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BECAUSE I AM A WOMAN:
AN INVESTIGATION OF GENDER BIASES IN ENGINEERING FIELDS

INTRODUCTION

In recent years, universities have been placing an increased emphasis on inclusivity and diversity due to a pressure to accommodate the practices of their students [2]. Despite these efforts, female students in undergraduate Computer Science (CS) courses participate less than their male counter-parts due to gender biases, stereotypes, and negative experiences [1].

While inclusivity in computing is a positive change we would like to witness at the university level, there may be certain challenges to meeting our goals. Levey specifically discusses cultural diversity and presents arguments for multiculturalism, but also presents limitations which can be extended to diversities beyond culture; these types of diversity include but are not limited to gender, age, sexual orientation, and disability [2]. For the purposes of this research, we will focus specifically on the inclusivity of women in Engineering and Computer Science at the University of Victoria (UVIC).

I'm frustrated 'cause it's always a struggle, you know? Why am I having a hard time making friends, or asking questions in class? Because I am a woman." -Participant 22

METHODOLOGY

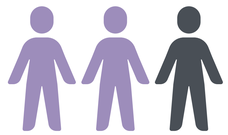
Previous research suggests that focus groups have become increasingly popular for collecting exploratory, qualitative data [3]. One of the key benefits to focus groups is the interaction between group members. This interaction catalyzes the generation of new ideas, and meaningful discussion [3].

39 students from the faculty of Engineering & Computer Science were recruited for this study; there were no constraints placed on participant-gender as all perspectives were welcome in our focus groups. Participants were recruited via announcements on UVIC platforms.

Each of 7 focus group sessions was conducted as a semi-structured discussion with the same questions. The researcher was tasked with taking notes of the conversations' highlights, while posing the next question when appropriate.

Common themes were generated from the participants' discussions. Themes that were discussed by multiple participants across different focus groups are particularly emphasized in this presentation. Participants were asked to share their personal experiences if they were comfortable doing so, alongside suggestions for the University of Victoria and the faculty of Engineering and Computer Science to improve the environment for female-identifying students.

RESULTS



- *13/*39 participants (33.33%) identified as both male, and as belonging to a non-marginalized gender.
- 26/39 (66.67%) identified as belonging to a marginalized group. Of these 26, 22 identified as female, and 4 preferred to self-identify.
- Of those in the non-marginalized group, 9/13 (69.23%) report being encouraged to pursue an Engineering or CS degree. Of those who identified as marginalized, 11 (42.31%) report the same encouragement.

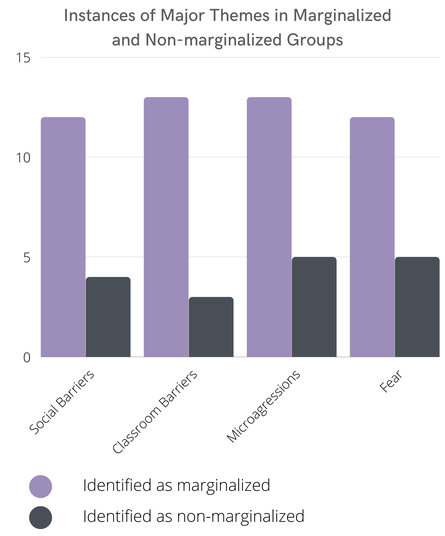


Figure 2: The number of participants that experienced a hardship described by any of four major themes: Social Barriers, Classroom Barriers, Microagressions, and Fear.

- Social Barriers: *difficulty integrating and feeling confident in academic environment due to an inability to form friendships or positive interactions with peers.*
- Classroom Barriers: *academic difficulty due to feeling uncomfortable in a classroom environment.*
- Microaggressions: *academic or social difficulty faced due to others perpetrating microaggressions in the form of comments, and other dismissive/derogatory actions.*
- Fear: *academic or social difficulty faced due to fear of poor academic performance, and therefore ridicule by one's peers.*

DISCUSSION

Our results identify a discrepancy between how marginalized individuals perceive their experience compared to those who did not identify as marginalized. On average, those who did not identify as marginalized reported instances of the four major themes above 65.87% less frequently, despite many stating that they were aware of these issues.

Feedback:

- Firstly, many participants (14) felt that Equity, Diversity, and Inclusivity (EDI) should be a part of the first year curriculum so that all students are aware of the barriers faced by women and other marginalized groups.
- Secondly, 17 participants discussed implementing a method of reporting negative instances to the faculty anonymously, so that all individuals had a safe space to be heard without any social repercussions.
- Participants also highlighted the importance of hiring diverse faculty and staff, with one participant saying: *"it really made a difference when one of my first year Engineering profs was a woman. She walked into the room and I immediately felt like I could succeed"*.

Although further research into this area would be required, participants also raised the fact that different genders are treated differently even in childhood, thus affecting their affinity to STEM. One participant says: *"I was not encouraged in high school math the way my brothers were. I think that's where the lack of confidence all started".*

CONCLUSION

This research provides insights into the experiences of those of marginalized gender identity in undergraduate Engineering and Computer Science, particularly female students. We also gain some understanding of how others view these experiences, as our project included those from non-marginalized groups. Moving forward, we hope to assist our university and other institutions in improving the Engineering and CS environment for all students and improving the accessibility of these fields.

REFERENCES

HTTPS://BIT.LY/3URJDVX

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