

Needs, Success, Race, and Equality: A Q Methodology Study of Community College Algebra Students

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Keywords: college algebra, community colleges, diversity, equity, inclusion, Q methodology

While prior studies have explored students' experiences in college algebra (Gardner, 2020) and examined undergraduate students' sense of inclusion and belonging in mathematics at predominantly white institutions (Leyva et al., 2021), there remains a gap in research focusing on how community college students understand diversity, equity, and inclusion or how these understandings develop over time. Our study seeks to address this gap by exploring the question: What are community college students' understandings of diversity, equity and inclusion in their college algebra classrooms?

We present preliminary findings from a Q methodology study exploring community college students' perspectives of equity in college algebra. This study is part of a grounded theory analysis (Charmaz, 2006) to build a conceptual framework of this construct from students' perspectives. Community colleges serve students from diverse local contexts, and thus, their interpretations of equity are shaped by both institutional and community factors. We collected data from 41 students from eight colleges located in four regions of the United States—Northwest, Southwest, Central, and Midwest. The participating colleges were selected for the demographic diversity of their student populations. Our recruitment efforts intentionally focused on including students representing varied racial, gender, ethnic, physical, and neurodiverse identities.

Each participant completed four semi-structured interviews over one year. During these interviews, students (1) discussed their personal and mathematical histories and how these shaped their current understanding of diversity, equity and inclusion; (2) provided commentary on short classroom videos, identifying moments they associated with equitable or inequitable practices; (3) engaged in a Q-sort activity (Rieber, 2020) using 33 statements derived from student interviews and literature to express their viewpoints on equity in mathematics classrooms; and (4) are currently completing interviews that allow participants to reflect on changes in their perspectives throughout the process.

In the Q-sort activity, 25 of the 41 participants placed statements on a scale ranging from most disagree to most agree. We used a scale in the shape of a normal distribution for the use of a forced sort structure allowed us access to individual students' unique perspectives and to directly compare student responses to identify common themes. Following the Q-sort activity, we asked the participants to explain how their unique perspectives were formed, focusing on the four statements they placed into "most agree" and "most disagree". The Q-sort data was analyzed using the KADE desktop application (Banasick, 2019), which identifies shared and divergent perspectives among participants. Our analysis yielded four distinct factors (Needs, Success, Race, Equality), each representing a different way community college algebra students conceptualize equity in mathematics classrooms. In this poster, we present findings from the Q-sort analysis, highlighting the themes and perspectives that emerged from these four factors.

Acknowledgment

The AI@CC 2.0 VMQI Research Team: Alecsa Agbayani, Claire Boeck, Inah Ko, Megan (Mack) McCormick, Rabia Gul Kirikçilar, Vilma Mesa, University of Michigan; April Ström, Laura Watkins, Patrick Kimani, Maricopa Community Colleges; Irene Duranczyk, Bismark Akoto, Siyad Gedi, Dexter Lim, University of Minnesota; Camden Collins, Mary Beisiegel, Oregon State University.

References

- Banasick, S. (2019). KADE: A desktop application for Q methodology. *Journal of Open Source Software*, 4(36): 1360. <https://doi.org/10.21105/joss.01360>
- Charmaz, K. (2006). *Constructing grounded theory: A practical guide through qualitative analysis*. Sage.
- Gardner, A. (2020). Listening to College Algebra survivors: A natural history ethnography [Doctoral dissertation, University of Colorado at Denver]. ProQuest Dissertations and Theses Global.
- Leyva, L. A., McNeill, R. T., Marshall, B. L., & Guzmán, O. A. (2021). “It seems like they purposefully try to make as many kids drop”: An analysis of logics and mechanisms of racial-gendered inequality in introductory mathematics instruction. *The Journal of Higher Education*, 92(5), 784-814. <https://doi.org/https://doi.org/10.1080/00221546.2021.1879586>
- Rieber, L. P. (2020). Q methodology in learning, design, and technology: An introduction. *Educational Technology Research and Development*, 68(5), 2529-2549.