

Exploring the Role of Peer and Faculty Interactions in Shaping the Sense of Belonging among International Graduate Engineering Students (IGES) at an HBCU

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Abstract

Research has demonstrated that a sense of belonging is crucial for promoting academic success, emotional well-being, and social integration. This is more pronounced among diverse international graduate engineering students who often face challenges such as cultural differences, language barriers, and unfamiliar academic environments. However, limited attention has been given to Historically Black Colleges and Universities (HBCUs) in understanding how interpersonal interactions influence this sense of belonging of International Graduate Engineering Students (IGES). This study explores the impact of interpersonal interactions on the sense of belonging among IGES at a HBCU in the United States. Using the Sense of Social Fit (SSF) scale, a 17-item survey on a 7-point Likert-type scale, this study assessed social and academic fit, supplemented with additional questions exploring interactions with lecturers and faculty. The SSF captures dimensions such as social match, social acceptance, and identification with the university, while added items evaluate the quality of relationships with faculty members using three (3) open-ended items. This will contribute to the knowledge of how peer and faculty interactions contribute to a student's overall sense of belonging. The findings aim to uncover HBCUs' unique role in fostering inclusive academic and social environments, especially for IGES. This research offers insights for improving broadly the international student engagement, integration, and faculty support. In addition, the findings will contribute to broader discussions on diversity, inclusion, and intercultural relations in higher education.

Key words: Inclusion, Higher Education, Engineering Graduate Students, Sense of Belonging.

Introduction

A sense of belonging is widely recognized as a critical factor influencing graduate students' overall success, mental well-being, and academic resilience [1]-[3]. This sense of belonging can be particularly significant for IGES, as they often navigate unique challenges in their academic journey, such as cultural transitions, language barriers, and new academic expectations [4]. While extensive research explores the experiences of international students at Predominantly White Institutions (PWIs), there is limited empirical work on how IGES experiences belonging at HBCUs [4]. HBCUs provide a unique cultural and historical context that fosters a strong sense of racial identity and community, but this environment may present both advantages and challenges for IGES, who share a racial identity with many peers but often differ in culture, nationality, and lived experiences [5].

Peer and faculty interactions play a central role in fostering a sense of belonging, particularly for students adapting to a new environment. Positive relationships with faculty members and supportive connections with peers can mitigate feelings of isolation and provide a foundation for academic and social integration, which is crucial for international students [6], [7]. At HBCUs, IGES encounter this interplay with unique complexities, while most share a racial identity with many of their peers, they often experience cultural differences that influence the dynamics of their interactions and the depth of their integration within the community [5]. These distinctions can shape how IGES navigate their social and academic environments, ultimately affecting their sense of belonging on campus.

Despite the growing enrollment of international students at HBCUs, there is limited research on how peer and faculty interactions specifically influence the sense of belonging for IGES at these institutions [8]. Most existing literature examines international students at PWIs or focuses on native-born black students' experiences at HBCUs, with little attention to the unique experiences of black international students [5], [9]. This lack of empirical studies leaves a gap in understanding how the intersection of race, culture, and academic environment at HBCUs influences the sense of belonging among IGES.

This study addresses this gap by exploring how peer and faculty interactions shape the sense of belonging for IGES at an HBCU. By examining this population in a distinct institutional setting, this research contributes to a nuanced understanding of belonging that moves beyond broad racial categorizations to consider cultural and academic identity intersections. Findings from this study will offer insights into how HBCUs can foster inclusive environments that support both academic success and social integration for international students, challenging the assumption that shared racial identity alone ensures a strong sense of belonging.

Theoretical Framework.

The theoretical framework for this study is based on Strayhorn's model of college students' sense of belonging [6], with a focus on their ideas about cultural identity and intersectionality. These theories help explain how interactions with peers and faculty shape the sense of belonging for IGES at "HBCUs".

Strayhorn's Model of Sense of Belonging

Strayhorn's model of college student's sense of belonging [6] defines sense of belonging as a degree to which students feel accepted, valued, and supported in the academic community, this builds on the idea that belonging is a fundamental need that directly impacts student's academic motivation and success, and it continuously requires reinforcement through meaningful interactions with peers, faculty, and the broader academic environment. These interactions are shaped by institutional climate and support structures [10].

For IGES at HBCUs, Strayhorn's model highlights cognitive belonging, which is the recognition of shared goals and alignment with institutional values, as well as effective belonging, which is the emotional connections through positive relationships with peers and faculty. Hence, using this model for the IGES, the framework suggests that a sense of belonging emerges when institutions address students' unique cultural needs while creating opportunities for both academic and social engagement.

Conceptual Model for the Study

Building on the premise of Strayhorn's model, this study posits the hypothesis that peer and faculty interactions serve as mediators in fostering a sense of belonging among IGES at HBCUs. These interactions are influenced by institutional climate as well as support structures that would facilitate cross-cultural engagement and integration.

This framework builds on well-known models while also addressing the specific challenges that international graduate engineering students (IGES) face at HBCUs. Strayhorn's models with ideas about cultural identity offer a thorough way to understand how peer and faculty interactions influence students' sense of belonging.

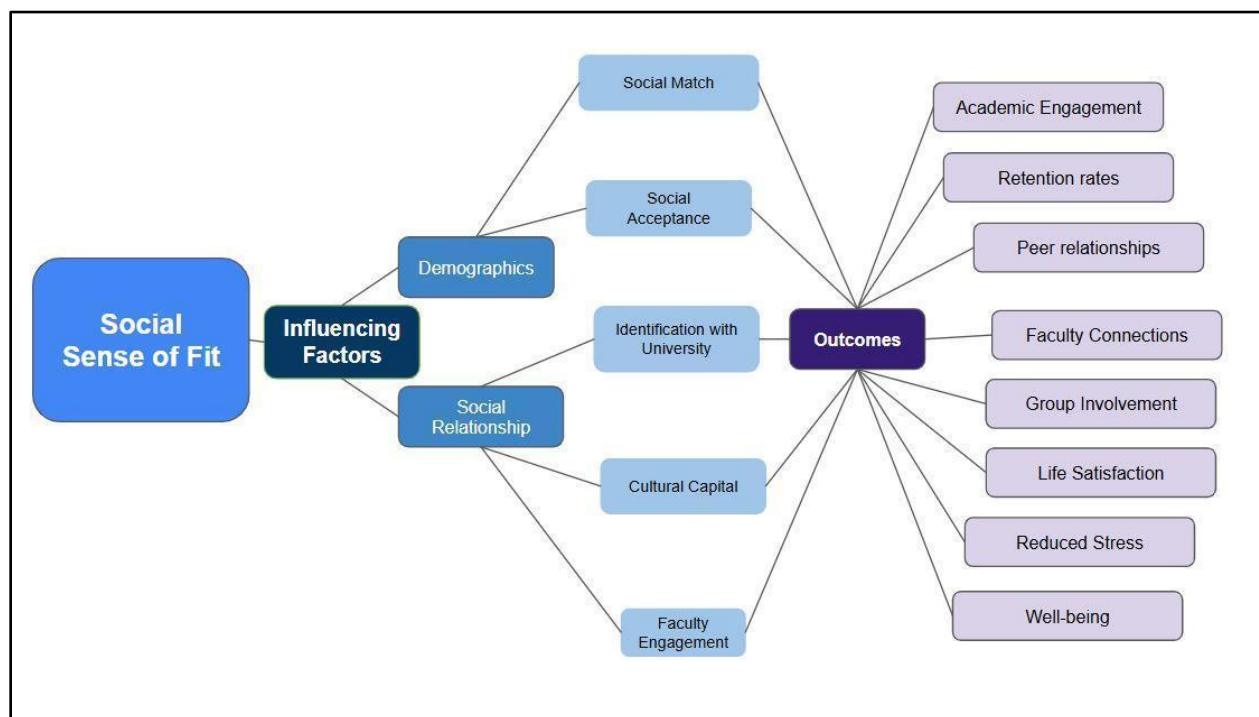


Figure 1: Present Study Conceptual Framework

Methodology

Research Design

This study employs a mixed-method research design, integrating quantitative and qualitative approaches to provide a comprehensive understanding of how peer and faculty interactions shape the sense of belonging among (IGES) at Morgan State University a (HBCU). The use of mixed methods allows for the triangulation of data, enhancing the validity and depth of the findings [11]. The quantitative component focuses on the Sense of Social Fit (SSF) scale to evaluate key dimensions of belonging, such as social match, social acceptance, and identification with the university. To complement these measures, qualitative data are collected through four open-ended questions, enabling a rich exploration of student experiences and interactions. This design addresses the multidimensional nature of belonging as theorized in the literature [6], [7].

Participants

The study targets international graduate engineering students enrolled at Morgan State University. Inclusion criteria are defined to ensure relevance and consistency. The inclusion criteria include participants must be enrolled in graduate engineering programs, hold an international student status (non-U.S. citizen), and have completed at least one semester at the institution to ensure familiarity with the campus environment. Recruitment employs purposive and snowball sampling techniques, leveraging departmental communication channels, and referrals from student organizations such as the International Student Association. This approach of recruitment aligns with recommendations for reaching hard-to-access populations in higher education research [12].

Quantitative Component

The SSF Scale [13] serves as the primary quantitative instrument. This validated 17-item measure evaluates dimensions of belonging, including social match, social acceptance, and identification with the university, with an inclusiveness of three questions addressing relationships with the faculty. To capture additional nuances of faculty interactions, three custom Likert-scale items are added, assessing perceived faculty approachability, supportiveness, and the facilitation of resource connections. Participants rate items on a 7-point Likert scale ranging from "Strongly Disagree" (1) to "Strongly Agree" (7), ensuring sensitivity to variations in responses [14]. The online survey uses Google Surveys to facilitate accessibility and streamline data collection.

The quantitative analysis involved the use of graphs representing a side-by-side stacked bar chart that visualizes survey responses across items measuring the various subscales of the SSF scale including Each bar corresponds to an individual survey item within these subscales, and responses are divided into seven levels of agreement: Strongly Disagree, Disagree, Somewhat Disagree, Neutral, Somewhat Agree, Agree, and Strongly Agree.

The horizontal axis displays the number of responses, with positive agreement extending to the right and negative disagreement extending to the left. Distinct color gradients represent the levels

of agreement, ranging from red for Strongly Disagree to darker green for Strongly Agree. The visualization provides a clear view of response patterns across all subscales, highlighting trends such as the extent to which participants identify with the university, feel socially accepted, perceive cultural alignment, and engage with faculty.

Descriptive statistics, including means, standard deviations, and frequencies, are used to summarize participants' demographic characteristics and survey responses. The reliability of the SSF scale is assessed using Cronbach's Alpha, with a threshold of ≥ 0.70 indicating acceptable internal consistency [15]

Qualitative Component

To complement the quantitative survey data, this study incorporates a qualitative component through four open-ended questions. While the quantitative analysis provides structured insights into students' sense of belonging, numerical data alone cannot fully capture the personal experiences, challenges, and interactions that shape students' perceptions. The addition of qualitative questions allows for a deeper exploration of the themes identified in the quantitative findings, ensuring a more comprehensive understanding of the factors influencing IGES belonging at Morgan State University.

The qualitative phase involves open-ended survey questions with a purposive subset of quantitative survey participants to explore their lived experiences in greater depth. Open-ended questions focus on themes such as inclusivity, challenges in adjusting to campus life, involvement in social or academic groups, and perceived similarities or differences with peers. Example questions include:

- Can you share a specific experience that made you feel included or excluded on campus?
- How has your involvement in social groups influenced your sense of belonging?
- What challenges, if any, have you faced in adjusting to life on campus?
- In what ways do you feel similar to or different from your peers?

The qualitative component was designed to specifically explore key dimensions of social fit as identified in the quantitative survey. The four open-ended questions were structured to align with these dimensions:

1. Experiences of Inclusion or Exclusion, which is to provide context for students' responses on social match, social acceptance, and faculty engagement.
2. Challenges in Adjusting to Campus Life which further examines cultural capital and difficulties in navigating the U.S. education system.
3. Impact of Social and Religious Group Involvement, which determines the role of community engagement in fostering a sense of belonging.

4. Similarities and Differences with Peers, which assesses how perceived social fit aligns with lived cultural and academic integration.

By integrating both quantitative and qualitative methods, this study triangulates data to enhance the validity and depth of the findings [11]. The qualitative data not only helps explain patterns observed in the survey results but also highlights nuanced experiences that might not be evident in numerical trends. This mixed-methods approach ensures a holistic analysis of IGES belonging at Morgan State University.

The open-ended transcripts are analyzed using thematic analysis, a method well-suited for identifying patterns and themes within qualitative data [16]. Interview transcripts are analyzed using thematic analysis, a method well-suited for identifying patterns and themes within qualitative data [16].

The analysis follows six steps, the first step being data familiarization, which involves thoroughly reading and re-reading transcripts to gain a deep understanding of the data while taking initial notes. The second step is initial coding, which involves systematically identifying key segments of text and assigning descriptive labels to capture relevant ideas. The third step is identification, where patterns across codes are examined and grouped into broader, meaningful themes that reflect core insights from the data. The fourth step is theme review, which is a process of refining and validating themes by checking them against the dataset to ensure they accurately represent participants' experiences. The fifth step is defining and naming themes, where each theme is clearly articulated to convey its significance and how it relates to the research question. The sixth step is report writing, in which the themes are organized into a coherent narrative, supported by direct quotes from participants, and interpreted concerning the theoretical framework. Emerging themes are compared to the theoretical framework of sense of belonging [6] to enhance interpretive rigor, ensuring that the findings align with established concepts while also allowing for new insights to emerge.

Faculty Demographics

Understanding the faculty demographics is essential in analyzing the academic and social environment that shapes the sense of belonging for IGES at Morgan State University. The faculty composition significantly fosters inclusive experiences, provides mentorship, and influences student-faculty interactions.

The university has a total of 741 faculty members, with 45 faculty members specifically in the College of Engineering. The demographic breakdown of the faculty is represented in the pie chart below.

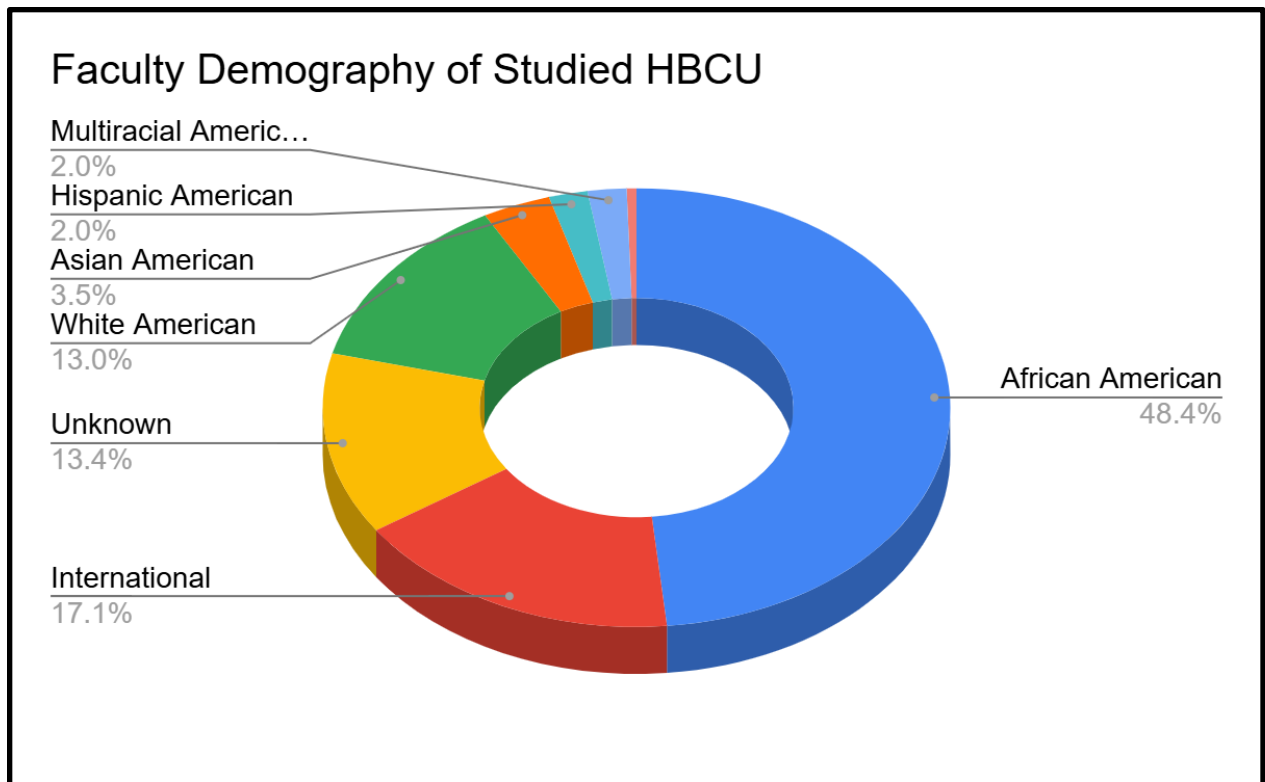


Figure 2: Faculty Demography of Morgan State University

This distribution highlights the institution's strong African American faculty representation, which aligns with its mission as an HBCU. However, the 17.1% international faculty presence also suggests a growing global influence within the academic environment. The relatively lower proportions of White American (13.0%) and Asian American (3.5%) faculty members, as compared to PWIs, indicate a faculty structure that differs from mainstream U.S. higher education demographics.

Within the College of Engineering, the faculty composition may further influence IGES experiences. Given the technical nature of engineering disciplines, interactions with faculty members from diverse backgrounds could impact academic mentorship, research collaboration, and cultural adaptation. Understanding the representation of international faculty within engineering could provide deeper insights into how IGES perceive support and inclusion in their academic journey.

This demographic overview provides a foundational context for assessing peer and faculty interactions and how they contribute to shaping the sense of belonging among IGES at Morgan State University.

Data Collection

A total of 21 participants who have experienced a minimum of a semester took part in the study, representing a diverse range of academic programs using the purposive and snowball sampling method. Among the respondents, 12 students which is 57.1% of the total sample size were pursuing doctoral degrees in engineering (PhD), 5 students which is 23.8% of the total sample size were enrolled in Doctor of Engineering (D.Eng.) programs, 2 students which is 9.5% of the total sample size were pursuing Master's degrees in Engineering (M.Eng.), and another 2 students which is 9.5% of the total sample size were enrolled in Master of Science in Engineering (M.Sc.) programs which are represented in Figure 3 and Table 1 below.

The national demography of the sample distribution includes 17 Nigerians, which is 80.5% of the total sample size, 1 Bangladesh, 1 Pakistan, 1 Iranian, and 1 Congolese, which is 4.8% each of the total sample size of participants. This distribution highlights the representation of advanced graduate students across different engineering disciplines. The analysis of their responses provides valuable insights into their sense of belonging, focusing on key subscales, including identification with the university, social acceptance, cultural capital, and faculty engagement.

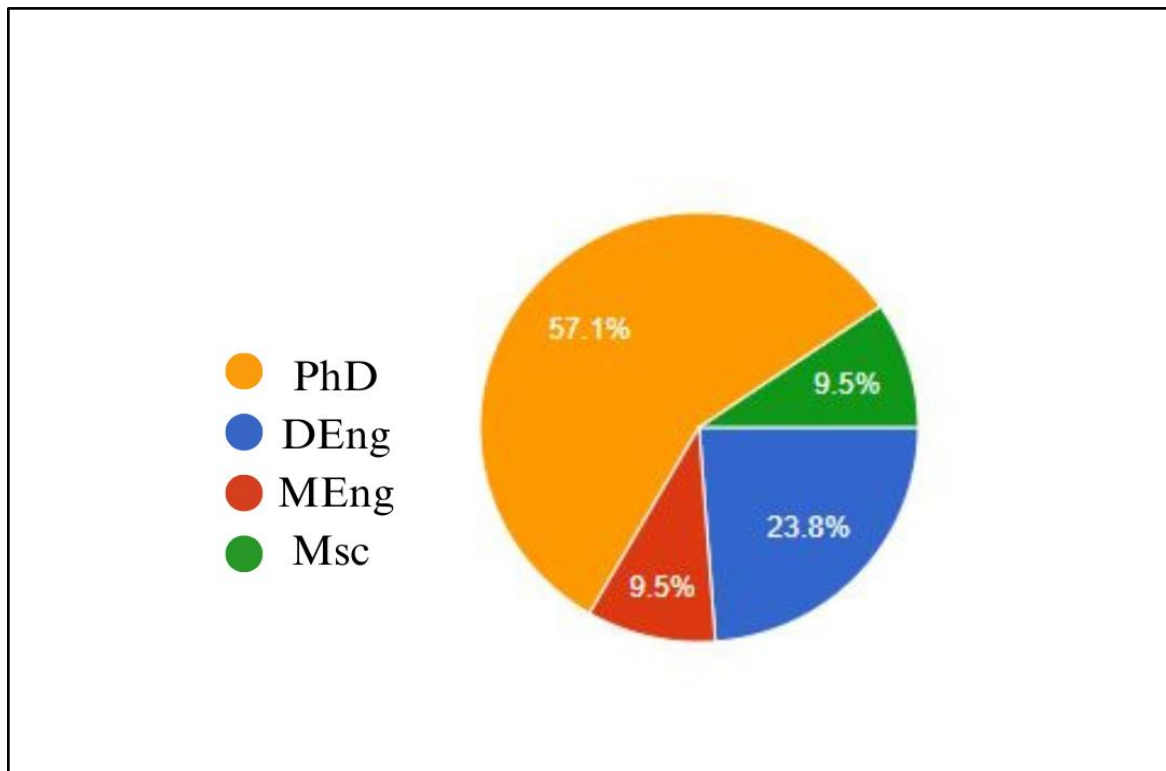


Figure 3: Course of study Demography pie chart.

Table 1. Participants Course of Study Demography

Program	Number (N)	Percentage %
Ph.D	12	57.1%
D.Eng.	5	23.8%
M.Eng.	2	9.5%
M.Sc.	2	9.5%

Quantitative Analysis

The analysis focuses on the SSF scale, including the subscales: Identification with the University, Social Match, Social Acceptance, Cultural Capital, and Faculty Engagement.

A side-by-side stacked bar chart was used to represent responses to each survey subscale measuring a sense of identification with the university, Social Match, Social Acceptance, Cultural Capital, and the added 3 Items that serve as the Faculty Engagement Subscale. Each bar corresponds to an Item, and responses are divided into seven levels of agreement, from "Strongly Disagree" to "Strongly Agree."

Identification with University

From Figure 4 below, the analysis of Identification with the university reveals that most respondents express a strong sense of belonging at the university. The majority of participants agree or strongly agree with statements such as *"I feel comfortable"*, *"I belong at the university"*, and *"I don't feel alienated"*, indicating a generally positive affiliation with the university. However, responses to *"I feel like an outsider"* show a mix of agreement and disagreement, suggesting that while many students feel integrated, some still experience a degree of exclusion. The presence of neutral and disagree responses across statements highlights opportunities for further institutional efforts to enhance inclusivity and address underlying concerns about alienation.

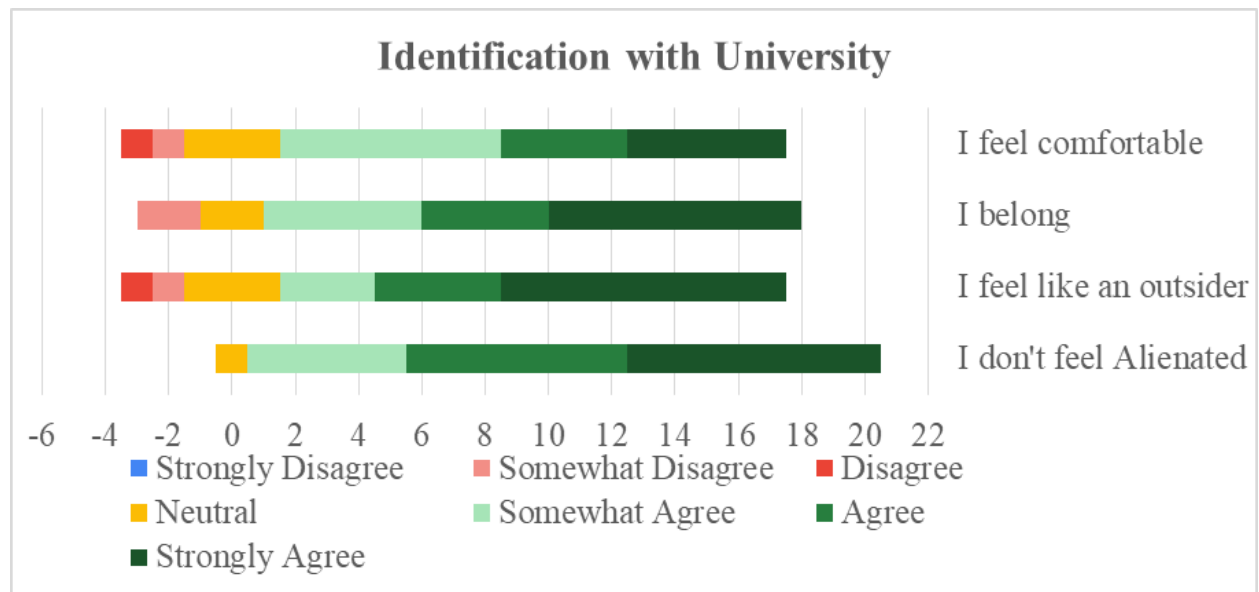


Figure 4: Identification with University Subscale

Social Match

The Social Match analysis as shown in Figure 5 indicates that most respondents feel a sense of similarity and connection with their peers at the university. A strong majority agree or strongly agree with statements such as *"I fit in well"*, *"I know what kind of people are here"*, and *"People are like me"*, suggesting that many students perceive alignment in social and cultural aspects. However, responses to *"I think the same way"* and *"I am similar"* display a wider distribution, with some neutral and disagree responses, indicating that while many students relate to their peers, differences in thought and identity still exist. These findings highlight an overall positive social integration while suggesting room for further inclusivity and community-building efforts.

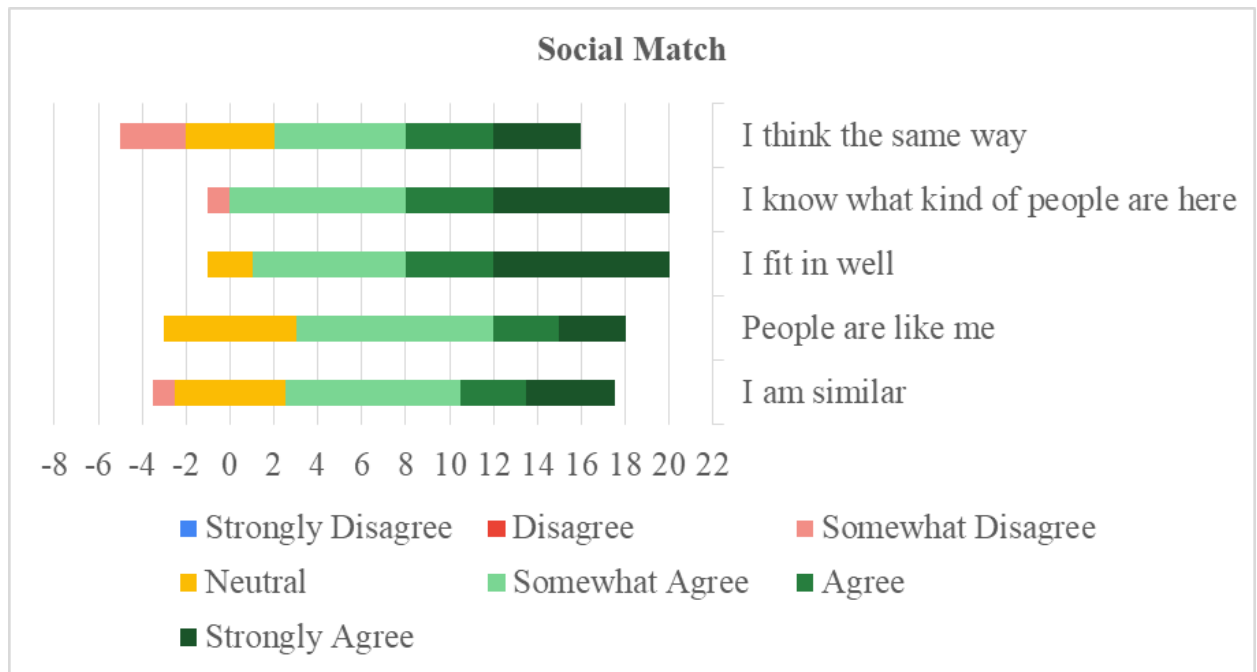


Figure 5: Social Match Subscale

Social Acceptance

The Social Acceptance analysis in Figure 6 demonstrates that most respondents feel well-integrated and accepted within the university community. A significant proportion of students agree or strongly agree with statements such as *"People like me at the university"*, *"I get along well at the university"*, and *"People accept me at"*, suggesting an overall positive social experience. However, a small portion of responses fall under neutral, somewhat disagree, and disagree, indicating that while the majority feel accepted, some students may still experience social barriers or difficulties in forming connections. These findings show the university's generally inclusive environment while also emphasizing the need for continued efforts to foster deeper social connections for all students.

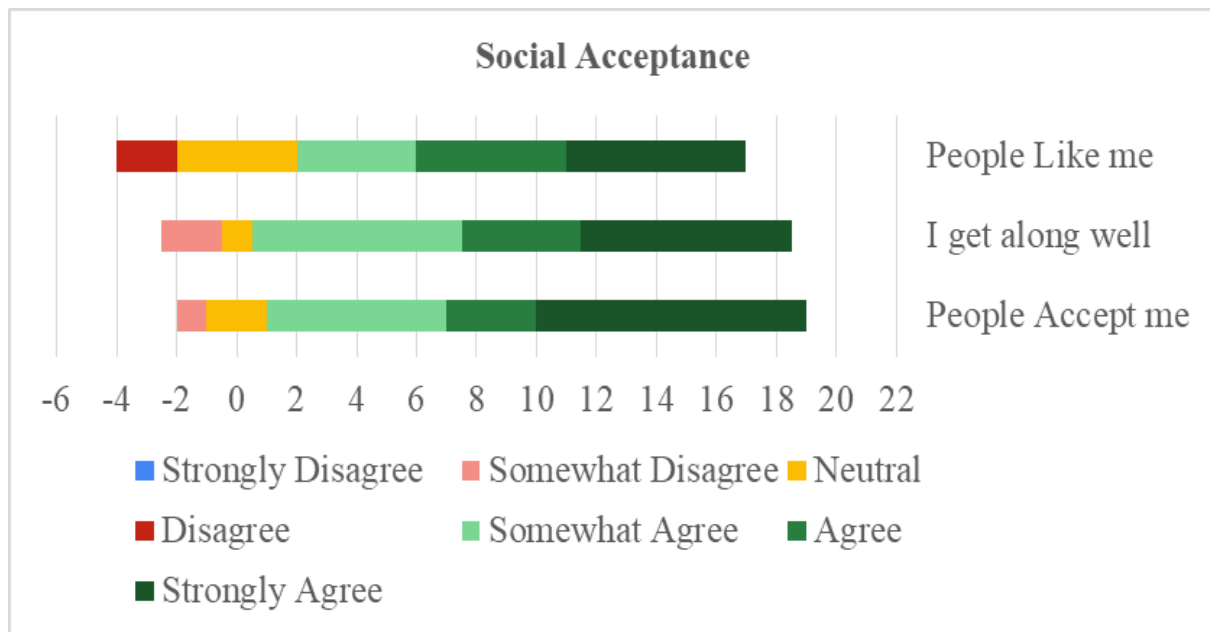


Figure 6: Social Acceptance Subscale

Cultural Capital

The Cultural Capital analysis seen in Figure 7 indicates that most respondents feel confident in their ability to navigate the academic environment at the university. A significant proportion of students agree or strongly agree with statements such as *"I can do well potentially," "I have knowledge about how to succeed at the university,"* and *"I understand the rules and expectations,"* reflecting a strong sense of institutional awareness and preparedness. However, some responses fall under neutral, somewhat disagree, and disagree, particularly regarding knowing how to make professors like them and understanding how the school operates, suggesting gaps in cultural capital. These findings reveal the overall preparedness of students while underscoring the need for additional support systems, such as mentorship and academic guidance, to ensure all students can fully integrate and succeed.

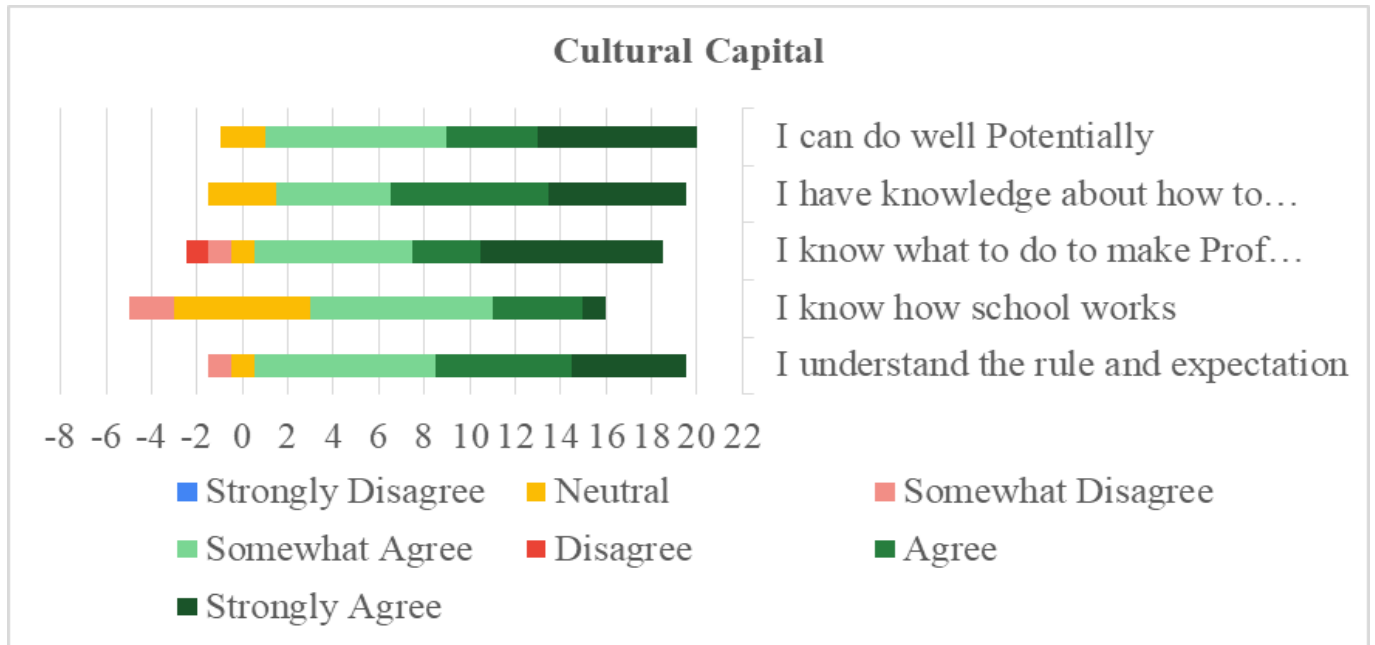


Figure 7: Cultural Capital Subscale

Faculty Engagement

The Faculty Engagement analysis shown in Figure 8 reveals that most respondents perceive faculty members as supportive and accessible at the university. A significant proportion of students agree or strongly agree with statements such as *"Faculty Members help me to connect with resources at Morgan State University"*, *"Faculty Members value my class contribution,"* and *"Faculty Members are easily approachable and supportive,"* indicating a generally positive faculty-student relationship. However, some responses fall under neutral, somewhat disagree, and disagree, suggesting that while faculty engagement is largely effective, a portion of students may still experience challenges in accessing support or feeling valued. These findings highlight the faculty's important role in student success while emphasizing the need for continued efforts to strengthen faculty-student interactions and resource accessibility.

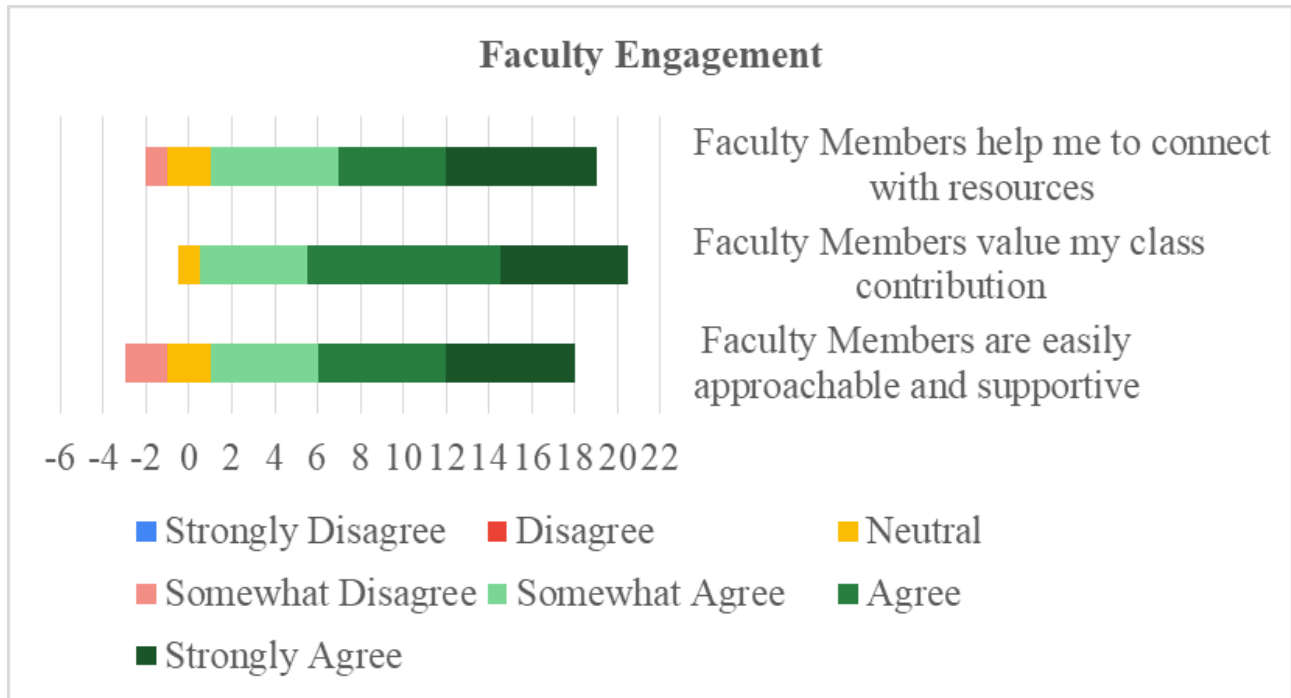


Figure 8: Faculty Engagement Subscale

The figure 4 represents the survey responses on each subscale, with each bar corresponding to an individual item. This illustrates that the identification with the university subscale had the majority of respondents agreeing or strongly agreeing that they feel comfortable, belong at the university, and do not feel alienated. Notably, the statement "I belong at Morgan State University" received the strongest positive response, indicating a high sense of belonging among participants. Conversely, the statement "I feel like an outsider" got predominantly negative responses, further reinforcing the perception of inclusivity within the university community.

In Figure 5, Statements such as "I fit in well" and "I am similar" received the strongest positive responses, highlighting a strong sense of social compatibility. However, fewer respondents agreed with the statement "I think the same way," indicating some diversity in thought while maintaining social cohesion. While Figure 6 Shows that students experience an inclusive and welcoming environment. Figure 7, and Figure 8. This shows that students experience good cultural capital and strong faculty engagement.

Table 2: Individual Item Analysis

Item	mean	Standard Deviation
I feel like an outsider	5.67	1.53
I don't feel Alienated	6.05	0.92
I belong	5.67	1.35
I feel comfortable	5.29	1.38
I think the same way as the people	5.10	1.34
I fit in well	5.86	1.06
I am similar	5.19	1.17
I know what kind of people are	5.86	1.11
People are like me	5.14	1.01
People Accept me	5.81	1.25
I get along well	5.62	1.28
People Like me	5.33	1.56
I understand the rules and expectation	5.62	1.07
I know how school works	4.81	1.03
I know what to do to make Prof Like me	5.62	1.43
I have knowledge about how to succeed	5.76	1.04
Faculty Members are easily approachable and supportive	5.57	1.29
Faculty Members value my class contribution	5.95	0.86
Faculty Members help me to connect with resources at Morgan State University.	5.71	1.19

Overall Scores

The overall mean for the 17 Items is 5.53, which indicates a moderately high sense of social fit among respondents. The overall mean, including the 3 items of the faculty engagement addition is 5.57, which differs in value, showing that faculty engagement adds to the overall social sense of fit of an “IGES.”

Sub-scale Level Analysis

Table 3: Sub-scale Level Analysis

Subscale	Mean	Standard Deviation	Cronbach Alpha
Identification	5.67	1.31	0.83
Social Match	5.43	1.17	0.86
Social Acceptance	5.59	1.35	0.89
Cultural Capital	5.51	1.32	0.86
Overall for 17 Item	5.53	1.25	0.95
Faculty Engagement	5.74	1.11	0.89
Over all for all Items	5.57	1.26	0.96

All the subscales were analyzed separately without the Faculty Engagement subscale to determine their individual and overall Cronbach’s Alpha to compare it’s result with the Faculty Engagement subscale which was also analyzed separately to examine its specific contribution to SSF and to determine whether faculty interactions play a distinct role on IGES compared to other sub-scales as another overall analysis was done with the Faculty Engagement included.

The overall Cronbach’s alpha of the 17 Items without the Faculty Engagement subscale is 0.95, while the Cronbach’s alpha of the overall scale with the Faculty Engagement subscale is 0.96. The Faculty Engagement subscale emerged as a critical component, with the highest mean (5.74) and a strong sense of fit ($\alpha = 0.89$) indicating a strong internal consistency, reinforcing its reliability as an independent subscale. High scores on items such as “Faculty members value my class contributions” (5.95), “Faculty members help me to connect with resources” (5.71), and “Faculty Members are easily approachable and supportive (5.57) underscore the pivotal role of faculty in fostering a sense of belonging. These findings align with research emphasizing the importance of faculty support in improving academic and social integration.

However, including Faculty Engagement in the overall scale resulted in a marginal increase in Cronbach's alpha from 0.95 to 0.96. While this suggests that Faculty Engagement contributes slightly to the overall internal consistency of SSF, the increase is not substantial enough to indicate that Faculty Engagement is more critical than other factors like Social Match, Identification, Social Acceptance, or Cultural Capital.

Comparing the Influence of each Subscale

Table 4: Influence of Subscale Comparison

Subscale	Sense of Fit (α)
Without Faculty Engagement	0.95
Without Identification with University	0.95
Without Social Match	0.95
Without Social Acceptance	0.95
Without Cultural Capital	0.95
Overall Social sense of fit	0.96

The comparison of subscales from the table above shows the internal consistency (Cronbach's alpha) of the SSF scale when individual subscales are excluded, as well as the overall scale reliability when the Faculty Engagement subscale is included.

The Cronbach's alpha for the SSF scale remains consistent at 0.95 across all subscales (Sense of Fit, Identification with University, Social Match, Social Acceptance, and Cultural Capital), with a slight increase to 0.96 after the addition of the Faculty Engagement subscale.

The analysis shows that each subscale contributes equally to the SSF scale's reliability, with no single subscale disproportionately affecting the internal consistency of the overall instrument and the slight increase in the Cronbach's alpha after the addition of the Faculty Engagement subscale is not substantial enough to indicate that Faculty Engagement is more critical than other factors.

While the quantitative analysis provided measurable trends in students' sense of belonging, it did not capture the lived experiences, emotions, and contextual factors influencing these perceptions. To address this, qualitative analysis was conducted to explore the deeper meanings behind the statistical findings.

Qualitative Data Analysis

The qualitative data analysis for this study employed an inductive approach by Tracy [17] in conjunction with the Sense of Belonging framework. In the first phase, one of the authors read through the data thoroughly and then coded data unit sets employing open-coding using the participants' descriptions gathered from the open-ended questions [17]. In the second phase, the authors employed a constant comparative method to describe a common set from the repeated themes informed by the Sense of Belonging framework. The major themes derived from the qualitative data are, Sense of Inclusion, Cultural and environmental Adjustments, and Guidance from Support Networks.

Qualitative Data Results

The major themes that were gathered from the qualitative data of this study are explained below.

Sense of Inclusion: Some of the participants described experiencing belonging through inclusion in projects, clubs or other activities. Some sample excerpts to this theme are *“One specific experience that made me feel included at Morgan State University occurred during my involvement in a campus club focused on community service.”* *“I have had several group work which has brought about interactions with my colleagues, and I feel well included with acceptance of my contributions.”* They further discussed that participation in campus activities fostered their sense of inclusion saying, *“My involvement in social groups, religious groups, and campus organizations at Morgan State University has significantly contributed to my sense of belonging.”*

Cultural and environmental Adjustments: Some participants described having to make adjustments culturally in the environment that they are. Some participants described experiencing culture shock due to different social norms in their new environment. One participant described this saying, *“There is this cultural shock of mind your business, don't talk to anyone, students aren't friendly enough to each other...they go their separate ways with no sense of togetherness.”* Some participants explained struggling with adapting to a new academic culture. They described their experiences further saying that *“However, I also recognize several differences. For example, my personal background, cultural values, and interests might vary from those of some students,”* and *“I feel that they have a better academic background. Their social cultures are also varied with mine.”*

Guidance from Support Networks: The participants explained that they got guidance and support from the networks they connected with. Some of them explained that they shared academic goals with their peers, creating a sense of similarity. A sample excerpt to this theme is *“I feel similar to peers because we share the same goals as Black/African American.”* Some participant described this saying *“I feel similar to people at Morgan State University by having the same skin color”*. Other participants described receiving peer support in navigating academic challenges. Another excerpt of this theme of getting assistance from faculty is *“During my first year, I was*

struggling with a particularly challenging experiment in the lab. Morgan employees helped me troubleshoot. They spent hours working with me.”

Integrating the Qualitative Theme with the Quantitative Dimensions

The qualitative findings closely align with the key dimensions of social fit identified in the quantitative survey, offering deeper insights into students’ experiences. The Sense of Inclusion theme relates to feelings of inclusion or exclusion, as participants shared their experiences of integration through group work, clubs, and campus engagement, which reinforces the dimensions of social match, social acceptance, and faculty engagement.

Cultural and Environmental Adjustments reflect the challenges students encounter in adapting to new academic and social norms, aligning with the cultural capital dimension and the broader difficulties of navigating the U.S. education system. The Guidance from Support Networks theme highlights the importance of involvement in social and religious groups, along with faculty and peer support, in fostering a sense of belonging, directly associated with community engagement and institutional support structures.

Lastly, students’ reflections on Similarities and Differences with Peers were spread across the Cultural Adjustments and Support Networks themes, illustrating how their perceptions of social fit correspond with their cultural and academic integration experiences. By linking these qualitative themes to the quantitative framework, this study offers a more comprehensive understanding of the factors that shape the sense of belonging among IGES at an HBCU.

Qualitative Result Discussion

One of the key findings emerging from the data is the positive impact of collaboration and academic opportunities on IGES’s sense of belonging. This aligns with Glass et al. [6], who found that collaborative projects and research opportunities enhance cross-cultural understanding and academic integration. For instance, one student described feeling supported when their lab teammates spent hours troubleshooting a challenging experiment, emphasizing the inclusive culture fostered by faculty and peers. Such experiences highlight the importance of creating collaborative academic environments to strengthen students’ sense of belonging [18].

It was also discovered that participation in campus activities also emerged as a significant factor in fostering a sense of belonging, consistent with findings by Maramba and Velasquez [19], who observed that involvement in social and academic groups positively influences students’ perceptions of belonging. One student highlighted their sense of inclusion when their business idea was selected to represent the University in an HBCU competition. However, feelings of exclusion were also prevalent, with many students citing cultural differences and unfamiliarity with the U.S. education system as significant barriers. One student noted, “The system is totally different from where I came from, making me look like an outsider.” These findings suggest that while pockets of support exist, broader efforts to integrate students into the campus community are necessary

[20]. Research by Harper and Nichols [21] suggests that intentional efforts to integrate international and domestic students can mitigate feelings of exclusion. This study reinforces the need for HBCUs to develop programs that actively engage IGES in campus life, thereby promoting broader social integration [11].

Despite the presence of supportive academic and social networks, IGES often face barriers related to cultural differences and unfamiliarity with the U.S. education system, which underscores the challenges of adjusting to new academic expectations and cultural norms. Similar challenges were documented by Zhang and Goodson [22], who noted that cultural adjustment significantly impacts international students' psychosocial well-being. Furthermore, the accents of lecturers were cited as a barrier to communication, a finding consistent with Ward et al. [23], who emphasized the importance of cultural sensitivity training for faculty. Addressing these challenges through targeted orientation programs and ongoing support can facilitate smoother transitions for IGES [14].

Another common concern was academic workload, including tight deadlines and high expectations. Additionally, financial constraints, such as the high cost of tuition and healthcare, were cited as barriers to adjustment. One respondent shared, "I spent all my savings and went broke when I got sick," highlighting the urgent need for more accessible health insurance options for graduate students [24].

Participation in social groups, religious organizations, and campus activities emerged as a critical factor in fostering a sense of belonging. Many students emphasized the positive impact of these groups in creating a supportive network. For instance, one student noted, "Being involved in a Christian fellowship has helped me to have a sense of belonging." However, some students expressed limited involvement in such groups, either due to time constraints or a lack of awareness, indicating an opportunity for the university to promote broader participation in these activities [25].

Students reflected on the ways they felt similar to or different from their peers. Many identified shared academic and career goals as a unifying factor, with one respondent noting, "We share the same goals despite different cultures." However, international students also recognized differences rooted in cultural and social backgrounds, which influenced their interactions and approaches to problem-solving. As one student explained, "I bring a distinct cultural perspective, which sometimes leads me to approach problems or research questions differently." These differences, while significant, were also seen as opportunities for growth and learning [20].

The qualitative findings reinforce the notion that a strong sense of belonging is shaped by active engagement in academic and social spaces, successful cultural adaptation, and access to supportive networks. Prior research has demonstrated that international students who establish meaningful faculty and peer relationships tend to experience a smoother transition and higher levels of academic success. However, cultural differences and social barriers continue to pose challenges,

indicating the need for targeted institutional interventions that promote cross-cultural interactions and structured support systems.

Recommendation

The following recommendations offer targeted strategies to enhance their academic and social integration.

Faculty Development for Cross-Cultural Engagement

HBCUs should implement faculty training on culturally responsive teaching to improve faculty-student relationships. Inclusive pedagogical strategies, mentoring, and active learning can create a more supportive environment. Faculty should also be encouraged to involve IGES in research and academic networking to strengthen their integration.

Peer Mentorship and Support Networks

Structured peer mentoring programs can help new IGES transition into academic and social life. Connecting them with experienced students, both international and domestic, can reduce isolation and promote cross-cultural interactions. Encouraging participation in student organizations and cohort-based study groups can further support their integration.

Bridging Cultural and Academic Gaps

HBCUs should develop tailored pre-arrival orientations to familiarize IGES with academic expectations and campus resources. Cultural competency workshops can help bridge communication gaps, while academic success programs focused on research writing and technical communication can provide additional support.

Encouraging Social, Cultural, and Religious Engagement

HBCUs should create opportunities for IGES to engage in structured social events, cultural celebrations, and interdisciplinary networking activities to strengthen their sense of belonging. Facilitating student-led initiatives, such as international student associations, cultural exchange programs, and informal gatherings, can encourage peer interactions across diverse backgrounds. Additionally, supporting religious organizations and faith-based groups can provide IGES with familiar community spaces that offer emotional and social support. Encouraging collaboration between domestic and international students through shared academic, cultural, and extracurricular projects will further enhance social integration.

Strengthening Faculty-Student Interaction

Universities should incentivize faculty mentorship through tenure recognition and research grants. Encouraging faculty to incorporate diverse perspectives in coursework and projects can enhance IGES engagement. Establishing clear faculty-student support mechanisms will further improve academic integration.

Financial and Well-Being Support

Financial constraints and healthcare access are major concerns for IGES. Expanding graduate assistantships, offering affordable health insurance options, and providing emergency financial aid can help address these challenges.

Conclusion

This study highlights the multifaceted factors influencing the sense of belonging among IGES at an HBCU. A key finding is the critical role of faculty support and engagement in fostering both academic and social integration. Quantitative results demonstrated high reliability of the SSF scale, with faculty engagement emerging as a pivotal factor (mean = 5.75). Students emphasized the value of faculty members' approachability, guidance, and support in navigating academic challenges, underscoring the importance of inclusive faculty-student relationships [6], [25].

Collaboration and participation in academic opportunities and campus activities further enhanced students' sense of belonging, aligning with prior research on the benefits of cross-cultural academic integration [26]. However, challenges such as cultural adjustment, unfamiliarity with the U.S. education system, and financial barriers highlight areas where additional support is needed. These findings underscore the importance of tailored interventions, including cultural sensitivity training for faculty [23], targeted orientation programs [22], and enhanced access to financial and healthcare resources [24].

Participation in social and religious groups also played a significant role, with students reporting stronger support networks and a greater sense of community through these avenues. Nonetheless, limited awareness or involvement in these groups among some students suggests the need for improved outreach to ensure broader participation [21].

Ultimately, this study contributes to the growing body of literature on belonging by situating these insights within the unique socio-cultural context of HBCUs. By implementing culturally responsive strategies and leveraging the strength of faculty-student interactions, institutions can create inclusive environments that promote the success and well-being of their international student populations [20]. Future research should explore the longitudinal impacts of these strategies and assess their effectiveness in bridging cultural and social gaps [27].

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