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Engagement in Practice: Accessing Engineering Stakeholder Perceptions at HBCUs During COVID-19 by Leveraging University Leaders and Partners

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Abstract
The novel coronavirus disease (COVID-19) has created a global crisis disrupting life as we know it, negatively affecting the overall economy, and abruptly transmuting the traditional methods, experiences and abilities of higher education institutions' stakeholders (e.g., administrators, faculty, staff, students). While this unprecedented lockdown impacted all post-secondary institutions, many minority serving institutions (MSIs), including historically black colleges and universities (HBCUs), were under resourced as they already face challenges that include smaller endowments, less funding from alumni, and lower levels of federal investment. To investigate this impact, a collaborative group of academic leaders worked together to develop instruments and collect data from HBCU stakeholders to better understand the impact of COVID-19. This paper will detail how the research network, encompassing multiple institutions and a minority serving professional engineering society, came together to effectively ensure the success of a project centered on providing a voice to members of the HBCU community during a global crisis.

Background
Research often includes a primary researcher or a research team developing a project based on a concept of interest. Once this research is completed, findings can be disseminated using platforms that align with the research topic. However, an alternative model of community partner research can increase the application of the findings by including partners invested in the communities of interest [1]. Partners connected to the community of interest can provide insight that may strengthen the research methods and outcomes.
Specifically, a partnership between stakeholders in the community of interest and traditional researchers offers several benefits [2]. For example, the research can be enhanced by engaging those invested in the community from the beginning of the research process as well as throughout. Including these partners allows for important aspects of the research, such as the study methods, to be developed with applicability to the community of interest in mind. Similarly, each partner brings their own perspectives and experience to the project, and therefore, can bring their own set of research questions and methods to be considered during the research design. Additionally, the participation of all partners can help refine the techniques used and yield information that is the most useful for the population of study. The partnership also allows for sustained dissemination of the findings, as the partners are consistent in the population of interest [3]. Furthermore, this sustained implementation by partners invested in the community enables the research to have a long-term impact on the community of interest and an influence on future work.

Motivation for Project
Pellecchia et al. [2] emphasized the importance of "building a coalition". This partnership enables active participation from all members of the group and supports the use of their expertise. This is especially important for underserved and underrepresented communities. Specifically, there is a persistent need for research focusing on the retention of Black students in engineering. While recent research has furthered highlighted the need for increasing Black student representation and graduation rates, a better understanding of the factors influencing

Black student success is still required to effectively aid institutions in supporting these students [4].

Historically Black colleges and universities (HBCUs), along with other minority serving institutions (MSIs), award a disproportionately higher share of degrees to minority students in fields such as engineering than other institutional types [5, 6]. Evidence shows that HBCUs provide students of color, especially Black students, with stronger academic experiences and more supportive environments than non-MSIs [7, 8]. However, HBCUs also face persistent challenges that include (1) smaller endowments, (2) less funding from alumni, and (3) lower levels of federal investment [9, 10], which lead to less resources to develop distance learning programs and platforms to support such avenues [11]. This is particularly relevant as HBCUs face the unprecedented challenge of transitioning to remote learning and working due to the impact of the coronavirus (COVID-19).

The COVID-19 pandemic provided an opportunity to build a relevant coalition to address the needs of the HBCU community. A collaboration of individuals invested in the community was essential to accurately assess the needs of target stakeholders at HBCUs. Therefore, the current project leverages the knowledge of selected HBCU stakeholders (i.e., administrators, faculty, staff, students) and allies.

Partnership Development

A collaborative research group, including a minority serving professional engineering society and stakeholders from five HBCUs were assembled under the leadership of a core research team at a large MSI to achieve the goals of a project aimed to understand the impact of COVID-19 on HBCU stakeholders. The core research team consisted of the principal investigator (PI) and two researchers, all of which are advocates for minority success in STEM. Similarly, HBCU stakeholders, referred to as *knowledge partners*, were selected because of their expertise and commitment to serving HBCUs. Knowledge partners possessed professional and academic expertise in engineering and other STEM disciplines, as well as key insight into HBCU institutional values and operations. Additionally, a minority serving engineering society was selected because of their mission to increase Black student success in engineering.

Project Design

During the first collaborative meeting, the team outlined the research goals and established the timeline and deliverables for the duration of the project. Subsequently, the group outlined the study methodology and worked together to develop surveys and collect information from engineering stakeholders (i.e., administration, faculty, staff, students) at HBCUs through an electronic survey. Through this process, survey instruments were developed and deployed to investigate the following research question: *How has COVID-19 impacted the success and persistence of engineering students, faculty and staff at historically Black colleges and universities?*

Project Execution

The project included the development of survey to gain insight into HBCU stakeholder experiences during the COVID-19 pandemic. The survey was derived from a pilot survey

administered at a single HBCU and was refined to capture the experiences of administrators, faculty, staff, and students, at HBCUs across the country.

Pilot Testing

A mid-atlantic public research HBCU, known for its production of a large number of Black engineers at the undergraduate and graduate level, was the site of the pilot test. Results of the pilot test indicated the negative impact of COVID-19 on learning and working experiences. Items were subsequently edited to address the current research question.

Item Development

The collaborative research team met prior to beginning the new survey recruitment to refine the survey instrument. Edits were made to survey to address the potential areas of concern for HBCU stakeholders and were adjusted for applicability across HBCUs. Specifically, the collaborative research group reviewed item language and experiences were shared as effective items were developed. Items regarding stress and anxiety, as well as access to technology and software needs, were added, as knowledge partners shared their experience with target stakeholders during the transition to off-campus operations as a result of COVID-19. Subsequently, four surveys with similar items were developed for each stakeholder group with unique language for relevance to their role. For example, each stakeholder was asked about how remote instruction has impacted their capacity to meet expectations within their role as well as if they had adequate access to technology. However, items unique to a stakeholder were developed and discussed as well to capture further details about each role, including aspects of course completion for students and research endeavors for faculty. Thus, item development was driven by the faculty and administrative aspects of the knowledge partner's expertise and personal experiences.

Recruitment

The initial recruitment strategy consisted of survey distribution to the membership of the engineering society previously mentioned, HBCUs, and other affiliated organizations. All members of the collaborative research team were tasked with sharing the survey with the target stakeholders.

Marketing

Outreach included email blasts and social media outreach. After implementation of the initial outreach strategy, survey participation was lower than expected (i.e., less than 100 responses). In an effort to increase participation, the collaborative research group met to develop a multi-pronged recruitment approach to target the specific population of interest (i.e., HBCU stakeholders). This strategy required the research team to extend the survey collection period and implement an intentional and effective series of marketing strategies. The approach included an intensive Twitter campaign soliciting participation and support from HBCUs, as well as personalized emails to stakeholders. The twitter campaign included five phases of outreach to verified general HBCU accounts, as well as tweets to active HBCU accounts for leaders (e.g., presidents, provosts), student organizations, campus athletics, and allies. Personalized emails were sent using a three-phase approach, which began with emails to institutional leadership, then student organizations, and concluded with HBCU staff (e.g., assistants, coordinators). Additionally, the collaborative research team leveraged their professional contacts and access to

stakeholders. While all of the outreach methods were helpful in increasing participation, direct appeals to university stakeholders have yielded the most participation (i.e., over 200 responses).

Key Findings

The main goal of the project was to gain insight into the experiences of administrators, faculty, staff, and students at HBCUs across the country. Over three hundred stakeholders (*N*=301) from 32 institutions completed a survey. Initial findings indicated that over 75 percent of each stakeholder type trusted their institutions decisions during the pandemic (e.g., preparation, dissemination of information) and felt supported during the execution of those decisions. While staff responses trended towards positive outcomes regarding experiences with remote working during the COVID-19 pandemic, all of the other stakeholder groups expressed difficulties with adjusting to working or learning from home. Overall, perceptions regarding the transition to remote working and learning highlighted how in-person experiences are important in providing the HBCU experience (e.g., in-person interaction, participation in research or social organizations).

Successes and Lessons Learned

Challenges with community partnerships arise when there are issues with exchanges, equity, and the distribution of power [12]. Specifically, if the distribution of power is inequitable, partners may feel inferior (e.g., status of dean versus administrative assistant). Likewise, some partners may hesitate to participate in certain activities, due to the perceived time demand. Both of these challenges can be combated with clear roles, expectations, and transparency of partnership duties.

The research team assembled for the current project was able to meet the research goals through established roles and clear collaboration objectives. Virtual group meetings were imperative as they served as opportunities to solidify project goals, provide status updates as the project progressed, and make informed decisions as challenges arose in the research process. Outside of meetings, the group completed assigned tasks and updated the PI on their progress and shared opportunities to connect with the community of interest. Overall, there were a myriad of successes and lessons learned during the duration of the current research project.

Successes

This collaborative model worked well for the current project, as the team was able to leverage the expertise of each of the members. This knowledge was critical during the survey development and dissemination phases of the project. During this time, the input of all team members was weighted equitably, and all perspectives were considered in the decision-making process. Similarly, knowledge partners aided in targeted recruitment of stakeholders as the group faced challenges with participation. Faculty members allowed the PI to share the survey with students during classes, staff members shared the survey directly with colleagues via email, and administrators disseminated the survey through employee listservs. All methods used by the knowledge partners contributed to increased participation.

Lessons

The collaborative research group underestimated the prolonged impact of COVID-19. In addition to increasing the survey response rate, the research group determined it would be beneficial to

continue to capture stakeholder experiences as the pandemic persisted past the initial data collection period. While the initial survey period was scheduled to conclude by the end of the Spring 2020 semester, data collection continued throughout the summer and into the Fall 2020 semester. This extended data collection period enabled the group to brainstorm and implement recruitment strategies that increased response rates. Additionally, extending the collection period allowed for an unexpected analysis, as the survey responses can now be compared by semester.

Transferability

This partnership model could be replicated for similar projects. Identifying partners invested in a community of interest (e.g., engineering leaders at HBCUs) adds valuable insight to the research process. These partners can be leveraged to identify the needs of the community and to provide access to community members. The collaborative approach also enables increased access to the community of interest during the research process and subsequently allows for improved dissemination (and implementation, if relevant) in the targeted community.

Conclusion and Next Steps

The inclusion of partners connected to the community of interest was imperative to the current research project. The HBCU partners were able to provide invaluable insight into the perspectives of stakeholders during the item development process and aid in survey dissemination to key stakeholders during the data collection period. The combined efforts of the partners, which stand as leaders within the broader HBCU community, highlight the importance of collaboration and networking more broadly.

The next phase of the project will include dissemination of the findings to the larger HBCU community, including ally organizations (e.g., community non-profits, companies recruiting HBCU graduates, diversity, equity, and inclusion [DEI] firms), through events (e.g., virtual town hall, company or institution leadership meetings). The goal of dissemination is not only to share information, but use it to facilitate discussion around key changes and institutional improvements that can further serve the HBCU community during challenging national (and even global) emergencies. Furthermore, these events also provide a platform for highlighting the positives and strengths of HBCUs in response to COVID-19 in supporting their stakeholders. The awareness and joint interest established during these events can lead to the development of a robust HBCU network that can be sustained through a commitment to Black student success.

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