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Summer Bridge Programs and The Impact on African American Students

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Summer Bridge Programs and the Impact on African American Students
by
Astin Martin
July 31, 2023

Master's Project
Submitted to the College of Education
and Community Innovation
At Grand Valley State University
In partial fulfillment of the
Degree of Master of Education



The signature of the individual below indicates that the individual has read and approved the project of Astin Martin in partial fulfillment of the requirements for the degree of M.Ed. in Higher Education, College Student Affairs Leadership.

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Astin Martin

Abstract

Summer bridge programs have been an effective strategy for increasing African American students' success in higher education according to Detgen, Fernandez, McMahon, Johnson, and Dailey study (2021). This project explores summer bridge programs and highlights how these programs provide academic, social, and cultural support to help students overcome the challenges they may face during their transition to college (Ghazzawi, Pattison, Horn, Hardy & Brown, 2021). The success of summer bridge programs can be attributed to their ability to provide early academic preparation, build a sense of community, and increase the confidence and self-efficacy of disadvantaged students in Science, Technology, Engineering, and Math (STEM) fields (Detgen, Fernandez, McMahon, Johnson, & Dailey, 2021). By participating in academic workshops, receiving tutoring, mentoring, and building relationships with peers, students are better prepared to navigate the academic and social challenges in STEM fields. Additionally, research highlights the significance of providing targeted support to underrepresented students to ensure their academic success.

Keywords: summer bridge, African American students, STEM, mentor, academic coaching, retention

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Chapter 1: Introduction

Problem Statement

The underrepresentation of African American students in STEM fields in higher education persists as a critical issue, requiring targeted interventions to address the disparities and promote equitable opportunities. Research studies have consistently highlighted barriers African American students face in pursuing STEM disciplines, including limited access to resources, lack of representation, and socio-cultural challenges (Booker & Brevard, 2017; Mutegi, 2012). For instance, Suran (2021) found that 40% of Black undergraduate students switched out of STEM majors, compared to 29% of White students. African American students are disproportionately affected by inadequate STEM opportunities in K-12 education, leading to disparities in STEM preparedness (Barton & Tan, 2018). These students have been affected by racial bias, stereotype threat, and a lack of cultural representation in the academic experiences and outcomes of African American students in STEM disciplines (Harper & Newman, 2016). Limited access to resources, lack of representation, and social-cultural challenges hinder the academic and professional growth of African American students in these fields and necessitate the development of a summer bridge program designed to address these barriers and foster their success in higher education.

Importance and Rationale of the Project

According to a report by the National Center for Education Statistics, in 2020-21, African American learners earned 8.9% of the awarded STEM bachelor's

degrees/certificates compared to 57.4% of White learners, 13.8% of Asian/Pacific learners, and 15.2% of Hispanic learners. Furthermore, African American learners are less likely to persist in STEM-related degrees/certificates and are more likely to switch to non-STEM-related fields or drop out of college altogether. Moreover, underrepresented students struggle to find mentorship and support in their STEM programs, which can further exacerbate feelings of isolation and hinder academic success (Wilson et al., 2011). This trend is particularly troubling given the growing demand for workers in STEM-related careers, and the need for a diverse workforce to address complex societal challenges (Ghazzawi et al., 2021). As the number of STEM-related job opportunities continues to increase, the need to continue to develop African American students will also need to be addressed.

Developing a STEM summer bridge program that has a direct focus on African American learners will address the need to increase degree/certificate attainment, mentorship, and exposure to STEM fields for these students. Several studies have demonstrated the positive impact of summer bridge programs on student success. For example, Cooper et al. (2018) found that students who participated in a summer bridge program had higher first-year grade point averages and were more likely to persist to the second year of college than non-participants. Similarly, Detgen et al. (2021) found that summer bridge program participants had higher retention and graduation rates than their non-participating peers. The success of summer bridge programs can be attributed to their ability to provide early academic preparation, build a sense of community, and increase confidence and self-efficacy among

underrepresented students (Raines, 2012). By participating in academic workshops, receiving tutoring, and mentoring, and building relationships with peers, students are better equipped to navigate the academic and social challenges of college.

Background of the Project

Over the next decade, STEM careers are expected to grow between 9% and 15%, in which 99% of the job opportunities will require either a postsecondary degree or a certificate (Ghazzawi et al., 2021). According to the National Science Foundation, African Americans represented 8.5% of the national STEM workforce, compared to 65.3% of White, 14.2% of Hispanics/Latinos, and 9.3% of Asians. Despite that African American students are the fastest-growing segment of students across the nation, the group is one of the least represented in STEM fields. In the 2015-2016 academic year, only 8.5% and 12.7% of STEM degrees were awarded to Black and Hispanic students, respectively, compared to 62.6% awarded to white students (Ghazzawi et al., 2021). Studies have shown that underrepresented minority (URM) students enroll in STEM fields at rates comparable to their white peers, but a persistent pattern of early attrition and low graduation rates exists among URM students. (Kramarczuk, et al., 2021).

In recent years, there has been a growing surge in the popularity of mentoring programs designed specifically for STEM students, and with good reason. These programs aim to match aspiring students in science, technology, engineering, and mathematics with seasoned professionals who possess valuable expertise, offering

them invaluable guidance, support, mentorship, and advice throughout their educational and professional journeys in STEM disciplines (Cooper et al., 2018).

One of the fundamental advantages of these mentoring programs for STEM students lies in their ability to address the glaring issue of underrepresentation and lack of mentorship faced by individuals from diverse backgrounds, particularly students of color and other marginalized groups, in these fields (Estrada et al., 2016).

Mentors can offer guidance on coursework, research opportunities, and career options, as well as provide insight into the culture and expectations of STEM fields (Booker & Brevard, 2017). This resource can be particularly beneficial for students who may be the first in their families to pursue higher education or who may lack access to professional networks (Allen et al., 2004).

Additionally, mentoring programs can help to improve retention and graduation rates for STEM students. Studies have shown that students who participate in mentoring programs are more likely to persist in their studies and complete their degrees than those who do not (Booker & Brevard, 2017). This is achieved because mentoring programs can provide students with the support and resources, they need to overcome challenges and stay motivated in their academic and career pursuits (Estrada et al., 2016).

The importance of this project lies in its capacity to bridge the gap between the theoretical and practical approaches for enhancing the success rates of students of color in STEM fields. Specifically, the objective of the project is to formulate a set of guidelines that can facilitate the creation of mentoring programs, thereby linking

students of color with the STEM fields, hence resulting in higher graduation and retention rates.

Statement of Purpose

The purpose of this project is to develop a Start STEM Summer Bridge Program for African American students interested in STEM-related fields. The development of this program will lead to an increase in African American students both enrolling in and graduating from STEM-related fields. This project will involve approaches to develop a summer bridge program aimed at providing students with guidance through their college experience. First, this program provides students with an early introduction to the expectations and demands of college-level STEM courses. Secondly, this program can help to build a sense of community among students who share a common interest in STEM (Cooper et al., 2018). This can allow students to meet other students who share their passion for STEM and form valuable social connections that can support their academic and professional success in the future. Thirdly, this program can connect students to professional development opportunities. This piece is equally important, by connecting students to STEM-related companies, in which students can see themselves thriving in STEM fields (Estrada et al., 2016). The goal of this program is intended for participating students to gain the necessary tools to be successful in STEM-related fields, which will lead to improved enrollment and graduation rates in higher education.

Objectives of the Project

There are four main objectives of the Start STEM Summer Bridge Program. Each with the goal to promote the development and growth of students within the program. The first objective is students will be able to complete two courses that will be connected to their STEM academic programs. This will be completed during the Start STEM Summer Bridge Program. The second objective is students will be able to both connect to and identify their safe learning environment. This will include workshops and events connecting students' valuable university resources. The third objective is students will be able to navigate barriers to their educational development and learn strategies that will help them navigate these barriers. This will be ongoing throughout the summer and academic year as they meet with mentors. The fourth objective is students will be able to learn more about the careers that are connected to STEM fields. Students will engage with professionals from these STEM fields.

The effectiveness of this program can be evaluated by using pre-and post-surveys, which will provide insights from the students on their connection with their mentors. This project will also connect African American students to mentorship opportunities during the academic year on the college campus.

Definition of Terms

Academic coaching – An interactive process that focuses on the personal relationship created between the student and the coach (Alzen et al., 2021).

Academically underprepared – Academically underprepared refers to individuals who lack the necessary knowledge, skills, and academic readiness to meet the expectations and demands of higher education (Hurd et al., 2021).

Mentorship – A personal developmental connection where a more experienced or knowledgeable individual provides guidance and support to a less experienced or knowledgeable person (Wilson et al., 2011).

Science, Technology, Engineering, and Math (STEM) – Academic disciplines and fields of study that focus on science, technology, engineering, and math, and their applications in the real world.

Summer Bridge Programs – Multiday intensive experiences designed to prepare students for the upcoming academic challenges (Cooper et al., 2018).

Scope of the Project

This project is designed for African American students that have an interest in pursuing STEM-related fields in higher education. The program is designed to be implemented during the summer months prior to the beginning of a student's postsecondary academic career. There will be opportunities to incorporate successful strategies gained from the summer program during the academic year. The program can address the benefits of implementing a summer program for African American students such as increasing student interest in STEM, mentorship, improved academic readiness, increasing diversity in STEM fields, and exposure to STEM careers.

This project will concentrate on designing the Start STEM Summer Bridge program tailored explicitly for African American students. Additionally, it will

establish the Start Stem Mentorship Program that will provide ongoing support throughout the academic year, complementing the efforts made during the summer bridge initiative. The project will prioritize conducting research to equip institutions with valuable insights and best practices that address the unique requirements of African American students. However, it is essential to clarify that the research conducted in this project will not extend to supporting students who do not identify as African American.

Chapter 2: Literature Review

Introduction

Targeted strategies are needed to address the disparities and promote fair opportunities in higher education STEM fields, as the persistent underrepresentation of African American students remains a critical issue (Hurd et al., 2012). STEM fields are crucial components of modern society, driving innovation, economic growth, and social progress. The National Center for Education Statistics (NCES) reported, in 2020-21, African American students earned 8.9% of all levels of degrees/certificates in STEM fields compared to 57.5% of White students, 15.2% of Hispanic students, and 13.8% of Asian/Pacific Islander students. Riegler-Crumb et al. (2019) conducted a study highlighting 40% of Black students switch out of STEM majors compared to 29% of White STEM students. The literature review will focus on systemic barriers among African American students in the K-12 education system, the importance of mentoring in terms of success for African American students, successful STEM programs, and the impact of early career and research opportunities for African American students.

Historically, African American students have encountered systemic barriers and a lack of resources in the K-12 education system, impeding their ability to succeed in higher education. Several scholarly studies have extensively documented the disparities in educational opportunities faced by African American students (Allen et al., 2018; Aymer, 2016; Booker & Brevard, 2017; Chambers, 2020). For instance, Cookson (2017) shed light on the persistent inequities in educational resources that

disproportionately affect African American students. The research highlighted how unequal distribution of funding has resulted in under-resourced schools in many African American communities (Orfield, 2004). Consequently, these systemic shortcomings have contributed to lower high school graduation rates and lower college enrollment rates among African American students compared to their white counterparts (Eaton, 2020). Addressing these resource disparities is essential to promoting educational equity and enabling African American students to thrive in higher education.

Mentoring plays a crucial role in empowering African American students and bridging the gaps in their educational and career opportunities. Research has consistently shown the positive impact of mentoring relationships on the academic and professional success of African American students (Kramarczuk et al., 2021). Allen and colleagues (2004), found that African American students who receive mentoring support are more likely to persist in higher education, excel academically, and develop a sense of belonging in their academic institutions. Fostering mentoring relationships is a powerful strategy for promoting the educational and professional advancement of African American students.

Early career and research exploration play a pivotal role in the academic and professional development of African American students. Studies have shown that engaging in research activities at an early stage enhances critical thinking skills, fosters intellectual curiosity, and promotes self-confidence (Chang et al., 2014). Research exploration provides an avenue for African American students to challenge

the status quo, address societal issues, and contribute to knowledge creation in their respective fields (Harper et al., 2015). Therefore, investing in early career and research exploration for African American students is essential for empowering them to overcome systemic barriers and achieve their full potential in their chosen fields.

Theory/Rationale

The development of a STEM summer bridge program for African American students is supported by various theories and frameworks that inform the design and implementation of the program, addressing the unique challenges faced by African American students in STEM education and promoting their academic success. This section will discuss key theories that underpin the development of such a program.

Self-efficacy theory, proposed by Albert Bandura (1997), emphasized the reciprocal interactions between individuals, their environment, and their cognitive processes. This theory suggests that individuals learn and develop through observation, modeling, and self-efficacy beliefs. In the context of a STEM summer bridge program, Self-efficacy theory highlights the importance of providing African American students with positive role models, mentors, and opportunities for hands-on, experiential learning, which can enhance self-efficacy beliefs and motivate students to pursue STEM fields (Bandura, 1997).

Stereotype vulnerability theory, developed by Claude Steele (1997), highlights that the awareness of negative stereotypes about one's social group can lead to underperformance and disengagement in academic settings. African American students often face stereotypes suggesting inferiority or a lack of ability in STEM

fields. A STEM summer bridge program can help mitigate stereotype vulnerability by creating an inclusive and supportive learning environment where students feel valued, respected, and intellectually safe. By addressing stereotype vulnerability, the program can enhance African American students' confidence, motivation, and academic performance in STEM disciplines (Steele, 1997).

Research/Evaluation

Access to Higher Education

African American students' access to higher education has been a topic of concern and discussion for many years. Historically, they have faced significant barriers and systemic inequalities that have limited their opportunities for educational advancement (Chambers, 2020). According to the U.S. Department of Education (2019), African American students continue to experience disparities in access to higher education compared to their White counterparts. These disparities encompass multiple factors, including limited financial resources, inadequate educational preparation, and a lack of representation and support within institutions of higher learning (Hurtado et al., 2007). There have been efforts to address these disparities and improve African American students' access to higher education through various initiatives and policies (Harper et al., 2009 & Hurtado et al., 2007). Examples of these efforts include institutions focusing on retention data of African American students, developing strategies based on institution data to improve retention efforts, expanding financial aid award packages and scholarship criteria, and recruiting African

American students by attending community engagement events (Iloh & Toldson, 2013; Cooper et al., 2018).

Harper et al., (2009) provided an examination of policies aimed at promoting access and equity for African American students in higher education. Harper et al., (2009) adopt a critical race historical analysis approach to explore the historical context of policies aimed at promoting access and equity for African American students in higher education. Understanding the historical context of these policies, such as affirmative action and desegregation efforts, is essential in assessing their impact. Numerous access-related policies have played pivotal roles in shaping public higher education, benefiting African American students significantly. One such landmark policy was the 1862 Morrill Land Grant Act, which allocated funds and 30,000 acres of land to establish institutions in each state. As a result, Historically Black Colleges and Universities (HBCUs) emerged (Harper et al., 2009).

In 1954, a monumental turning point occurred when the U.S. Supreme Court ruled in *Brown v. Board of Education*, declaring racial segregation, including the operation of “separate but equal” facilities in public education, as unlawful (Harper et al., 2009). This landmark decision dismantled barriers and paved the way for greater inclusivity in higher education.

The Higher Education Act of 1965 represented another crucial milestone, as it provided a surge in federal funding to universities and offered financial assistance to students. HBCUs benefited from this legislation, receiving essential resources that bolstered their survival and growth (Harper et al., 2009)

Affirmative action policies have played a significant role in enhancing access for underrepresented minority students, including African Americans, and have had a profound impact on providing them with greater opportunities to access higher education (Harper et al., 2009; Carter & Lippard, 2020). According to the U.S. Department of Education, African American students make up 13% of current college students, when compared to only 9% in 1976 (Carter & Lippard, 2020). However, there is a difference in terms of the concentration of African American students enrolled in higher education. Walter et al., (2018) highlight that African American college students make up 14% of the total enrollment in public two-year institutions. Notably, more than 50% of all African American college students opt to pursue their education at community colleges, while only 40% of White students choose the same path. Additionally, there is an overrepresentation of African American students in for-profit institutions (Walter et al., 2018). Unfortunately, attending for-profit institutions often means paying higher tuition fees, facing a higher likelihood of defaulting on student loans, and experiencing lower graduation rates (Iloh & Toldson, 2013). In their discussion, Walter et al. (2018) highlighted how affirmative action has played a significant role in promoting diversity on college campuses, creating more inclusive learning environments by bringing together students from different racial and ethnic backgrounds.

The Importance of Mentorship Partnerships

Throughout history, African American learners have faced numerous barriers and challenges in their pursuit of education and professional advancement in the

United States. These obstacles rooted in systemic racism and discrimination, have often limited opportunities for African American individuals to reach their full potential (Aymer, 2016). However, mentorship has played a crucial role in empowering African American learners and overcoming these adversities. According to Ellis et al. (2018), the historical presence of racism in the African American community has had a profound impact on the well-being and educational perceptions of Americans. Harris (2019) points out that W.E.B. Du Bois emerged as a mentor, actively advocating for higher education and intellectual pursuits. Through his mentorship, he guided numerous African American scholars and activists who later took up the cause of challenging racial inequality. These mentors not only provided educational guidance but also instilled a sense of resilience and determination in African American learners, inspiring them to break down barriers and fight for justice and equality (Ellis et al., 2018). Jones (2019) further supports that mentorship has a historical significance for African American learners, offering guidance, support, and inspiration, thereby fostering their personal and academic growth.

Through mentoring African American students can develop through self-authorship, a psychological and developmental concept that refers to individuals' ability to construct their own identity, value, and beliefs autonomously (Mondisa & Adams, 2022). Mentoring relationships play a crucial role in fostering self-authorship in proteges. Mentors act as learning partners and provide support, guidance, and opportunities for reflection and growth. Mentors aid in developing the skills and

mindset necessary to navigate complex challenges, make informed decisions, and construct their own identities and life trajectories (Reddick, 2012).

Successful Summer Bridge Programs

If students establish a strong connection with professors and peers, they are more likely to achieve academic success on campus, (Cooper et al., 2018). The evaluation of the bridge program shows that bridge students gain advantages from participating in such programs. To gather information related to the research, several qualitative research techniques were used. The first technique was the correlational technique, which focused on both Bridge and non-Bridge students. Cooper et al. (2018) conducted a study about the implementation of a two-week intensive summer bridge program designed for first-year biology students who were academically underprepared. The summer camp provided a platform for students to interact with one another and biology faculty members. The selection of students for the program was based on a college index (CI) score created by the institution. Students who scored lower on the CI score were identified as eligible for the summer bridge program (Cooper et al., 2018). The calculation of the CI score involved combining the student's GPA and SAT/ACT scores, but the exact formula was not disclosed by the institution (Cooper et al., 2018).

Cooper et al. (2018) qualitative research study examined the questions “To what extent are there differences between Bridge and non-Bridges students’ comfort and connections with biology peers?” and “To what extent are there differences between Bridge and non-Bridge students’ comfort and connections with biology

faculty?" (p. 2) as it relates to analyzing the surveys provided to the student participants. According to Cooper et al. (2018) study, 83% of Bridge students identified that interacting with two of the three primary biology faculty members during the bridge program helped them feel more comfortable.

Raines (2012) highlights the benefits of a successful summer bridge program. The Pre-College summer bridge program at Middle Tennessee State University (MTSU) is part of a five-year National Science Foundation (NSF) grant called FirstSTEP. The program focuses on retaining STEM majors who enter the university with ACT math sub-scores ranging from 19 to 23. Its purpose is to address math deficiencies through structured instruction, peer-led learning, individualized study plans, and exposure to STEM applications (Raines, 2012).

The results of the FirstSTEP program showed that the comparison of cumulative GPAs and persistence reveals that students who departed during or after the fall semester had a GPA of 1.02, while the five students who did not register for the Fall 2011 semester had a GPA of 1.33. On the other hand, the 27 students who remained enrolled for Fall 2011 classes achieved a GPA of 2.77, indicating an average of B-. These findings suggest that grades potentially influence a student's decision to persist in their academic journey.

Ensuring that students are prepared academically in math and science courses as STEM majors on the college campus is also an important objective of summer bridge programs. Ghazzawi et al., (2021) examined student participation within the STEM Enrichment Summer Bridge Program, which was a nine-week program.

Students' course grades in Calculus 1, Chemistry 1, and Biology 1 were higher for students that participated in the summer program by earning an average GPA of 2.85, compared to an average of 2.15 earned by students that did not participate in the program (Ghazzawi et al., 2021).

Career and Research Experiences

Early career and research exploration play a pivotal role in the academic and professional development of African American students (Mutegi, 2012). Studies have shown that engaging in research activities at an early stage enhances critical thinking skills, fosters intellectual curiosity, and promotes self-confidence (Chang et al., 2014). Research exploration provides an avenue for African American students to challenge the status quo, address societal issues, and contribute to knowledge creation in their respective fields (Harper et al., 2015). Additionally, early exposure to research experiences opens doors to mentorship opportunities, which are crucial for African American students' academic success and career advancement (Miller et al., 2011). These experiences not only bolster their resumes but also equip them with the necessary skills and networks to navigate the competitive landscape of academia and industry (Seymour et al., 2016). Therefore, investing in early career and research exploration for African American students is essential for empowering them to overcome systemic barriers and achieve their full potential in their chosen fields.

Detgen et al. (2021) conducted a case study that qualitatively explored the effectiveness of a program called Bridge to Employment (BTE) in preparing high school students from underrepresented communities for college and career readiness,

specifically in STEM fields. The study aimed to investigate how effective the BTE program was in equipping students with the necessary skills and knowledge, as well as the impact of firsthand activities, mentorship, and exposure to real-world STEM experiences on their confidence, motivation, and interest in pursuing STEM-related careers (Detgen et al., 2021).

Seymour et al. (2004) highlight that the benefits of exposing students to undergraduate research early will improve a student's personal/professional gain, increase confidence, and provide students an opportunity to apply their knowledge and skills to real problems.

In a separate study, Hurtado et al. (2008) discovered that African American students face significantly lower chances of engaging in health science research during their college years when compared to their White counterparts. However, African American students attending institutions that provide formal health science research opportunities to first-year students were four times more likely to participate in research compared to students at institutions lacking such programs (Hurtado et al., 2008).

Another example of the importance of career and research experiences for student development was investigated by Wilson et al. (2011) that identified key elements of developing a successful STEM education program. Undergraduate career/research opportunities have been correlated with the success of the undergraduate education experience, by reducing attrition rates and increasing the graduation rates among underrepresented students (Wilson et al., 2011). By having

students become exposed and more familiar with STEM in a practical sense, students can gain the confidence to persist and succeed in STEM programs.

Summary

Historical barriers and systemic inequalities have limited African American students' access to higher education, with factors such as limited financial resources, inadequate educational preparation, and a lack of representation and support within higher education institutions still contributing to disparities in access (U.S. Department of Education, 2019; Hurtado et al., 2007). Efforts have been made to address these disparities, such as, targeted recruitment opportunities, improved financial aid/scholarship opportunities, Universities created relationships with community-based organizations, and development of pipeline pathway programs (Harper et al., 2009; Carter & Lippard, 2020).

Research has focused on STEM summer bridge programs to address the gap in bachelor's degrees awarded between African American students and other populations. The projected growth of STEM jobs further underscores the need for intervention, as these jobs are expected to increase by 9 to 15% in the next decade and require postsecondary degrees or certificates (Ghazzawi et al., 2021).

As previously stated, African American students currently receive only 8.9% of all STEM degrees/certificates, while White students receive 57.5%, Hispanic students receive 15.2%, and Asian/Pacific Islander students receive 13.8% (National Center for Education Statistics, 2020-21). Underrepresented minority students, despite being the fastest-growing population in the country, remain underrepresented

in STEM fields. In response, summer bridge programs have gained popularity to attract students to STEM fields, provide training opportunities for undergraduates, and improve support systems in K-12 and higher education institutions (Ghazzawi et al., 2021).

College and career readiness, as defined by Detgen et al. (2021), encompasses the knowledge and skills necessary to enroll in and complete a postsecondary or higher-quality certificate program and qualify for entry-level career opportunities. This readiness is fostered through mentorship partnerships, academic enrichment, and career exploration and readiness (Seymour et al., 2004).

Mentorship has played a pivotal role in empowering African American learners throughout history, providing educational guidance, resilience, and determination to challenge racial inequality (Jones, 2019). Establishing strong connections with professors and peers also contributes to the academic and professional development of African American students, as it enhances critical thinking skills, intellectual curiosity, and self-confidence (Chang et al., 2014).

Several summer bridge programs have been identified in this study to showcase the need to develop more of these programs. Summer bridge programs have been found to prepare underrepresented high school students for STEM careers and found that they provide valuable benefits, including career exposure, soft skills development, postsecondary education preparation, and support through alumni and employee relationships (Detgen et al., 2021). Research opportunities in health sciences and undergraduate career and research opportunities are correlated with

increased participation and success among underrepresented students (Hurtado et al., 2008; Wilson et al., 2001). Investing in early career and research exploration for African American students is crucial for empowerment and academic success (Seymour et al., 2016).

Conclusion

African American students' access to higher education has historically been hindered by significant barriers and systemic inequalities. Disparities in access to higher education persist, including limited financial resources, inadequate educational preparation, and a lack of representation and support within institutions. However, efforts have been made to address these disparities through initiatives and policies, such as affirmative action. While affirmative action has contributed to enhancing access for underrepresented minority students, there still is a concentration of African American students in lower-tier institutions and for-profit colleges, which come with challenges such as higher tuition fees, higher default rates on student loans, and lower graduation rates.

Mentorship has played a crucial role in empowering African American learners and overcoming adversities. Historical mentors, like W.E.B Du Bois, have inspired countless African American scholars and activists to challenge racial inequality and achieve educational and professional success. Establishing strong connections with professors and peers has been shown to contribute to academic success, and mentoring relationships foster self-authorship in African American students.

Early career and research exploration are vital for the academic and professional development of African American students. Engaging in research activities enhances critical thinking skills, intellectual curiosity, and self-confidence. Research experiences also provide opportunities for mentorship, which is essential for academic success and career advancement. Investing in early career and research exploration helps African American students overcome systemic barriers and reach their full potential.

Programs such as Bridge to Employment (BTE) and formal health science research opportunities have proven effective in preparing underrepresented high school and college students for college and career readiness in STEM fields. These programs expose students to career options, develop soft skills, provide support and guidance, and build relationships with mentors and peers.

Overall, addressing the disparities in access to higher education for African American students requires a multi-faceted approach that includes policies promoting equity, mentorship programs, and early career and research exploration opportunities. By empowering African American students, fostering supportive environments, and providing them with the necessary resources and opportunities, we can break down barriers and promote educational and professional success for all.

Chapter 3: Project Description

Introduction

As stated in the first chapter, the persistent underrepresentation of African American students in STEM fields within higher education remains a pressing issue that demands targeted interventions to rectify disparities and promote equitable opportunities. Numerous research studies consistently underscore the obstacles African American students face pursuing STEM disciplines, such as limited resources access to information, inadequate representation, and socio-cultural challenges (Booker & Brevard, 2017; Mutegi, 2012). Consequently, it is imperative to establish a STEM summer bridge program explicitly tailored to address these barriers and cultivate the success of African American students at Grand Valley State University. By combining elements of culturally responsive pedagogy, mentoring, counseling services, and the establishment of a nurturing and inclusive learning environment, a STEM summer bridge program has the capacity to successfully address the socio-cultural obstacles at hand. This holistic approach empowers African American students to overcome these challenges, resulting in enhanced retention rates and increased success within higher education STEM programs (Ellis et al., 2018). As stated earlier the outcomes of the Start STEM program are:

1. Students will be able to complete two courses that will be connected to their STEM academic programs.
2. Students will be able to both connect to and identify their safe learning environment.

3. Students will be able to navigate barriers to their educational development and learn strategies that will help them navigate these barriers.
4. Students will be able to learn more about the careers that are connected to STEM fields.

This chapter will explain the Start STEM program, highlighting the intentions behind the four outcomes, how the program will be implemented, and evaluated, and conclude with information about how this program will benefit African American students pursuing STEM fields.

Project Components

Start STEM was developed into two programs to achieve each of the four outcomes of this project: the first is the Start STEM Summer Program and the second is the Start STEM Mentorship Program. Next, I will explain each program, including the components of each and how they aim to achieve the four outcomes.

Start STEM Summer Program

The Start STEM Summer Program was developed with similar intentions that many successful bridge programs incorporate. Summer bridge programs are educational initiatives designed to assist students in their transition from high school to college, with a growing focus on underrepresented students and students from low-income backgrounds (Cooper et al., 2018). This program will be similarly focused but will target African American students. The program will run for five weeks beginning early to mid-July. African American students who have identified an interest in STEM-related fields will be invited to participate in the Start STEM Summer

Program. Participants will be required to select a math or science track. Track #1 will include a Grand Valley State University (GVSU) math course and an elective course, while the second track requires a science course and an elective course. The program will ensure that each participant's preferred course selection will align with their academic major plan. These courses will play a vital role in the education and development of the students. Each course will provide foundational knowledge, problem-solving skills, and interdisciplinary connections necessary for success in STEM disciplines (Raines, 2012). Students will be strongly encouraged to complete the FAFSA application, as the completion of the application will allow the student to qualify for the housing, book, and meal grant that will be provided by the institution. Living on campus during the summer program will be mandatory for all students, as this experience will provide students with a community to thrive in. The program spans five weeks and encompasses sessions aimed at enhancing the academic and social skills of each student. Through a series of workshops and engaging group activities, students will have the opportunity to strengthen their abilities in these areas. These areas will include but are not limited to connecting students to key student resources such as tutoring, financial literacy, career exploration, disability student support, and multicultural resources. Additionally, every workshop and activity integrated into the program will offer team-building opportunities, particularly during the weekends. A sample schedule of the five-week Start STEM Summer Program is provided in Appendix A. The GVSU campus partners that have been identified to support the program include the College of Health Professions, the

School of Engineering, the College of Liberal Arts and Science, the Division of Enrollment Development and Educational Outreach, and the Division of Student Affairs.

Start STEM Summer Program will seek to satisfy outcomes 1 and 2; students will be able to complete two courses that are connected to STEM academic program plan and connect to and identify their safe learning environment by providing each student with an opportunity to build relationships with faculty, staff, mentors, and other program student participants. Organized group activities and daily interactions will promote the development of a safe learning environment for student growth.

Start STEM Summer Program will satisfy outcome 3; students will be able to navigate barriers to their educational development and learn strategies that will help them navigate these barriers by attending workshops led by mentors, student affairs professionals, and current students that attend the university. These workshops will include open discussions and group activities that will provide strategies that will focus on navigating challenges faced by college students. Start STEM Summer Program will satisfy outcome 4; students will be able to learn more about the careers that are connected to STEM fields by engaging with various STEM professionals each week. Students will also tour university lab and technology spaces, which will allow students both discover and understand the tools, equipment, technology, and resources available to students.

Start STEM Mentorship Program

Current students will serve as mentors, students will apply for this paid position. The mentor position will pay students a stipend for the summer program and an hourly wage during the academic year. The application process will require the student to submit a letter of recommendation from a GVSU faculty or staff member that can speak to the student's passion and characteristics to be a successful mentor. The program's success hinges on the crucial factor of ensuring diversity within the pool of mentors. Universities often look to faculty, staff, and students from diverse racial and ethnic backgrounds to actively contribute to university initiatives that aim to achieve outcomes directly tied to diversity (Mondisa & Adams, 2022).

The Start STEM Mentorship Program will include weekly meetings for each participant during the summer program but will be voluntary once the academic year begins. Each participant will be paired with a junior or senior mentor. During the summer program, the engagement between the mentor and the mentee will serve as building blocks to the development of the relationship. The mentor will serve as the main pillar to support the mentee as the mentee develops their academic, cultural, and emotional foundation. Each week there will be a group activity that will involve all the mentors and mentees strengthening their relationship as a community activity. These activities will include golf outings, bowling, going to the beach, cookouts, and other group activities.

During the academic year, the Start STEM Mentorship Program will hold monthly gatherings that will connect all mentors and mentees in the program for

fellowship. During these meetings all participants will be exposed to lunches, learn about campus resources, and have discussions led by both campus and community leaders. Mentors will schedule weekly check-ins with their mentees to engage in continuous conversations and assist with solving problems while the problems are manageable.

The Start STEM Mentorship Program will effectively fulfill outcome 2 by facilitating a safe learning environment where students can connect and find a sense of belonging. This will be achieved through regular interactions between mentors and mentees, with the mentors actively working to foster a secure and safe learning space.

Furthermore, the program will successfully address outcome 3 by empowering students to overcome barriers that hinder their educational development. Mentor-mentee meetings will incorporate strategic discussions aimed at equipping students with effective strategies to navigate these obstacles.

Moreover, the Start STEM Mentorship Program will effectively fulfill outcome 4 by providing students with valuable insights into career opportunities connected to STEM fields. During the program's monthly meetings throughout the academic year, campus and community leaders from various STEM disciplines will engage with students, sharing their expertise and experiences.

Overall, the Start STEM Mentorship Program is designed to achieve multiple outcomes, including creating a safe learning environment, assisting students in overcoming barriers and increasing their awareness of diverse career paths within STEM.

Project Evaluation

There will be several methods used to measure success including quantitative and qualitative measures. A qualitative measure of success will rely on students completing a pre-and post-survey, the pre-survey will be received from student participants during the first week of the summer program. A sample of the pre-survey is provided in Appendix B. The pre-survey will provide feedback to the program facilitators on the student's comfort level and knowledge in terms of STEM fields. The post-survey will be received from students during the last week of the summer program. A sample of the post-survey is provided in Appendix C. This survey will provide feedback to the program facilitators on the student's growth and development when it comes to their comfort level and knowledge after completing the summer program. The post-survey will collect data points to measure each student's growth, such as, expanding their knowledge of potential careers in STEM fields, developing strategies to overcome personal and educational challenges, and showcasing the skills acquired through the summer program. The quantitative measures will include reviewing of the change in the student's grade point average between the first and second semester. The data will be collected by the mentor during their final meeting at the conclusion of each semester. Data will also be collected on the number of student participants that registered for courses during the second semester and the following academic year. This data will be collected by the director of the program requesting information from the university records office. Overall, this feedback will

be used to evaluate the program and provide opportunities to make improvements to the program.

Project Conclusions

The research conducted for my project will provide valuable evidence in favor of establishing a STEM summer program specifically tailored for African American students. As stated in Chapter 2, Wilson et al. (2011) discovered the essential components that contribute to the effectiveness of STEM education programs. Their research revealed a significant correlation between undergraduate career and research opportunities and a decrease in attrition rates, as well as an increase in graduation rates, particularly among underrepresented students (Wilson et al., 2011). Also, in Chapter 2, Seymour et al. (2016) highlighted the investment in early career and research exploration specifically tailored for African American students is of the utmost importance. Emphasizing the development of STEM skills through summer bridge programs, mentorship, and career exploration, will aim to enhance the representation of successful African American students in STEM fields. This positive impact will manifest in higher retention rates, increased campus engagement, and improved overall academic performance.

Plans for Implementation

Further research is imperative to enhance comprehension of the requirements of African American students, surpassing the scope of this project. Ongoing adaptations must be made annually, as they significantly impact the effectiveness of the interventions proposed to support African American students pursuing STEM

disciplines. The utilization of pre- and post-program surveys serves as valuable tools for identifying areas necessitating adjustments on a yearly basis. Moreover, the Start STEM Mentorship Program will generate invaluable insights that may necessitate modifications within the program and the institution itself.

I intend to contribute and present my work and ideas to the Enrollment and Development Department, specifically, the Admissions and Recruitment team, where I am currently employed. The inclusion of the Start STEM Summer Program at GVSU is of great significance, given the ongoing growth in the number of African American students. The plans that I have created for the Start STEM Summer Program could be implemented in partnership with faculty, staff, and students from the Black Excellence affinity group at GVSU. This project could be presented within the guidelines of the GVSU Strategic Enrollment Management Plan for African American learners for recruitment and retention purposes (Grand Valley State University, 2021).

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Appendix A Program Experience

July 2023

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1
2	3	4	5	6	7	8 Movie in for Start STEM Summer Program
Free Day 9	Introductions 10	Counseling Center 11	Library 12	Campus Dining 13	DSR Office 14	Craig's Cruiser's 15
Free Day 16	Recreational Center 17	Financial Aid 18	Writing Center 19	Tutoring Center 20	Career Center 21	John Ball Zoo 22
Free Day 23	GR Health Campus Tour 24	Engineering Tour 25	Office of Multicultural Center 26	Campus Safety 27	Center for Undergraduate Scholar Engagement 28	Whitecaps Game 29
Free Day 30	Internships 31					

EVENTS

August 2023

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1 Student Employment	2 Study Abroad	3 TRIO	4 Student Academic Support Center	5 Habitat for Humanity
6	7 Laker Link & Student Organizations	8 Group Project	9 Group Project	10 Group Project	11 Group Project Presentations	12 Grand Haven Beach
13 Move-Out	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

EVENTS

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View and edit this document in Word on your computer, tablet, or phone.

Appendix B

Pre-Survey Assessment

Start STEM Summer Program Post-Survey

Rate how comfortable you are with each of the following statements:

*Please select only one choice.

I have a strong knowledge of STEM majors.

1 2 3 4 5

Strongly Disagree

Strongly Agree

I feel confident that I will be successful in math and science courses in college.

- 1 2 3 4 5

Strongly Disagree

Strongly Agree

I can identify my safe learning environment.

- 1 2 3 4 5

Strongly Disagree

Strongly Agree

I have strategies to navigate barriers to my educational development.

- 1 2 3 4 5

Strongly Disagree

Strongly Agree

I have an understanding about careers connected to STEM fields.

- 1 2 3 4 5

Strongly Disagree

Strongly Agree

What questions do you have about college?

What would you like to gain from your Start STEM experience?

Appendix C
Post-Survey Assessment

Start STEM Summer Program Post-Survey

Rate how comfortable you are with each of the following

statements:

*Please select only one choice.

I have a strong knowledge of STEM majors.

1 2 3 4 5

Strongly Disagree

Strongly Agree

I feel confident that I will be successful in math and science courses in college.

1 2 3 4 5

Strongly Disagree

Strongly Agree

I can identify my safe learning environment.

1 2 3 4 5

Strongly Disagree

Strongly Agree

I have strategies to navigate barriers to my educational development.

1 2 3 4 5

Strongly Disagree

Strongly Agree

I have an understanding about careers connected to STEM fields.

1 2 3 4 5

Strongly Disagree

Strongly Agree

Were your questions about college answered during your Start STEM experience?

What skills did you gain from your Start STEM experience?

Share your favorite Start STEM Summer Program moment?

What improvements would you make to the Start STEM Summer Program
