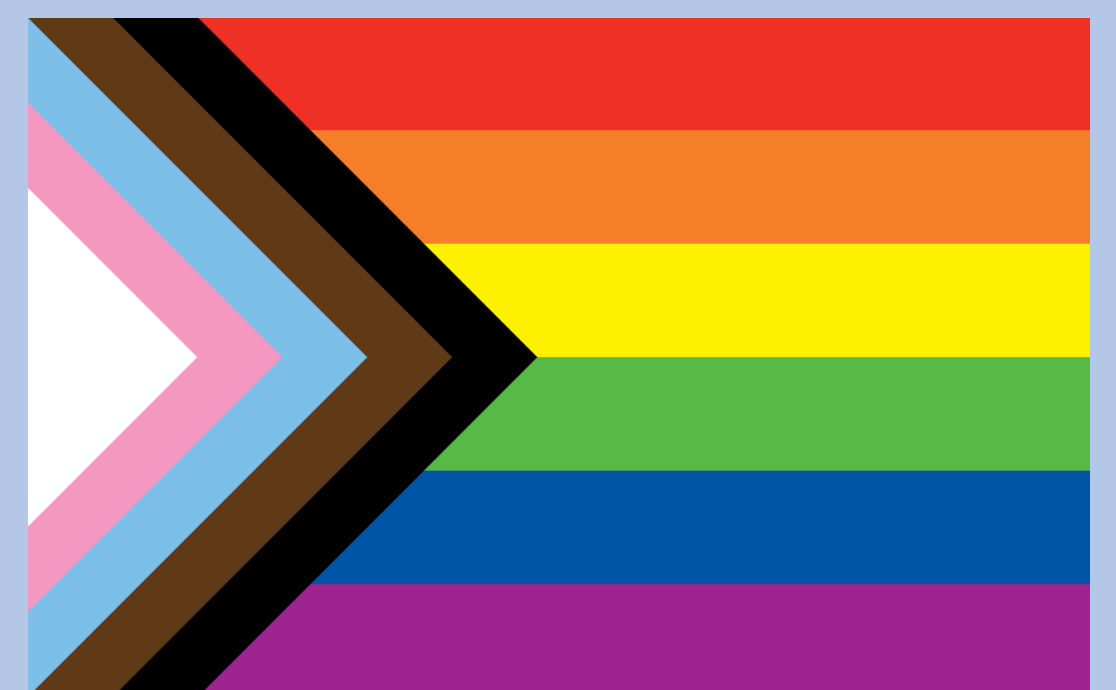


The Social Implications of Queer Identity in STEM Education

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Introduction

The STEM (Science, Technology, Engineering, and Mathematics) field has been historically dominated by cisgender, white, heterosexual men. As diversity and visibility become increasingly valued and the demographic of the student body changes, the importance of the social landscape in higher education must be recognized.

Objectives

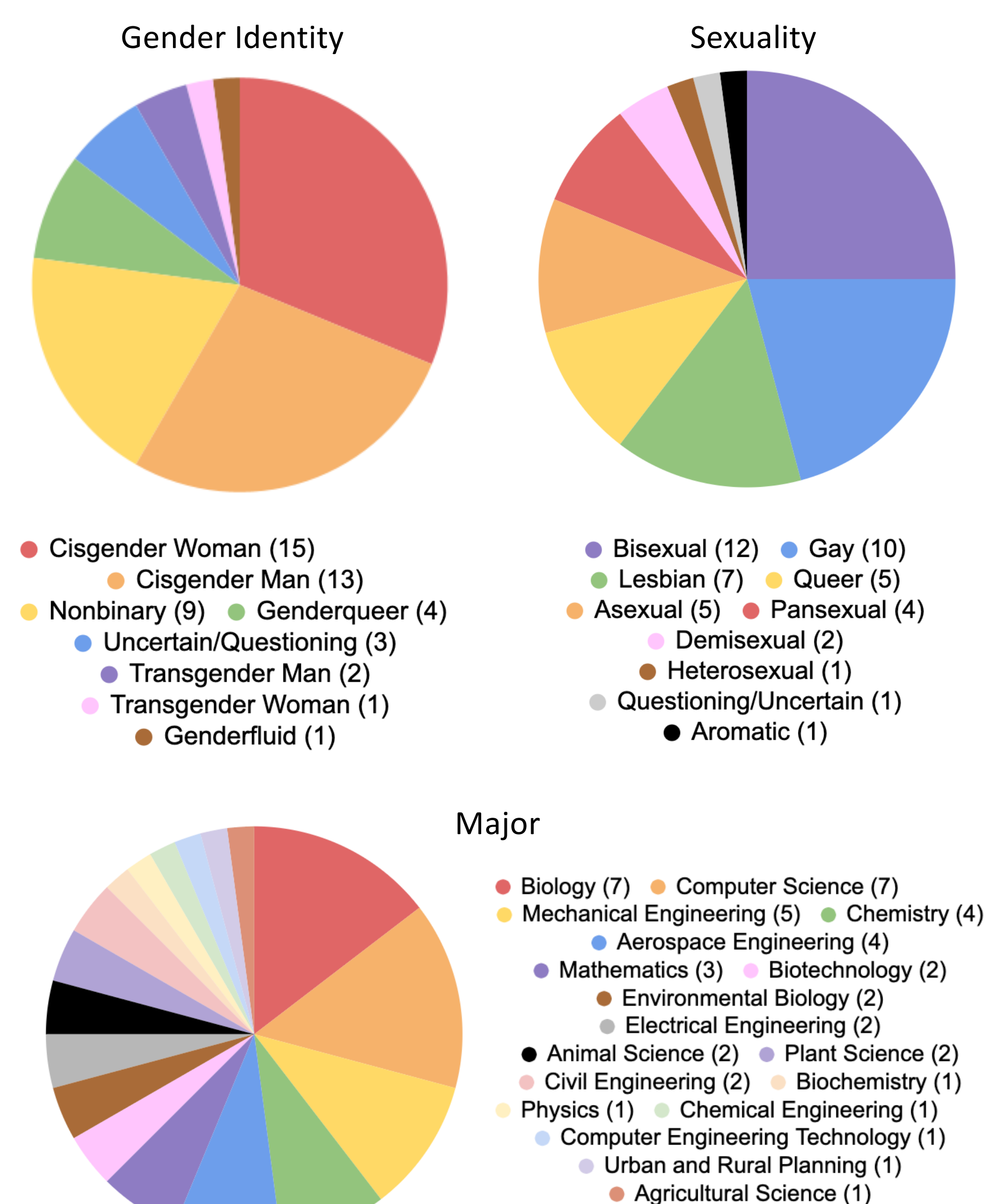
- Investigate whether there is an affinity to STEM in connection with queer identity.
- Explore the sentiments felt by queer students in STEM majors at Cal Poly Pomona in regard to their comfortability and social connection with their peers.
- Listen to the experiences of students to identify how STEM education and CPP's environment have supported or challenged their identities and the process of self-discovery.

Methods

- Anonymous surveys and confidential interviews were conducted.
- Respondents were asked to rate their level of agreement or disagreement with statements relating to queer experience in STEM education on a 5-point scale.
- Free-response questions were prompted regarding affinity to STEM, self-discovery, and the role identity plays in an academic setting.

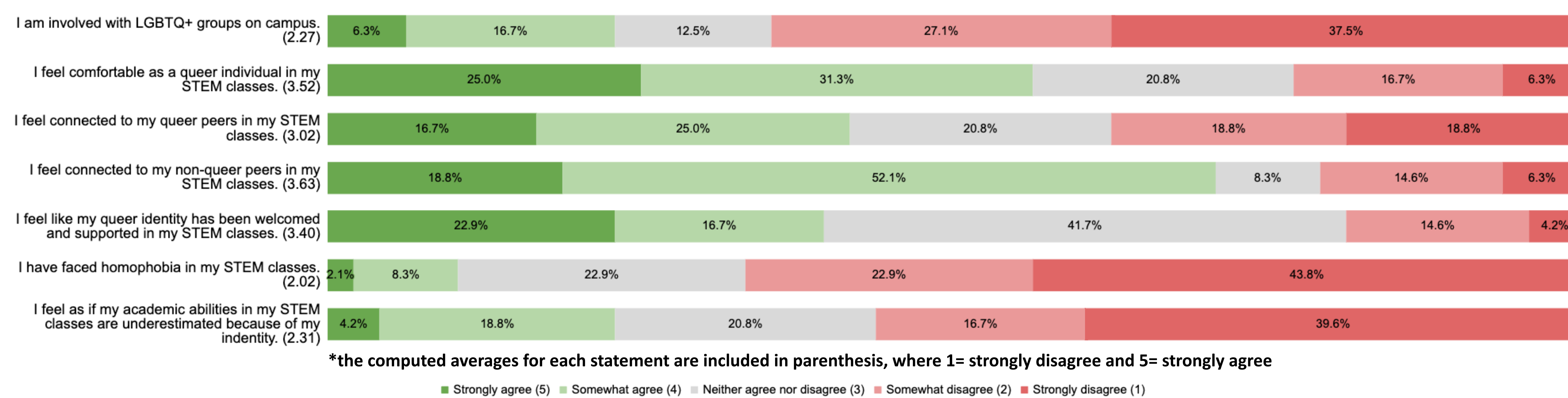
Response Data

48 total survey respondents



Results and Discussion

Response Distribution of Survey Part 1: Statement Rating



Survey Overview and Deviation by Factor

- Generally, respondents express neutral or positive sentiments regarding comfortability, connection, and acceptance of their queer identity in STEM classes.
- There is a large gap in the connection between queer and non-queer peers- 42% of respondents either somewhat or strongly feel connected to their queer peers, whereas 71% feel somewhat or strongly connected to their non-queer peers. This may be due to a lack of visibility and representation of queer individuals in STEM.
- The majority of queer students (56%) do not feel academically underestimated due to their identity and have not faced homophobia in STEM classes (67% disagree; 23% neutral).
- The factor which led to the greatest consistent deviation from the average was gender, with disparities both in the comparison of the sentiments felt by cisgender men vs. cisgender women and of cisgender vs. transgender individuals.
 - Cisgender women on average feel more comfortable as queer individuals (3.87 > 3.46), more connected to their queer (3.13 > 2.54) and non-queer peers (4.20 > 3.23), and more welcome in their identity (3.60 > 3.31) than their male counterparts. However, cisgender men on average face more homophobia (2.23 > 1.80) and feel more underestimated due to their queer identity (2.54 > 2.20) than their female counterparts.
 - Cisgender individuals on average feel more comfortable as queer individuals (3.66 > 2.63), more connected to non-queer peers (3.72 > 2.87), and more welcome in their identity (3.45 > 2.58) than their transgender peers. Meanwhile, transgender people on average expressed that they feel more connected to their queer peers (3.09 > 2.84) but have faced more homophobia (2.24 > 2.02) and feel more underestimated academically due to their identity (2.46 > 2.37) than their cisgender peers.
- Comparison on the basis of sexuality also led to differences in average sentiments. However, these were not consistent by identity and cannot be grouped together into larger cohorts in the way that gender can (e.g. cis vs. trans); therefore, more data would be required for analysis.
- Respondents that are involved in on-campus LGBTQ+ groups on average feel more comfortable as queer individuals (3.55 > 3.35) and more connected to both queer (3.82 > 3.02) and non-queer peers (3.91 > 3.48) than those who stated that they are not involved in LGBTQ+ groups. Additionally, students who are not involved on average felt more underestimated in their STEM classes (2.41 > 2.09) than those involved.
- Respondents in science and agriculture on average felt more comfortable as queer individuals (3.56, 4.20 > 3.13), more connected to their queer peers (3.11, 3.60 > 2.60), and feel more welcomed and supported (3.44, 4.20 > 3.07) than students in engineering. Furthermore, students in engineering on average have faced more homophobia (2.47 > 1.93, 1.40) and feel more underestimated (2.80 > 2.26, 1.40) than students in science and agriculture. Students in agriculture consistently had the most positive sentiments. There was an insignificant difference for all academic colleges in connection to non-queer peers.

Free-Response: Student Experiences and Insights in STEM Classes

- Most students do not feel as if their queer identity has challenged their ability to succeed in STEM education, although several individuals noted that personal and home-based challenges related to their identity have indirectly challenged their academic journey.
- Several respondents noted that there is little room for self-expression or acknowledgment of identity in STEM because classes are fast-paced, competitive, solely academically focused, and lack personal conversations or connection.
- Students involved in LGBTQ+ campus groups feel that these spaces have been very instrumental in providing them with a support system.
- While most individuals feel that their queer identity is welcomed in their STEM classes, many stated that they notice the lack of representation or visibility, which can feel isolating.
- Many students expressed the desire for their identity to be more visible or represented in the academic sphere and acknowledged the ability of STEM education to supplement their self-discovery or understanding of their own identities.

"I feel like being in science, it kind of gives you routines that you can adhere to and it gives you a way to method your way out. It lets you figure yourself out in a way that is more systematically approached than emotionally."

"STEM has supported my identity in that it helps quantify the world in its infinite intricacies, as well as providing a myriad of examples of how the queer experience isn't confined to one sexuality, gender expression, or even species."

Limitations and Future Directions

- Continuing this research to expand respondent participation may offer a more developed and encompassing overview of CPP's culture.
- How identity affects lived experience is an intersectional matter- queer identity rarely exists on its own but rather interacts with other factors such as race, religion, disability, and class.
- Locational context is important; the experiences of LGBTQ+ students and their resulting sentiments likely differ across other college campuses due to the surrounding cultures and attitudes, which is worth investigating further.
- The reported trends on the basis of gender necessitates further investigation of how sexism and transphobia play a role in academia
- Insight into the demographics of each academic college (Science, Agriculture, and Engineering) may offer a suggestion for the difference in sentiments between these colleges, in addition to the general sense of academic competition or community within them.
- The interpretation of how and *why* different factors may affect overall sentiments has research potential in the realms of psychology and sociology.

Summary

While affinity to STEM education does not necessarily have a direct relation to queer identity, students can create meaningful connections between the methods of thinking or pedagogies within STEM that can develop or validate queer identities. Generally, the comfort and social network of queer students on Cal Poly Pomona's campus are neutral or positive, but at times queer students feel strained due to the competitive and occasionally disconnected nature of STEM. Primarily, students do not feel as if their academic ability is underestimated due to their queer identity, although some noted that personal and home-based challenges in connection with their identity have led to academic barriers. Furthermore, there are notable differences in the average sentiments expressed by respondents on the basis of gender, sexuality, involvement in LGBTQ+ campus groups, and academic college. The greatest influencing factor was gender, which produced gaps in the sentiments expressed between both cisgender women and men as well as cisgender and transgender individuals. Overall, this study highlights the importance of representation and visibility and prompts discussion about how we can elevate the voices of individuals not traditionally recognized in the STEM field.

Acknowledgments

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