BOARD #143: Shattering the Bamboo Ceiling: Asian American Student Perceptions of Engineering Leadership

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Introduction

While engineering is often perceived as a highly technical field, “non-technical” professional skills, such as leadership, have become central to preparing undergraduate engineering students for careers in industry [1]. As more engineers enter careers in management and leadership, developing teamwork and leadership skills is crucial for success post-graduation. However, most of these leadership opportunities do not occur in regular curricular activities, but in co-curricular or extracurricular activities [2, 38]. Researchers have found a lack of formal leadership development within undergraduate engineering curriculum, indicating that leadership development often occurs outside the academic context [2]. Despite the potential and growth of engineering as a leadership field, engineering students do not see engineering as a leadership profession [3].

Engineering education aims to foster leadership skills in students, but one demographic often overlooked as “leadership material” is Asian Americans [4]. In discussions about race and leadership development, Asian Americans are frequently excluded due to stereotypes that portray them as quiet, docile, socially awkward, and “model minorities” [5]. However, the history of Asian Americans is rich with examples of leadership, often overlooked in mainstream narratives and US history. For instance, some of these histories document how Asian American college student activists in the 1960s fought for ethnic studies and the rights of migrant farmers [6]. Although Asian Americans make up the largest non-White ethnic group in engineering, they remain underrepresented in leadership positions within the field.

The lack of Asian American leaders is attributed to what scholars in Asian American Studies refer to as the “bamboo ceiling,” a concept that highlights cultural and organizational factors that hinder Asian Americans' upward mobility in leadership positions [7, 8]. We suspect that the “bamboo ceiling” effect persists in engineering. We aim to examine how cultural and institutional practices in engineering education impact Asian students’ opportunities for leadership development. In addition to formal engineering curricula, we also want to explore informal experiences, such as extracurricular activities, community involvement, and mentorship, outside of engineering that can help foster leadership skills among these students.

This work-in-progress (WIP) paper presents a pilot study exploring how undergraduate Asian American engineering students perceive leadership development and skills within the context of their educational experiences, focusing on how they navigate leadership opportunities in the engineering field. To achieve this goal, we conducted six in-depth interviews with undergraduate Asian American student leaders in the field of engineering.

Engineering Leadership

More recently, leadership development in engineering education has become a topic of interest to both researchers and educators. Calls from the National Academies of Engineering (NAE), the American Society for Engineering Education (ASEE), and ABET (formerly the Accreditation Board for Engineering and Technology) indicate that leadership skills are essential for the future of engineering [9, 10, 11]. Even so, ABET's accreditation process for baccalaureate-level programs requires students to gain "an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives" [11]. Thus, engineering students need to be exposed to and develop leadership skills during their undergraduate studies in engineering.

To understand what leadership is in the context of engineering, we must recognize that there is no one universal definition of "leadership." However, it is nearly impossible to come to this conclusion as the definition of leadership can be dynamic depending on the context. Scholars from fields such as communication, business, and organizational studies have built their own definitions of leadership [12]. For instance, one of the more popular definitions "borrowed" from communication research defines leadership as follows: "Leadership is not defined by a title or position, but rather as a process that takes place between leaders, followers, and/or team members" [13]. The field of business has defined leadership as "the process of interactive influence that occurs when, in a given context, some people accept someone as their leader to achieve common goals." [14] Winston and Patterson [15] from organizational studies define leadership in the following way:

> A leader is one or more people who selects, equips, trains, and influences one or more follower(s) who have diverse gifts, abilities, and skills and focuses the follower(s) to the organization's mission and objectives causing the follower(s) to willingly and enthusiastically expend spiritual, emotional, and physical energy in a concerted coordinated effort to achieve the organizational mission and objectives.

Despite the various definitions of leadership, several commonalities exist among them. First, all discuss some sort of interaction and relationship between participants, including leaders and followers, or group and team members. Second, leadership is described as a process of influencing others. While these definitions of leadership may apply to engineering, there is something remarkably different about engineering leadership.

One attempt to contextualize engineering leadership has been to include management and managerial positions as part of engineering leadership. In other words, there is a close relationship between management and engineering leadership. Lappalainen's [16] quantitative research to determine if managerial qualities can predict effective leaders in the engineering industry links the relationships between leadership performance and three dimensions of

managerial capabilities. Lappalainen [17] notes that 'leadership' and 'management' are used interchangeably. Similarly, Lappalainen [17] again examines the intrapersonal and interpersonal levels of leadership to strengthen the case for developing engineering management competencies and teaching conflict management. In developing the "Elements of Engineering Leadership," Daley and Baruah [18] identify six knowledge bases or skills required for engineering leadership, including management skills. Bariraktarova et al. [19] explored leadership training in Bulgarian STEM education, noting the importance of partnerships between businesses and STEM schools to offer management training. Zhu et al.'s [20] qualitative study of Chinese engineers' perceptions of engineering leadership found that, under the Four Capabilities Model (4-Cap), the aspect of inventing includes discussions about project management skills as important for leadership. Management skills have also been critical in leadership assessments, particularly the Managerial Behavior Instrument, which aims to measure students' leadership in self-managed teams using the Competing Values Framework [21]. In developing an instrument to measure leadership, change, and synthesis in undergraduate engineering students, Ahn et al. [22] found that their version of engineering leadership was similar to that of leadership in business and organizational management. Rottmann et al. [39]'s work on engineering leadership and engineers' professional identity identified three engineering leadership orientations of technical mastery, collaborative optimization, and organizational innovation. Needless to say, within engineering education and the engineering industry, engineers often do not see themselves as leaders.

Bamboo Ceiling

Within the Asian American community, there is a similar sentiment regarding alignment with leadership. However, this often comes from outside forces, referred to as the bamboo ceiling. Jane Hyun defines the bamboo ceiling in her book, *Breaking the Bamboo Ceiling,* as "a combination of individual, cultural, and organizational factors that impede Asians' career progress inside organizations" [7]. Whereas the glass ceiling discusses a threshold of movement towards leadership for women and minorities, the bamboo ceiling aims to explain a similar phenomenon for Asian and Asian Americans in the workforce.

Despite its perception, the effect and impact of the bamboo ceiling have been researched. Gee et al. 's [23] analysis of the 2013 U.S. Equal Employment Opportunity Commission data released by five major companies in Silicon Valley found that Asian men and women were overrepresented in Silicon Valley's workforce, yet underrepresented across executive leadership. Gee cites three significant gaps in Asian American leadership - lack of awareness and expectations, lack of Asian American executives as role models and mentors, and behaviors which emphasize comfort in asserting power and navigating conflicts [23]. In a study on leadership perceptions of Asian American and Caucasian engineers and salespeople, Asian American engineers were perceived as having higher technical competency than their Caucasian

peers. Sy et al. [24] also found that Asian American salespersons were perceived as having lower technical competency and were viewed as the least likely to possess leadership qualities. In another study, Caucasians perceived Asian American managers as equally competent but less sociable, transformational, and authentic than the ideal, successful manager [25]. Lu [26] found that, specifically, East Asians were perceived as less creative and less assertive in comparison to the South Asian, White, Black, Latino, and Middle Eastern peers. Though the bamboo ceiling has typically been identified in the United States, there are also perspectives of the bamboo ceiling occurring in Australia, Canada, and the United Kingdom [27].

All these studies indicate that the bamboo ceiling phenomenon has a significant impact on how Asian Americans are perceived as potential leaders in their respective industries. However, this phenomenon is not exclusive to industry, but appears in higher education and academia. Compared to Black, Latinx, and White faculty, Asian Pacific Islander American faculty were less likely to hold leadership positions and roles [28]. Lee's findings suggest that racial stereotypes may underlie the "bamboo ceiling" in academia. In a study of undergraduate students, Asian Pacific Islanders were less likely to identify other Asian Pacific Islanders as "excellent leaders" [29].

Intersecting the Bamboo and Glass Ceilings

Since Hyun's publication, scholars have argued that another phenomenon impacts Asian American women's experiences with leadership in the workplace. While the bamboo ceiling typically refers to Asian Americans in achieving leadership positions, this is mainly aimed at Asian American men. Asian American women face not only the bamboo ceiling (Asian American identity) but also the glass ceiling in reference to their identity as women. Thus, Asian American women are disadvantaged due to both their gender and racial identities. In particular, through Currier's [30] narrative of her experiences as a faculty member in Political Science, she cites how the stereotypes of both the Lotus Blossom (assumptions where Asian women are seen as passive and demure yet not assertive) and the Tiger Mom/Dragon Lady (the polar opposite where Asian American women are seen as strong and domineering while lacking tolerance and expects failure from others) are at odds with one another, yet continue to both be placed on Asian American women faculty. Thus, scholars have called for an intersectional lens to help better explain and understand the intersection of the glass ceiling with the bamboo ceiling [31].

Method

To understand the perceptions of leadership and explore how undergraduate Asian American engineering students develop leadership skills, the following research question helped guide this research project:

What are the ways in which current Asian American students in undergraduate engineering become exposed to, perceive, and experience opportunities for leadership skill development?

To examine this question, qualitative research methods were used to understand the firsthand experiences of undergraduate Asian American engineering students. Six interviews were conducted with undergraduate Asian American engineering students, who were selected through purposive and convenience sampling methods, as well as snowball sampling [31-33]. For our participant criteria, we required participants to be undergraduate students in the College of Engineering, of Asian American descent, and to have some experience with leadership outside of the classroom setting. This study was approved by the University's Institutional Review Board for Human Subjects Research (IRB 24-686). Students were in current attendance at a public Asian American, Native American, and Pacific Islander Serving Institution (AANAPISI), which is a minority-serving institution designated by the US Department of Education with at least 10% of its full-time undergraduate student population identifying as Asian American and with at least 50% of the student population receiving need-based assistance outlined by Pell grant eligibility [34].

In total, six student participants were interviewed over Zoom. Student participation consisted of one 45-60 minute interview with the graduate student researcher. The table below provides demographic information on the six student participants.

Major	**Year**	**Asian Ethnicity**	**Immigrant Generation**	**Type of Organization, Position**
Computer Science	Senior	Vietnamese	Second	Umbrella Asian Cultural Organization, President
Computer Engineering	Senior	Indian	Second	Professional Society (ethnic), President
Computer Science	Senior	Vietnamese	Second	Professional Society (ethnic), Former President
Computer Science	Junior	Indian	Second	Co-Founded Start-Up
Mechanical Engineering	Senior	Vietnamese	Second	Engineering Project Group, Safety Officer
Computer Science	Senior	Vietnamese	Second	Asian Cultural Organization, Former Vice President

Semi-structured interviews were conducted, allowing for a flexible and iterative interview process [35]. We developed an interview protocol to help guide the interview's trajectory, while allowing for necessary changes based on the student participant's responses to the questions. The

interview protocol included three sections of questions. First, student participants were asked demographic background questions to clarify the criteria for participation and build rapport with the graduate researcher. Second, students were asked questions about leadership skills and leadership education in their specific engineering setting. This could refer to the classroom or lab setting, as well as their extracurricular activities. The third section of the protocol focused on their experiences relating to Asian American experiences.

Positionality/Reflexivity

To recognize their own biases and positionalities that may affect the findings of this pilot study, the authors disclose their positionalities. The first author is a biracial woman of Asian (Korean) and European descent. She works as a graduate assistant for the university's Asian American Student Center and volunteers for various Asian American student organizations, helping to build relationships and community with the students, faculty, staff, and community members at the university. Given the first author's positionality, additional steps in the analysis process involved a broader research team to discuss codes and themes emerging from the data. Her research standpoint as a critical constructivist guides her perspective throughout the research and analysis process in this project [36].

The second author is a Chinese man currently serving as a faculty member at an R1 research university. His work focuses on the intersection of global and cross-cultural engineering education, as well as the ethics of technology and engineering. His interest in the experiences of Asian Americans in engineering education stemmed from a personal struggle during his graduate studies. He noticed that scholars in engineering education themselves were uncertain about how to classify Asians and Asian Americans—whether they should be considered a minority group or an overrepresented group, similar to White Americans.

Findings

While this set of interviews was primarily focused on engineering leadership, due to their own experiences with extracurricular organizations, conversations about these organizations and spaces became evident spaces where their leadership skills were developed. It became clear that these organizations were important for students to build and cultivate their leadership skills, whether they were aware of it at the time or not. In particular, two significant findings emerged across the interviews. First, students felt a need to give back to the communities which helped support them. Second, regardless of the type of organization they were part of (cultural, engineering-related, or professional development), students could recognize skills they learned from their experience, which could be applied to their futures in the engineering industry.

Little Influence of Leadership in the Engineering Curriculum

Throughout the interviews, students were asked about their experiences in their engineering education and coursework, including learning about leadership skills and development. One clear thing is that education on leadership was nearly non-existent in their studies. When asked about their experiences with being taught leadership skills, almost all students discussed the lack of leadership education in their engineering classes:

> I'm mostly focusing on math and CS [Computer Science]. I don't think they put a big focus on how to be a leader in those fields.
>
> No. No.
>
> That [leadership skills] might briefly be touched on in my senior design, but not talked about enough. It's mostly about different roles and what your groups can do.
>
> I don't think I've taken to my knowledge. I don't think I've taken any classes that explicitly say this is the marker of a good leader in engineering or anything like that. But I had to take a communications class, and they did touch upon some topics related to leadership.
>
> I'll be honest and say not directly. I think there have been definitely times where as part of projects, we've had some lectures about team management and team etiquettes, but never really a specific class that's been focused on leadership or achieving your goals, things like that. So I think with engineering, it seems like in a lot of my classes, the expectation is on us to develop good leadership principles and ensure that we know how to work as part of a team.
>
> I don't think so. I'm trying to recall….I don't think so.

Despite the lack of leadership education within their engineering coursework, these students were able to identify leadership skills through their experiences with extracurricular organizations. Yet, while those extracurricular organizations may not have formally explained leadership to them, they could still identify leadership skills, even if their experiences were outside of engineering.

Seeking Community in College

Another common thread throughout the interviews was their interest in serving as leaders for their respective organizations. Across the interviews, students described coming into their respective leadership roles as a way to give back to the communities that supported them. As these communities welcomed and supported them at the beginning of their college careers, they wanted to continue supporting and lifting these organizations as upperclassmen. As all student participants were either juniors (third year) or seniors (fourth year), they were able to reflect on their experiences since their freshman year (first year) about the impacts of various communities

on their growth and development, either adjacent to or related to their engineering education. For some students, friends and family, as well as prior high school experiences, encouraged them to join organizations as freshmen:

> I was encouraged to apply because I had friends and a sibling who had participated in these boards before.

> Part of it came from my upbringing. I was involved in Vietnamese Scouting growing up and a lot of the same people from that community just happen to be in MOVSA. In high school my highest priority extracurricular was the Vietnamese Student Association.

On the other hand, one student reflected on their experience freshman year, discussing their work experience, which transitioned into a leadership role.

> I joined freshman year because I didn't find any clubs. I was actually kind of homesick freshman year…[they] explained to me that I should come to the [organization] to make friends, go to events, hang out with people.

The two students from the Society of Asian Scientists and Engineers described how SASE's mentor-mentee program helped get them connected to SASE and the university during their first year:

> SASE has a mentor-mentee program that aims to pair upperclassmen mentors with underclassmen mentees. That was the first week I really found myself being really involved with SASE and trying to learn more about the club. I remember attending that my freshman year, and it seemed really cool. I got a chance to talk to so many different mentors, learn about academic interests, stuff like that. That was kind of like the motivating factor for me that made me stick with SASE as an organization.

> I was matched with my mentor, [mentor's name]. [Mentor's name] already had a leadership role in a couple different areas on campus. Seeing her do what she does in her roles really motivated me.

For other students, they craved building community away from engineering:

> I already spend my school work time doing all that engineering stuff, going to office hours, and even helping friends or people who ask me when I'm at these office hours. Getting away from that engineering community is like a good break because I don't want to always just be around engineers.

> You want to feel connected to them and you want to understand them. And myself being Asian American, I met so many kind of like-minded people, like second-generation immigrants you know in this organization. And I felt like we could really just all help each other.

> College campuses are full of so many diverse groups of people with different perspectives and different upbringings. And at [university], it's a primarily white student body, that can be very intimidating at times. One of the reasons why I chose to pursue a leadership position in SASE and not a society with engineers is because SASE had more people I identified with who were also

> Asian American and maybe some other Asian American students out there may be intimidated to apply for leadership positions, go for leadership positions, or even just be very visible in those spaces because of imposter syndrome. Everyone seems a lot more confident because, of course, they're like the majority. They are able to find their community a little more easily.

Finding community, whether within engineering, adjacent to it, or far away, became important for these students and helped them integrate into the university setting. No matter how they joined or started their respective organizations, they all experienced different levels of community within their organizations. This led them to pursue these leadership roles as upperclassmen:

> I found myself wanting to contribute to this community that gave so much to me. My freshman year, so many upperclassmen from that organization were able to help me in my classes, general advice, even things like internships, giving me advice for interviews, etc., and the events that they put on, I felt it really benefited underclassmen like myself.

Transferable Skills to Engineering

Whether their leadership experiences were outside of, adjacent to, or in engineering, students could recognize various skills they've developed as skills applicable to engineering. Students could also recognize ways in which their leadership skills could be used not only in their organization spaces but also for their future careers as computer scientists and engineers.

> Usually, they[recruiters] talk about leadership experiences and stuff like that. I would bring it up like, "Oh, I'm actually a leader at this club." It's not a hard skill for what I work in. It's mostly something to talk about and in a personality interview, something that you're passionate about outside of your work.

One of the most common leadership skills is networking with others. Learning about how to reach out, connect, and network with companies and engineering industry for their respective organizations would help build their communication skills, which is essential for effective leaders.

> I would be reaching out and emailing companies to schedule professional development workshops with us because SASE, like many of the other engineering organizations, has company sponsors. We try to reach out to them to see if they would be interested in sponsoring us, or do events with us, whether that's things like resume reviews, networking tips, general professional development.

> With Hack Violet, I'm responsible for sponsorship and communicating with company sponsors and doing technical workshops. I feel like that was just like a good role for me because being in CS is you're very much to yourself…also with sponsorship and things like that, the reason I decided to pursue that is because I have a lot of experience with [non-profit]. We have 30 company sponsors, and so I feel like I have a lot of connections in the field and in industry.

Another important leadership skill learned through extracurricular experiences is conflict resolution. Learning how to navigate conflicts is critical. Although conflicts are inevitable, it's all about how they are managed and resolved. A leader needs to be able to consider multiple perspectives on a conflict and decide how to move forward.

> For that conflict, I give them reminders, but I can only give them so many reminders. If it comes down to a point, I always keep my supervisors updated to make sure they're in the loop and make sure they know what staff is slacking, what staff is not doing the work that is being assigned to them. And I tell them weeks in advance for them to do the work.

> I think something that's really important when you're in these type of situations is taking a step back and evaluating the big picture and the big goal because ultimately, if you're on a team, you have the same goal at the end of the day. Taking a step back and evaluating you know “why am I here?” “Why am I doing what I'm doing?” “How am I positively contributing to this thing?” For me, something that really helps is a pros and cons. I think when being in a leadership position, it's also important that you keep an open mind and the people that you're working with have an open mind. Because if not, it's honestly just never going to work out. Because, I mean, if you're stubborn, then you know not everything's going to go your way.

> From my experience, even in my early engineering classes, there were so many group projects that you had to undertake. Being able to communicate in those group projects, sometimes you're the lead. Sometimes you've been assigned a different role that's not like the team leader. Being able to experience all different sides in group projects, in classes really allows you to develop skills in communication, like organization, being able to delegate responsibilities, being able to navigate conflicts, especially if someone's not doing their part. You have to figure out how to communicate professionally.

When discussing examples of model leaders from their lives, one student discussed the importance of passion and commitment:

> I did Indian classical dance called Kuchipudi. With my dance teacher, I really saw how much she cared about her students. She only charged all her students like $100 for 40 hours of dance a week, which she's getting nothing out of it…. Through having such a good leader and mentor, I started to actually care about it, even though it was something that I was like, "Oh, I don't want to do this."

The Intersecting Bamboo/Glass Ceiling Effect

Of our six participants, three identified as women, all of whom were majoring in computer science. During these student interviews, participants were invited to discuss the 'bamboo ceiling' and 'glass ceiling' to see if these sentiments still existed in engineering and computing. For the most part, these women were able to find inclusive spaces where they could lead. However, they still had some interactions with these ceilings. In particular, one of the women who was the former president of SASE described the subtleties that she experienced push back despite being in a space meant to support both Asian Americans and women in STEM:

> Being a female leader definitely brings different experiences. I've definitely had times where I felt like undermined. And sometimes it's not like explicitly like someone's not telling you like, "Oh, because you're a woman, I think that you can't do this," or, "You can't handle this." But there have been experiences where there have been other male leaders who've been like, "No, I can take the speaking role at a big event. You don't have to say it." And I'm like, "Wait, this doesn't make any sense because I'm also in charge of this." you know? A lot of my experience is like female leaders take on a lot of work.

However, most of these discussions became geared towards the uncertainty of their future careers as engineers. When asked about the bamboo or glass ceiling, they replied:

> Within industry I'm sure I will encounter the glass ceiling at some point, as I move around to different companies. I sure hope not, but I feel like it could be inevitable that I encounter [it] in my career…as much as I can wish that every company has a good work culture, it's a bit optimistic to say that all these companies have an inclusive work environment. Just navigating through that would be inevitable. While there are initiatives to bring more women and people of color into STEM into these tech companies, there are going to be people who think differently from the way I think who aren't going to be as inclusive to women. There are going to be so many people in industry who want to see more women in leadership positions in tech companies, I am sure there are also a handful of people who wouldn't.

> I do think that will be an issue within my specific company that I've had experiences in because I've looked at the organizational charts, and a majority, like 90% of the leadership there is white men. I'm lucky my manager is a POC [person of color] woman. There's another coworker of hers who's not exactly my manager, but part of the full-time team that I worked with. There are a lot of people on that team who kind of have given me advice about how to navigate the workplace as Asian American woman. But I do think that it'll take some time for these specifically, I'm working in a government contracting company, and I feel like that industry specifically is very white male-dominated, and it'll take some time to have people with different perspectives with different backgrounds to rise to talk there.

All three women participants expressed concerns about their future career trajectories related to their identities as Asian American women in computer science. For another student, her Asian American identity is not what she worries about, but her gender identity. When asked about feeling prepared to be a potential industry leader, one responded:

> I slightly feel prepared, but I am also scared due to the overall male domination of my field.

Discussion

While leadership has become an important aspect for engineering students to learn about and cultivate leadership skills, it has become evident that leadership is not formally taught; rather, it is tacit knowledge that students are expected to already possess before stepping into the

engineering classroom. As engineering educators, if we hear from our partners in engineering industry that our students need to learn leadership skills, we need to rethink where we can incorporate leadership education into the engineering curriculum without too much disruption. As students have mentioned, if they experience any formal leadership education, it typically occurs in communication classes, not in engineering, or senior design classes, at the end of the engineering education. We may want to reconsider some leadership education in first-year engineering courses. From these interviews, students indicated that if engineering faculty were to teach, discuss, or provide examples from engineering industry on the importance of leadership, students might pay more attention than if it were outsourced to the humanities.

If engineering educators find it challenging to incorporate leadership into the curriculum, they may encourage students to seek opportunities in extracurricular spaces or explore other avenues to support these experiences. Again, while it is not formal education, offering students opportunities not only gives them a chance to develop leadership skills, but, as mentioned by student participants, also allows them to find community and form stronger connections to the university. As mentioned, the skills learned in extracurricular experiences are essential for developing leadership skills.

Limitations

As a pilot study, this project allowed us to explore potential directions for a more extensive study on perceptions of leadership among undergraduate Asian American engineering students. For future iterations of this project, several aspects must be reconsidered. First, it became evident that multiple 30-60 minute interviews would be necessary to encapsulate the entire experiences of students with leadership. Thus, moving forward, there should be at least two separate interviews with each participant, one focusing on engineering and the other on leadership. The second interview focuses on the student's Asian American identity, as well as their gender (if applicable).

Second, since this study was in development, the concept of leadership needed to be more specific so that students could develop their descriptions and share their perceptions of leadership. It may be vital to consider a more nuanced definition of leadership as a position or as a set of skills needed to be a leader. This will help participants gain a more nuanced understanding of leadership, as one participant viewed engineering leadership as a formal position at the university level, such as the dean of a college or professors.

Third, an interesting aspect of these interviews was the demographic of the students interviewed for this project. All students identified as either ethnically Vietnamese or Indian (South Asian). As mentioned in the findings, ethnic background could be an interesting area for future research, as there is limited research on Southeast Asians in leadership positions. Students of East Asian

descent should be interviewed in future iterations of this project to see if sentiments about the bamboo ceiling and bamboo/glass ceilings continue. One of the women students, when asked about the bamboo and glass ceilings, indicated more concern with her gender identity as a woman than her identity as an Asian American. This supports previous research on the effects of the bamboo ceiling across Asian subgroups [37].

Along with identity, while Asian American men did not initially consider the bamboo ceiling a significant obstacle to their careers in the short term, they recognized that it could become an issue later on if they pursued higher management positions.

Conclusion

While this project explored the intersection of the bamboo and glass ceilings, it will be essential to continue exploring this phenomenon within the space of computing and engineering. With the prevailing climate towards diversity, equity, and inclusion across the country, if we want to continue encouraging women and Asian American women to participate in STEM fields, we need to continue understanding how bamboo and glass ceilings manifest within engineering, even if not explicitly so.

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