“FAIRNESS” OR “SAMENESS”? COMMUNITY COLLEGE STUDENTS’ PERSPECTIVES ON EQUITY IN THE MATHEMATICS CLASSROOMS

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Equity has long been a foundational principle in mathematics education, yet its meaning remains contested in practice. This study examines how college algebra students in the United States conceptualize equity in their community college mathematics classrooms. The participants included 23 students from eight community colleges across different regions in the United States. The analysis yielded four distinct perspectives: equity as meeting individual needs, equity as equal opportunity in the absence of racism, equity as colorblind fairness, and equity as sameness. These findings highlight equity as a socially constructed concept and demonstrate the value of Q methodology for capturing diverse student viewpoints in the context of community college mathematics.

Promoting equitable access and outcomes in mathematics education remains a persistent global challenge and moral obligation. The United Nations has situated equitable mathematics education within a broader ethical and developmental agenda, emphasizing not only access to schooling but meaningful opportunities to learn, particularly for historically marginalized students (UNESCO, 2017; United Nations, 2015). Mathematics education researchers have called for more nuanced conceptualizations of equity within mathematics learning environments. For instance, Esmonde (2009) defined equity as “a fair distribution of opportunities to learn” (p. 249), while Hunter and Hunter (2023) emphasized practices that “explicitly connect and build on the cultural, social, and linguistic contexts of non-dominant students, their family, and community” (p. 1768). However, there is very limited research on students’ perceptions of equitable instructional practices in mathematics classrooms.

This paper reports on a study that used Q methodology to examine how students at U.S community colleges—tertiary-type B institutions (OECD, 2017)—conceptualize equity in their mathematics classrooms. Q methodology research has been used to investigate the beliefs, practices, and professional development of teachers regarding equity (e.g., Bondurant & Young, 2024; Wilburne et al., 2018) and student attitudes toward mathematics, showing its utility in revealing diverse perspectives on fairness and access. However, the existing literature is heavily skewed toward K–12 settings or educator viewpoints. Our work centers college algebra students’ perspectives seeking

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to describe how they understand and experience equity in their community college mathematics classrooms. Community college algebra classrooms bring together students with wide variation in age, educational histories, racialized experiences, language background, and institutional positioning. These conditions make equity particularly visible, contested, and consequential in ways that may differ from K–12 settings or teacher-focused research. Centering these students' perspectives provides insight into how equity is understood and negotiated in mathematics classrooms marked by structural diversity and unequal access.

THEORETICAL FRAMEWORK

This study draws on a sociocultural view of equity in mathematics education that understands equity as a socially constructed concept rather than a fixed or universal principle. From this perspective, equitable instruction is shaped by student experiences with schooling, institutional structures, and classroom interactions. Students' interpretations of equity are therefore treated as theoretically meaningful, reflecting how fairness, inclusion, and support are understood within certain educational contexts. Lo and Ruef (2020) conceptualized equity in mathematics teaching and learning in terms of learning environments that are inclusive and comprehensive, emphasizing student experiences of participation and belonging. This framing underscores the importance of examining equity from students' perspectives, especially in contexts where educational pathways and opportunities are unevenly distributed. Variations that may emerge in how students interpret equity is theoretically productive by offering insight into how equity is constructed and negotiated by students and educators within the community college algebra classroom.

METHODS

We utilize Q methodology to systematically investigate the subjective student viewpoints regarding equity in mathematics. Established by Stephenson (1953) and further refined by McKeown and Thomas (2013), Q methodology allows for statistical modeling of participants' internal perspectives through a rank-ordering procedure. In this study, students expressed their perspectives on equity by sorting statements on a numerical scale that represents most agreement to least agreement.

Q-Sample Development

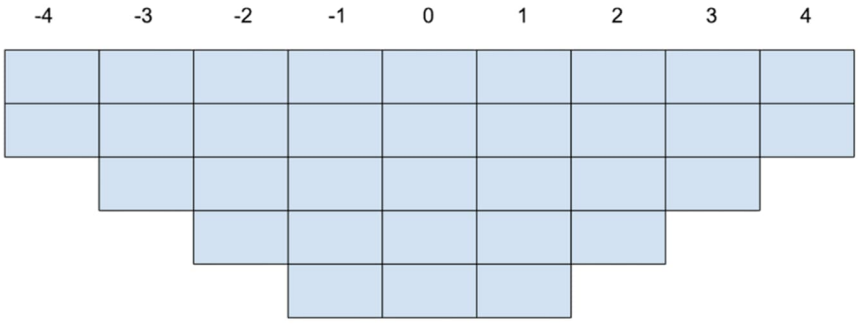
The development of the Q-sample followed a multi-stage process to ensure both ecological and theoretical validity. An initial concourse generated from preliminary interviews with algebra students formed a broad pool of 56 possible statements to draw from. A final Q-sample of 33 statements was obtained after a pilot testing that addressed participant fatigue and thematic overlap; this set included statements from literature and from student interviews to improve thematic clarity and variation of ideas. The set synthesized verbatim student utterances (e.g., defining equity as "giving everyone the same formula") with theoretical constructs from the literature (Esmonde,

2009; Gutiérrez, 2002) so that the instrument could test nuanced aspects of equity, such as the distinction between “fairness” and “needs-based support.”

Participants and Data Collection

The study involved a purposeful sample of 23 community college algebra students from eight institutions across four U.S. regions (Central, Midwest, Northwest, and Southwest); dimensions of selection included race, ethnicity, gender, and neurodiversity. Data were collected using the EQ Web Sort Configurator (v7.0.0) (Banasick, 2023) through a three-phase Q-sort procedure. Participants first completed a preliminary sort by grouping statements into agree, neutral, and disagree categories. They then completed a forced quasi-normal sort by placing 33 statements onto a distribution grid ranging from −4 (most disagreed) to +4 (most agreed) with limited slots at each extreme to reduce cognitive burden (see Figure 1). Finally, semi-structured post-sort interviews captured participants’ rationales for their extreme rankings.

Figure 1: Quasi-normal sorting grid used for this study.



Data Analysis

Analysis was performed using the KADE software (Banasick, 2019). After identifying the relationships between individual sorts using Pearson correlation, a principal component analysis was done to highlight and strengthen similar response patterns between Q-sorts. Factors, defined here as groups of participants with similar responses, were retained based on the Kaiser-Guttman criterion (eigenvalue > 1.00) and each Q-sort within the factor was retained if it met a statistical significance threshold of 0.409 ($p < .05$). Following extraction, Varimax rotation (Kaiser, 1958) was applied to redistribute factor loadings and clarify the thematic distinctions.

During analysis, some participants demonstrated statistically significant loadings on more than one factor, and certain statements functioned as defining statements across multiple factors. In cases where a Q-sort loaded significantly onto multiple factors, it was retained in the factor on which it loaded most strongly. This approach follows standard Q methodological practice, which does not support retaining a single Q-sort across multiple factors. Although overlaps occurred in both participant loadings and defining statements, each factor was treated as a distinct analytic grouping based on its overall configuration of statement rankings.

FINDINGS

Our analysis identified four distinct factors representing different ways the community college algebra students conceptualize equity. Of the 23 participants, 22 loaded significantly onto one of the four retained factors.

Factor 1: The Importance of Personal Needs Being Fulfilled

Factor 1 represents the predominant perspective within this study, comprising 14 of the 23 participants. This viewpoint is defined by a strong emphasis on meeting individual student needs rather than adhering to rigid standardization. Participants in this group prioritized statements that distinguished equity from equality. The highest-ranked items (commonly placed into $+4$ column) included Statement 27 and Statement 15 (see Figure 2). These selections underscore a consensus that equity in the classroom requires resource allocation that satisfies diverse needs rising from personal characteristics. Conversely, the viewpoints that received the strongest disagreement (-4) were definitions unrelated to pedagogical needs or those conflating equity with sameness. Statement 5 was rejected; interview data indicated students found this definition irrelevant to the classroom. More significantly, participants strongly rejected Statement 9, explicitly opposing the notion of identical treatment (see Figure 2). In sum, Factor 1 articulates a student-centered definition of equity where fairness is achieved through responsive differentiation rather than identical instruction and resource allocation.

Factor 2: Student Success and Personal Experiences with Racism

Factor 2 represents the views of five participants. This perspective is characterized by a dual focus on academic opportunity and the lived reality of discrimination. This group prioritizes the outcome of success and identifies racial bias as a primary barrier, rather than focusing on differentiated needs. Participants in this factor strongly aligned with Statement 8 (see Figure 3), However, this aspiration is coupled with a sharp awareness of bias. Statement 2: “You can blatantly see [when] some teachers are racist towards you, whether you're Hispanic or Middle Eastern or African American.” was commonly placed in $+3$. This suggests that for these students, equity is inextricably linked to the removal of prejudiced behaviors in the classroom. Unlike Factor 1, which

Figure 2: Defining Statements for Factor 1.

Factor 1: The Importance of Personal Needs Being Fulfilled		
Strongly Agree (+4)	27: Equity is when every person has what they need to succeed, but it's not necessarily equal to everyone. It's just what they need.	15: Equity means giving each student a fair chance to learn even if that doesn’t look the same for everyone.
Strongly Disagree (-4)	5: [Equity is] like, if you bring in your backpack or your phone. It's like ownership of your stuff.	9: [Equity is] just making sure everyone's treated the same.

Figure 3: Defining Statements for Factor 2.

Factor 2: Student Success and Personal Experiences with Racism		
Strongly Agree (+4)	14: Equity means giving everyone the same support, no matter what their background is.	8: Equity, I think it means every student has the chance to be successful in this class.
Strongly Disagree (-4)	28: Equity refers to money and the amount of money that is dispersed onto different groups or people.	23: Equity is more of a legal or political thing.

favored differentiated support, Factor 2 leans toward standardization as a form of fairness. This group strongly agreed with Statement 14 (Figure 3). This sorting indicates a complex relationship with "sameness"; they may view "different treatment" with suspicion, potentially fearing it could mask the racism highlighted in Statement 2. Participants strongly disagreed with statements framing equity as a political or monetary concept, as it is in Statements 23 and 28. For Factor 2, equity is not a policy or a budget issue; it is a tangible classroom experience defined by the absence of racism and the presence of opportunity. These statements can be seen in Figure 3.

Factor 3: Race Doesn't Have a Place in the Classroom

Factor 3 represents two outliers as it reflects only one participant's perspective (Riley) whereas a second participant (Jordan) wasn't sorted into any factor but was identified as having an inverse opinion to Riley's. This factor is distinguished by a colorblind approach to education, asserting that identity markers should not influence classroom dynamics. Riley strongly agreed with the ideal represented in Statement 18. This perspective envisions equity as a collaborative and respectful environment, described as a space "where everybody is working together, and actually listening to each other's opinions... and caring" (Statement 21) (Figure 4). Crucially, this viewpoint minimizes the systemic or racial dimensions of equity. Riley strongly disagreed with Statement 21, and most notably, in direct contrast to Factor 2, this Factor rejected the visibility of discrimination, strongly disagreeing with Statement 2. Thus, Factor 3 characterizes equity as interpersonal respect where race is rendered invisible. As Jordan had an inverse opinion to Riley's, he identified strongly with statements like 30: "Equity is everyone being graded fairly" he added to this by explaining that "Grading unfairly is just discrimination. Discrimination is the opposite of equity". Jordan feels that discrimination is antithetical to equity while Riley feels that discrimination is unrelated to equity.

Factor 4: Equity as Equality

The final factor, comprising two participants, is grounded in the association of equity with equality. Participants in this group prioritized uniform treatment above all else. This is evidenced by their strong agreement with Statement 22, alongside the belief

Figure 4: Defining Statements for Factor 3.

Factor 3: Race Doesn't Have a Place in the Classroom		
Strongly Agree (+4)	18: Being fair in school means that your race, gender, or language should not affect how well people think you can do in math.	21: [Equity is] where everybody is working together, and actually listening to each other's opinions and actually being nice and very respectable to each other, and caring.
Strongly Disagree (-4)	2: You can blatantly see [when] some teachers are racist towards you, whether you're Hispanic or Middle Eastern or African American.	23: Equity is more of a legal or political thing.

that identity should not dictate mathematical potential which is indicated by their agreement with Statement 18. These statements can be seen in Figure 5. Conversely, this group rejected specific interventions or alternative definitions of fairness. They strongly disagreed that an instructor supports equity by "providing free online resources" (Statement 26) and dismissed the complaint regarding rigid teaching methods represented in Statement 3 (Figure 5). Ultimately, Factor 4 defines equity not as meeting individual needs, but as ensuring identical treatment and expectations for every student.

DISCUSSION AND CONCLUSION

The application of Q methodology allowed us to identify both unique individual standpoints and collective patterns regarding equity among community college algebra students. By and large, participant definitions resonated with theoretical frameworks found in existing scholarship. These included conceptualizations of equity as fairness

Figure 5. Defining Statements for Factor 4.

Factor 4: Equity as Equality		
Strongly Agree (+4)	18: Being fair in school means that your race, gender, or language should not affect how well people think you can do in math.	22: [Equity looks like] if [the instructor] wants to treat one person good, you have to treat everyone the same way.
Strongly Disagree (-4)	3: Sometimes my teacher likes one method; if I know another method and I try to tell them, they are like: yes, we can do it this way but doing it my way would be better.	26: An instructor can support equity by providing free online resources for students who are struggling.

(Esmonde, 2009; Gutiérrez, 2002), personal responsibility (Dunleavy, 2015; Gresalfi & Cobb, 2006), and dynamics of classroom participation (Foote & Lambert, 2011; Mack, 2012; Reinholz & Shah, 2018). Additionally, some students emphasized the instructor's critical role in dismantling racism (Leyva et al., 2022). However, a distinct subset of participants diverged from these academic definitions, equating equity strictly with identical treatment for all—a perspective less visible in the equity literature.

Equity is an abstract and debated topic. While experts have tried to measure it and define it throughout literature, varying opinions exist on what the construct of equity means, feels, and looks like. Perspectives of equity are shaped by individual experiences. A student's unique positionality greatly impacts their experiences both in the community college mathematics classroom and in their interaction with politically popular words and phrases, like equity. Thus, it is not surprising to have a majority of students who are familiar and identify with a commonly accepted definition of equity as reflected in literature. It is also not surprising to have students who define equity through what they have identified as equitable or inequitable experiences throughout their lives or to have students who associate equity with a much more understood and similar-sounding term, equality.

These varied interpretations are directly reflected in the four factors identified in this study. The breadth of these interpretations underscores the multifaceted complexity of equity as a construct and validates the utility of Q methodology, which creates a non-evaluative space for capturing diverse subjective viewpoints. This methodological choice was pivotal in surfacing nuanced distinctions that might have been obscured by using only qualitative interviews or survey instruments. The next step in the analysis will add participant demographic data to elucidate possible reasons for students' perspectives, with the goal of understanding the role of individual identities in connection to equity within the community college mathematics context.

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