post hoc Dunn's test compared the three pairs of modalities on grades. The mean rank for African American students' course grades in hybrid courses (138,492, n = 16,416, p = .000) was significantly higher than the mean rank of grades in F2F courses. The mean rank for African American students' course grades in hybrid courses (138,492,

n=16,416, p = .000) was also significantly higher than online courses. Effect sizes for these combinations were very small at r_{pb} = -.03 and -.09, respectively.

Medians and means by modality confirm these findings for African American students at HBCUs. The median grade for all modalities was 3.0, a B. The mean grade for hybrid courses was slightly greater at 2.80 than for F2F (2.64) or Online (2.62) modalities for African American students.

Table 10

Hypothesis Test for Research Question 2

	N	*MR*	*MRD*	*SE*	*Dunns*	*Mdn*	*M*	*Sig.*	*H*	*df*
KW	255,856							.000	544	2
F2F	195,224	128,081	-4748	376	13.00	3.00	2.64	.000		
Hybrid	16,416	138,492	15159	652	23.25	3.00	2.80	.000		
Online	44,216	123,333	-10411	580	-17.959	3.00	2.62	.000		

Research Question 3

A Kruskal-Wallis *H* nonparametric test was conducted to test for statistically significant differences among non-African American students' course grades for three modalities. The test indicated that grades differed among modalities among all students, $\dot{X}^2$ (2, N = 56,027), p = .000. Therefore, I rejected the null hypothesis of no difference. Although course grades among modalities were different, the effect size was very weak ($\dot{\eta}^2$ = .003).

The post hoc Dunn's test compared the three pairs of modalities on grades. The mean rank for non-African American students' course grades in online courses (29,230, n = 16,407, p = .000) was significantly higher than the mean rank of grades in F2F courses.

The mean rank for non-African American student course grades in online courses (29,230, n =16,407, p = .003) was also significantly higher than hybrid courses. Effect sizes for these combinations were negligible at r_{pb} = .06 and .01, respectively.

Medians and means by modality confirm these findings among non-African Americans. The median grade for all modalities was 3.0, a B. The mean grade for hybrid courses was slightly greater at (2.97) than for online (2.91) or F2F (2.85) modalities for non-African American students.

Table 11

Hypothesis Test for Research Question 3

	N	*MR*	*MRD*	*SE*	*Dunn*	*Mdn*	*M*	*Sig.*	*H*	*df*
KW	56,027							.000	176	2
F2F	36,304	27,380	-1551.837	279	-5.560	3.00	2.85	.000		
Hybrid	3,316	28,932	-1849.863	145	-12.783	3.00	2.97	.000		
Online	16,407	29,230	-292.904	293	-1.017	3.00	2.91	.309		

Summary

The three null hypotheses tested were rejected. Statistically significant differences were indicated among grades for three modalities among all students, African American students, and non-African American students. All students earned the best grades in hybrid courses. All students and African American students earned better grades in F2F compared to online courses. Non-African American students earned better grades in online courses compared to F2F courses.

Though statistically significant, effect sizes were very weak among modalities compared. It is likely that statistical significance was present because of the very large sample size (Huck, 2004). Therefore, differences in grades earned were present but slight. This interpretation was confirmed by median and mean course grades.

In Chapter 5, the findings are interpreted, the study's shortcomings are discussed, future research recommendations are made, and the study's ramifications are discussed. Additional investigation is suggested. Presented in Chapter 5 is an interpretation of the findings, limitations of the study, recommendations for future research, and implications of the study. Recommendations for additional research are made.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this nonexperimental, quantitative study was to compare differences in grades among three learning modalities at three public, 4-year HBCUs in the United States for three student groups. I examined African American and non-African American student grades together and separately using a cross-sectional, quantitative, ex post facto, nonexperimental, comparative design.

Current research about differences in students' grades has contradictory outcomes depending on the course delivery modalities in HBCU programs (Harper, 2018; Office for Civil Rights, 2018). Given the important role of HBCUs among African American, and increasingly, non-African American students, understanding if students performed differently among different modalities was important (see U.S. Department of Education, 2020).

The findings indicated significant differences among grades for three modalities among all students, African American students, and non-African American students. It is likely that statistical significance was present because of the very large sample size (see Huck, 2004). Students earned the best grades in hybrid classes. All students and African American students earned better grades in F2F compared to online courses; however, non-African American students earned better grades in online courses compared to F2F courses. Though statistically significant, effect sizes were very weak among modalities compared; therefore, differences in grades earned were present but slight.

Interpretation of the Findings

Cavanaugh and Jacquemin (2016) recommended that researchers conduct comprehensive studies to investigate differences in learning environments by including multiple colleges, diverse student populations, and nonrandom course selections in different learning modalities. The lack of large studies comparing grades by modality at HBCUs led to this study that extends the research on the topic. I found very small, statistically significant differences in grades by modality. Power was likely strong in this study because of the very large sample size, but effect sizes were very weak. This finding is confirmed by several studies and disaffirmed by other studies.

Most previous research findings showed no significant differences among course modalities with grades as outcomes (Distance Education and Technological Advancements, 2019; Fischer et al., 2019; Larson & Sung, 2019; Roberts et al., 2019). The Larson and Sung (2019) study was conducted at an HBCU. Grades were different by modality in some courses but not in others in two other studies conducted at HBCUs (Bandara & Wijekularathna, 2017; Kang & Yang, 2016). Bourdeau et al. (2018) reported that differences in English composition course grades varied in different learning modes (Norvell, 2017). In a study at an HBCU, Buzzetto-More (2015) found that students performed better when YouTube, and not F2F modalities, was the primary teaching tool. Perhaps subject matter and learning processes influenced grades within modalities as the LEPO framework would suggest.

In the LEPO framework, Phillips et al. (2010) suggested that environment and learning process influence learning outcomes. Findings of this and other similar studies

suggest learning processes are more important than the learning environment. Other authors also agreed that the application of verified teaching best practices and learning principles can influence grades in any environment (Andrews Graham, 2019; Burgess, 2015; Crews et al., 2015).

Limitations of the Study

This study was limited in terms of internal, construct, and external validity. Internal validity was limited by studying only three course modalities, two categories of race, and nonrandomization of participants. Only three modalities were studied though other modalities of learning exist. Selection threats existed because only two categories of race were studied: African American and non-African American. The U.S. Census Bureau (2020) categorizes race into five groups, White; Black, or African American; American Indian or Alaska Native; Asian; and Native Hawaiian or Other Pacific Islander.

External validity was limited in terms of population and ecological factors. Population external validity was threatened by the limited number of racial groups selected for this study (i.e., two: African American and non-African American). African Americans were overrepresented by 6% and non-African Americans were underrepresented by 6%. Findings may have been different if students in additional racial categories had been compared. Ecological external validity was limited by studying 3 years of data from three public, 4-year HBCUs in the United States.

Recommendations

My recommendations for future research were based on the limitations of the study. First, I recommend that more modalities be studied. The number of modalities has

increased since the COVID-19 pandemic. Understanding differences in learning environments that became compulsory during the pandemic might be useful to understanding academic outcomes. Additionally, comparing course grades by modality before and after the pandemic would be of interest. Failing grades have been reported to be high across all elementary, secondary, and postsecondary grade levels during the pandemic (Smith, 2021; Wong, 2020).

Subject area differences might also be worthy of study. A comparison of grades in different subjects by modality would reveal if certain subjects were better suited for different modalities. For example, English and mathematics could be compared.

Regarding outcomes, I recommend other achievement outcomes be measured in addition to grades. Other outcomes, such as growth in responsible citizenship, ethical leadership, and access to professional opportunities could be measured (see Humphreys, 2009).

This study could be replicated in a national study about HBCUs. More races could be included beyond the binary categories of African American and non-African American. Students from American Indian or Alaska Native, Asian, Native Hawaiian or Other Pacific Islander, and Hispanic ethnicities and races could be compared.

Implications

The findings of this study have implications for administrators, faculty, students and their families, and support organizations at HBCUs. The findings indicated that grade differences among F2F, hybrid, and online courses are very small at public, 4-year HBCUs. Administrators at HBCUs can use the study findings to inform their decisions about course modalities (see Cole Martin, 2017). Previous researchers requested data on various course modalities and grades because course modality affects enrollment and subsequent finances, which, in turn, has an effect on institutional viability (see Arnett, 2014; Jones & Davenport, 2018; Neelakantan, 2020). The study findings could be used to inform HBCU administrators about the academic management of teaching and learning policies (see TMCF, 2019; UNCF, 2021). Prior to the COVID-19 pandemic, Nelms and Harvey (2018) urged HBCUs to adopt entirely online curricula to catalyze social change by narrowing educational attainment gaps among increasingly diverse student populations. The study findings may be used to justify an administrative decision to offer a hybrid or entirely online curriculum.

Additionally, the study findings have implications for faculty. With the knowledge that online learning has a very small effect on grades, as Jones and Davenport (2018) suggested, faculty at HBCUs may be less resistant to online learning. Reduced faculty resistance is particularly relevant in the current context when colleges are being forced to transition to online course delivery in response to the COVID-19 pandemic.

Research is scarce in the field of higher education on the characteristics that African American parents value in colleges despite the fact that parents are one of the

most influential factors in a student's college selection process (see Cole Martin, 2017). The findings in this study revealed that modality has a very small effect on grades at HBCUs. This information may reassure students that they can enroll in whatever course is most convenient for them, allowing them to complete their programs of study without risk of having their grades affected by modality. Parents who are aware of this finding can help their children make more informed college selection decisions (Cole Martin, 2017).

There are also implications for HBCUs' funding through support organizations like the UNCF and TMCF. Given the findings of this study, support organizations may be more inclined to fund curricula and programs delivered in various modalities. Numerous stakeholders may be more open and supportive of adopting a wider range of modalities beyond F2F with the understanding that grades are not different among students who take courses in various modalities. Adopting a wider range of modalities would lead to positive social change through increasing access to courses among diverse and traditionally marginalized students attending HBCUs.

Conclusion

With this study, I addressed gaps in the research literature by comparing grade differences among F2F, hybrid, and online modalities within large, diverse student populations at HBCUs (see Crews et al., 2015; Distance Education and Technological Advancements, 2019). Very small, statistically significant differences were found in grades earned by students who took courses in different modalities. With the findings of this study, HBCU students, parents, faculty, and administrators can be confident that

grades earned were only very slightly different among modalities. With this knowledge, these stakeholders can be more flexible in pursuing various modality options at HBCUs. Offering a variety of modalities might improve enrollment and retention at HBCUs that serve primarily African American students. Increased enrollment and retention of African American students will result in increased graduation rates for this population and will help close the educational gap that currently exists, which will result in a positive social change.

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Appendix: Seminal and Current Research Studies

How Grades Differ Depending on Learning Modality in HBCUs (2014-2018)

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