RESEARCH

Math teachers' perceptions, practices, and self-efficacy related to supporting Latinx students with learning disabilities

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Abstract
Latinx students with learning disabilities (LD) possess inherent strengths and bring valuable contributions to math learning, yet teachers often view them through a deficit-oriented lens. These students frequently experience limited opportunities to participate in math learning beyond learning procedures. This limiting exposure to math learning can adversely affect their self-perception as competent math learners. In this study, we administered surveys to general education (GE) middle school math teachers. Subsequently, we interviewed a subset to delve deeper into their perceptions, practices, and confidence in teaching this population. Our research yielded three main insights: (a) While teachers typically endorsed the inclusion of these students in GE math settings and recognized their potential for math achievement, there was also a sentiment that students lacked foundational knowledge and motivation; (b) the teaching methodologies employed reflected these beliefs; and (c) teachers expressed confidence in their ability to instruct Latinx students with disabilities effectively.

Keywords: special education, disability, Latino, Hispanic, teacher education

Latinx students with learning disabilities (LD) possess unique strengths and contribute valuable insights to math learning, a notion that is steadily gaining traction in the field (Bishop et al., 2022; Martínez-Álvarez, 2020). While there exists a growing body of research-based recommendations emphasizing high-quality math instruction (Jacobs & Spangler, 2017) and the significance of wholeheartedly including students as integral members of the math learning community (e.g., Bishop et al., 2022), there is still room to enhance the depth of participation of Latinx students with LD. It is essential to expand their engagement beyond just procedural or fluency tasks. Such comprehensive involvement nurtures a student's identity as a "doer of math"—a term encapsulating students' self-perception as adept and proactive contributors to mathematical thought and problem-solving. This identity is pivotal, given its influence on students' motivation and resilience in navigating mathematical challenges. By fostering a more inclusive environment, we can provide pathways to advanced math and deter undue tracking to lower-level courses (Kangas & Cook, 2020).

A high-quality math education for students requires thinking beyond the content that teachers are teaching, but how that content is delivered to enable all students to develop a sense of belonging and identification as a doer of math (Boaler & Greeno, 2000) that supports the learning of all students. One component essential for the math success of all students is a teacher who holds all students to high expectations, provides access to rigorous math instruction and relevant mathematical experiences, and supports the meaningful participation of all students. A teacher who meets the criteria mentioned above has the potential to support students as they develop a positive association with math leading them to preserver through challenging mathematics. Knowing that teachers are instrumental in the math classroom, it would be expected that all students be academically performing at high levels and identifying positively with math. However, students who belong to non-dominant groups are often limited in their access to high-quality math as evidenced by low academic achievement, disproportionate representation in lower-track classes, disproportionate underrepresentation in higher math level courses, and lack of identification with math as corroborated in the literature on student disengagement (Cioè-Peña, 2021; Kangas & Cook, 2020). Latinx students with disabilities deserve a math education that empowers them to identify positively as doers of math and achieve their full mathematical potential.

The research on math education points to classroom practices that engage students in deep mathematical thinking and learning (e.g., Jacobs & Spangler, 2017) and provides guidance on how to best support students with diverse learning and linguistic needs such as Latinx students with LD (e.g., Dennis et al., 2016). Although there continues to be a large focus on achievement gaps (Goodrich et al., 2021), counternarratives of Latinx students persevering in math, in which the dominant discourse around math ability is centered on White ableist ideals, have demonstrated that Latinx students can be successful (Oppland-Cordell & Martin, 2015). Further, ethnographic studies in classrooms have demonstrated that Latinx students with LD can be positioned as experts and successful mathematicians who use multiple linguistic and cultural resources (Lambert 2015; Moschkovich & Zahner, 2018). These findings highlight the important role teachers play in the education of students that can open the possibilities for math classrooms as spaces where all students can identify with math.

Teacher Beliefs, Instruction, and Self-Efficacy

Mathematics education thrives when all students can harness their potential and achieve positive outcomes. However, variations in these outcomes do exist among student groups. A combination of societal dynamics, proactive strategies within educational systems, and individual teacher perspectives can craft an environment where every student is recognized for their mathematical ability (Spencer et al., 2016). This is especially vital for marginalized groups. To enhance this equitable educational setting, it is essential to explore and understand the influences of teacher beliefs, instructional methodologies, and self-efficacy in shaping the academic experiences of these students.

Teacher beliefs, which can be defined as the implicit or explicit notions and conceptions that teachers hold about teaching, learning, students, and the nature of school and education (Fives & Buehl, 2012), play a crucial role in shaping student experiences and outcomes. These beliefs deeply influence students' experiences, guiding teachers' perceptions of student potential and instructional choices. Such beliefs become particularly impactful when considering Latinx students with disabilities. When founded on racial, linguistic, or ableist biases, these beliefs may inadvertently create obstacles to student success (Rubie-Davies, 2010). Often, these underlying biases can lead to a deficit view, setting diminished expectations and restricting the depth of academic content provided (Valencia, 2010).

Mathematics, a field where conceptual understanding is vital, frequently leans on procedural approaches, potentially neglecting depth for the sake of computation (Lambert, 2015). Historically, dominant societal values have favored characteristics typical of White, able-bodied, and English-proficient individuals, often sidelining racial minorities, individuals with disabilities, or emergent bilinguals (Lewis, 2004). While it is not our intention to assume all teachers adhere to these biases, it is pivotal to recognize their potential influence on educational beliefs and practices. Acknowledging these systemic biases aids in understanding the implicit advantages historically accorded to dominant groups, inadvertently shaping our understanding of competence in subjects like mathematics (Leonardo & Broderick, 2011).

Instructional practices adopted by teachers are another important factor in determining students' learning opportunities and outcomes. Teachers' instructional practices are shaped by their beliefs and perceptions of students (Fives & Buehl, 2012). These practices determine the nature and quality of opportunities for students to engage with mathematical concepts and problems. Pedagogical strategies that emphasize student engagement, meaningful discourse, and concept-driven instruction are particularly beneficial for students with LD (Moschkovich, 2007; Celedón-Pattichis & Ramirez, 2012). Teachers who may hold deficit views of students with disabilities often limit the cognitive demand of mathematical tasks presented to these students, focusing on procedural fluency and rote memorization instead of fostering conceptual understanding and problem-solving abilities (Lambert, 2015; Tobon & Hughes, 2024). This narrowed approach can restrict these students' opportunities to grasp deeper and more conceptually intricate facets of mathematics, thereby affecting their overall mathematical development. These practices severely curtail the opportunities for these students to engage in mathematical discourse and learning, restricting their math proficiency development (Wilhelm et al., 2017).

Another crucial facet influencing students' academic outcomes is the teacher's sense of self-efficacy, which refers to their confidence in their ability to handle and succeed in teaching scenarios. Extensive research has shown that teachers with a strong sense of self-efficacy are more likely to employ resilient teaching strategies, leading to improved student performance (Skaalvik & Skaalvik, 2017). Furthermore, teachers with high self-efficacy are often more likely to innovate and experiment with their instructional strategies, continually refining their pedagogical approach to better cater to the diverse learning needs of their students (Tschannen-Moran & McMaster, 2009). Teacher self-efficacy can shape instructional practices, classroom management, and student outcomes. It can also significantly influence their willingness and readiness to incorporate inclusive practices and differentiated instruction tailored to diverse learners' needs (Almog & Shechtman, 2007). For instance, teachers who perceive a high level of self-efficacy in teaching math are more likely to employ innovative teaching methods, introduce challenging tasks, and hold high expectations for all students (Gibson & Dembo, 1984).

This study aims to contribute to the evolving research on the educational opportunities of Latinx students with disabilities by exploring teachers' beliefs, practices, and self-efficacy related to educating Latinx students with LD in math classrooms. We utilized both quantitative and qualitative data collection and analysis techniques, to provide a more comprehensive and nuanced understanding of these dynamics. The following research questions guided our inquiry: (a) What are general education (GE) middle school math teachers' beliefs and perceptions of Latinx students with LD? (b) What practices do these teachers use to support these students?, and (c) How do these teachers perceive their self-efficacy related to teaching math to this population of students? Through our examination of these areas, we aim to highlight the influences that mold the learning experiences of Latinx students with LD within math classrooms and consider how teachers can be prepared to meet their needs.

Methods

Participants

Teachers for our study were recruited through a comprehensive approach. We leveraged our professional networks, deployed social media outreach, and engaged in direct contact through publicly available email lists. After receiving approval from the University Institutional Research Board (IRB), an initial email was sent to our professional contacts in school districts who could potentially qualify or know potential qualifying teachers. This email contained information about the study, including purpose, participation requirements, and a link to a Qualtrics eligibility questionnaire. Furthermore, the snowball sampling technique was utilized, encouraging the recipients to share the email with their contacts who might be interested and eligible. We further enhanced our recruitment efforts by emailing teachers from school districts with high populations of Latinx students. Parallelly, social media platforms (Facebook, Instagram, and X (formally Twitter)) were also employed to extend our reach. Over two months, weekly posts were made about the study and its aims, encouraging interested teachers to access detailed study information and the eligibility questionnaire. Teachers who believed they met the inclusion criteria based on their responses were invited to participate and were sent a link to the research survey within 48 hours. Of the 113 teachers who met the inclusion criteria, two emails bounced back, 11 teachers did not start the survey, and 40 teachers began but did not complete it, resulting in a 53% participation rate.

Sixty general education middle school math teachers completed the survey, most of whom identified as female (80%, n = 48). The teachers' racial makeup was predominantly White (68.3%, n = 41), with Latinx/Hispanic (16.7%, n = 10), Black (5%, n = 3), and Asian (8.3%, n = 5) teachers also represented. All teachers held a bachelor's degree, and 71.7% (n = 43) also had a master's degree (see Table 1). Many teachers (40%, n = 24) had 11 to 20 years of teaching experience, with a similar proportion (38.3%, n = 23) having taught in an inclusion class for the same duration. Upon completing the survey, teachers were asked about their willingness to participate in an interview. Eighty-five percent of teachers (n = 51) who completed the survey indicated their interest in participating in the interview. A random selection of these consenting teachers was interviewed until we reached 15 completed interviews (25% of the full sample).

Instruments and Procedures

Teacher's Beliefs and Self-Efficacy Survey (TBSES). In this study, we employed the TBSES survey, which is structured into two primary sections. The "Beliefs" section, from the Survey on Teaching Mathematics to Students with Learning Disabilities (TMSLD) (DeSimone & Parmar, 2006), captures teachers' beliefs and perceptions about teaching Latinx students with LD. Meanwhile, the "Self-Efficacy" section draws from the Exceptional Children who are English Learners (EXCEL) Teacher Inventory (Paneque, 2004) to understand teachers' confidence in teaching mathematics.

Table 1

Teaching experience and credentials

Teaching Experience/Certifications	**Survey Respondents** *n* = 60		**Interview Participants** *n* = 15 [a]	
	M	*SD*	*M*	*SD*
Years of teaching	13.6	6.9	10.8	8.2
Years of teaching inclusion	12.1	6.5	8.3	5.4
Years of teaching LD	11.2	6.2	7.8	4.9
Certifications/endorsements held [b]	*n*	%	*n*	%
Middle school math education	48	80	13	87
Middle school education	36	60	8	53
Elementary education	29	43	9	60
English as a second language	20	33	6	40
High school math education	14	23	3	20
Other	9	15	0	0
Special education	7	12	4	27
Bilingual education	7	12	2	13
Degrees in Math [b]				
No math degree	42	70	13	87
Bachelors in Math	17	28	2	13
Masters in Math	3	5	0	0
Proficiency in languages other than English	21	35	2	13
Proficient in Spanish	12	20	1	1.6

Note: [a] = Interviewed participants are a subset of the survey respondents. [b] The percentage is over 100% because some teachers hold multiple certifications or degrees. LD = learning disabilities

The complete TBSES survey has six subsections: three for "Beliefs", one for "Self-Efficacy", a section with open-ended questions, and a demographic portion. It comprises 66 Likert-scale items, four open-ended questions, and demographic items. For teachers proficient in Spanish, nine additional items were provided. The survey required about an hour for completion. Both the original TMSLD and EXCEL instruments have established content and face validity. For the TBSES, face validity was ascertained through expert review and feedback. We carried out a reliability analysis on the TBSES, adopting methods delineated by DeSimone and Parmar (2006) and Paneque (2004). This involved computing Cronbach's α for internal consistency, which revealed reliable results across the various sections.

Interview

We scheduled phone interviews with participating teachers to gain a deeper understanding of teachers' beliefs and perceptions. Utilizing a semi-structured interview protocol allowed us not only to standardize our approach but also to adaptively probe further, ensuring the richness and relevance of the data collected. This format permitted flexibility in asking follow-up questions, thereby uncovering insights directly relevant to our research questions. Our interview protocol was organized around three primary questions that addressed teachers' beliefs about Latinx students with LD, practices they used with them, and their perceived self-efficacy instructing these students. To fortify the credibility and accuracy of our data, we engaged in a member check process. Here, teachers were given an opportunity to review their transcriptions, ensuring the fidelity of their statements. This also allowed them to assess the integrity of our preliminary findings. This approach underscored our commitment to presenting an authentic, credible, and thorough depiction of teachers' beliefs and perceived self-efficacy.

Data Analysis

Descriptive statistics were carried out for demographic questions and Likert scale items on the survey. We employed a thorough and systematic approach to ensure depth and precision in our analysis for the qualitative data derived from the open-ended survey questions and interviews. Our multi-faceted method encompassed stages such as initial coding, thematic analysis, and triangulation, solidifying the credibility and integrity of our conclusions. In the first phase of coding, we immersed ourselves in the teachers' responses, diligently highlighting recurring patterns, terms, and themes. Throughout this phase, we prioritized staying faithful to the teachers' narratives, ensuring that our interpretations were rooted in their perspectives and not colored by our own biases. After the initial coding phase, we delved into a thematic analysis, systematically identifying, and grouping recurring patterns in the data. This deeper examination facilitated a more nuanced understanding, spotlighting salient themes that consistently appeared across various responses. To bolster the reliability and consistency of our analysis, two members of our research team undertook this phase independently. Their findings were later juxtaposed to ensure alignment and reach a unified consensus.

Our qualitative data analysis began with a review of the open-ended survey responses. These were then coded and clustered into broader categories aligned with the study's research questions. During each interview's preliminary analysis, recordings were listened to both pre and post-transcription, and analytical memos documented emerging ideas pertinent to the research questions. Leveraging these memos and survey-derived codes, we established an initial coding scheme. In the first detailed coding cycle, five randomly selected interview transcripts were carefully analyzed, leading to both the refinement of existing codes and the emergence of new ones (Creswell & Poth, 2017; Saldana, 2016).

In the subsequent cycle, overlapping codes from the initial five interviews were merged into broader categories for clarity, enhancing the subsequent interview coding process and supporting interrater reliability (Creswell & Poth, 2017). As we progressed through the 15 transcripts, we continuously cross-referenced emerging insights with prior codes, refining our codebook when necessary. These codes eventually coalesced into primary categories and themes tethered to our research questions (Saldaña, 2021).

To fortify the reliability of our coding methodology, a graduate student with expertise in qualitative analysis independently coded 30% of the interviews. This step aimed to validate the consistency of our coding approach. After the graduate student coded each transcript, we convened to rectify coding disparities, continuing this iterative process until we achieved a 90% intercoder reliability threshold (Saldaña, 2021).

Understanding the nuanced and subjective nature of qualitative analysis, we remained acutely aware of the potential influence of our personal biases and histories on our interpretations. Embracing reflexivity, we constantly interrogated our positionality – the unique combination of our backgrounds, experiences, and perspectives – ensuring it did not unduly influence our data interpretation. By transparently acknowledging and navigating our positionality, we aimed to provide a clear window into the lens through which our interpretations were crafted (Trainor & Graue, 2014). The first author self-identifies as a Latinx male, a first-generation American who embarked on his educational journey in a bilingual setting. His background includes teaching math in U.S. public schools, catering primarily to Latinx with LD in elementary and middle schools. The second author brings her unique perspective as a foreign-born Hispanic woman with Spanish as her first language. Her teaching experiences revolve around imparting math education to elementary students within English to Speakers of Other Languages programs. Our personal histories inevitably shape our perspectives. Engaging deeply with data, we realized our insights held the imprints of the mainstream U.S. education system – a system we have intimately experienced as students and teachers. This realization underscored the importance of continual reflexivity, pushing us to approach our data with an analytical and self-aware lens throughout the research process.

Triangulation stood as a pivotal component in our analytical journey. We cross-referenced our insights using all the data sources – including survey responses, interview transcripts, and demographic data. This comprehensive validation strategy reinforced the strength and accuracy of our findings, diminishing the possibility of biases and anchoring our conclusions firmly in a diverse array of evidence.

Results

We present the findings across three sections that align with each of the three questions: (a) teachers' beliefs and perceptions, (b) classroom practices, and (c) teachers' perceived sense of self-efficacy. We organize each section by first providing quantitative findings from the survey and then qualitative results from both the survey and interviews. Since no statistical significance was found for any survey item after conducting Kendall's tau-b (p = <.001 for each item), survey data is report for the group as a whole.

Teachers' Beliefs and Perceptions

Teachers' responses to 11 Likert items on the survey revealed information on teachers' beliefs about teaching this population (see Table 2). Four items with a lower score associated with inclusive beliefs were reverse-coded to facilitate the comparison of items. The mean rating for each item ranged from 2.03 to 4.63 on the 5-point Likert scale. The statements that teachers had the highest mean level of agreement focused on teachers providing opportunities to learn mathematics with GE students, focusing instruction on conceptual understanding, and they, as the GE math teachers, have the major responsibility of ensuring academic success. The items with the lowest ratings pertained to teacher preparedness and beliefs about how students learn.

Table 2

Descriptive Statistics on Teacher Beliefs

How much do you agree that...	*M*	*SD*
1. ___ should be afforded every opportunity to learn mathematics with general education students.	4.63	0.72
2. Instruction for ___ should focus on conceptual understanding as well as procedural math.	4.31	0.78
3. In general education classrooms, general education teachers have the major responsibility of ensuring ___succeed academically.	4.18	1.04
4. ___ who are taught in general education math classrooms will more positively contribute to the outcomes of all students compared to ___ who are taught in special education resource rooms	4.07	0.91
5. ___are best taught mathematics in a general education classrooms.	4.06	0.92
6. I have concerns about behavior issues with ____ in my general education math classroom. *	3.99	1.07
7. In general education classrooms, general education teachers often are the primary ones responsible for making accommodations e.g., giving extended time for assignments, and modifying instruction e.g., creating alternate assignments, for___.	3.97	1.07
8. Math instruction for ___should focus on mastering fact fluency e.g., memorizing multiplication facts.	3.87	1.07
9. Special education resource rooms are most effective in meeting the mathematics learning needs of ___.	3.64	0.99

How much do you agree that...	M	SD
10. General education teachers are given sufficient time to prepare to teach mathematics for___.*	3.60	1.14
11. My teacher education program supported general education teachers to develop an instructional philosophy related to teaching mathematics to ___.	2.92	1.29
12. My teacher education program offered specific information about the characteristics and needs of ___in mathematics learning.	2.80	1.26
13. My teacher education program offered specific instructional strategies for teaching mathematics to ___.	2.79	1.22
14. __learns best when taught explicitly e.g., structuring the lesson with modeling, think-alouds, and examples, rather than through constructivist/inquiry-based approaches e.g., having students solve a problem that connects to a math concept.*	2.63	1.21
15. In general education classrooms, ___require more time from the teacher than general education students.*	2.03	0.85

Note: 1 = strongly disagree; 5 = strongly agree; * Reverse coded

Based on qualitative analysis, teachers' beliefs and perceptions fell into two main themes with little differentiation in opinion based on the student group being considered: (1) capable of success and (2) lacked knowledge.

Capable of Success

Most teachers surveyed 75% (*n* = 45) including 93% (*n* = 14) of teachers interviewed believed that these students exhibited positive learning traits associated with learning math. The traits teachers discussed included confidence, motivation, a drive to learn, skills/knowledge, persistence, positive family and home life, and problem-solving skills. Kayla describes her current Latinx students in her 8th-grade class who are classified as LD as "both very driven. They work hard in our math class. They're determined." When discussing students' difficulties faced, 45% (*n* = 27) of teachers surveyed and including all teachers interviewed (*n* = 15) believed that students, although capable, struggled because of a lack of educational or instructional opportunities. Teachers believed that students could be engaged if teachers are able to tap

into their interest. For Latinx students in general, teachers describe the opportunity gap because of poor instruction. Tiffany explains how some Latinx students get to middle school performing below grade-level:

> The teachers who are teaching in elementary school, if they don't really have a strong math background then all of those students are maybe at a little bit of a disadvantage by the time they get to 6th grade. They are expected to think deeply about math problems. Maybe they didn't do that in prior years because of the teachers' lack of math understanding.

Lacked Knowledge

Despite most teachers believing that students were capable of mathematical success, many teachers also indicated a belief that students lacked knowledge. About half of teachers surveyed 53% (*n* = 32) including all teachers interviewed attributed students' difficulty with math to lacking either knowledge, skills, language, and/or cognitive abilities. Teachers' beliefs about students' lack of success in math were often contributed to issues located within individual students. Teachers pointed out deficits in knowledge, academic skills, language, and/or cognitive abilities that made it difficult for these students to be successful in math. The lack of number sense and foundational math knowledge at the conceptual level were cited multiple times as a student deficit contributing to students' math difficulty. Forty-two percent of teachers surveyed (*n* = 25) including 93% (*n* = 14) of teachers interviewed reported that students in general struggled with making sense of math or with specific aspects of math. Lauren describes one of her students' math ability:

> Definitely the foundational skills are missing. For example, today we were doing order of operations, so with multistep. So, being able to quickly do the…pull the 5x2 part, pausing counting on fingers or using a calculator to help with things like that…that you know it's that situation, when it is a multistep problem, and it is all these different parts. Getting bogged down and stressed out about those littler parts can be very discouraging.

However, several teachers (survey *n* = 16, 27%; interview *n* = 14, 93%) described these students as potentially being capable of success with the support of others or when certain conditions are met (e.g., when the lesson is relevant). Under the subtheme capable with supports, it was clear that these teachers viewed students as dependent on supports. Some teachers (survey *n* = 16, 27%; interview *n* = 11, 73%) also believed that the students did not associate with the ways math was done in the classroom. Teachers reported that Latinx students showed fear of being incorrect, embarrassment in utilizing extra supports that other students did not need and that students had low confidence in their math abilities. Teachers explained this lack of association towards mathematics because of years of negative math experiences that included being positioned as not good in math by previous teachers and seeing other students progress and be positioned as competent. Kayla explains why she believes Latinx students with LD do not associate with math, "it makes me think that in previous years somebody has gotten mad at them for not understanding and potentially they've internalized that not understanding things is bad."

Classroom Practices

The second research question focused on understanding teachers' practices with Latinx students with LD. The major themes for the classroom practices teachers reported were practices that primarily (a) engaged students in learning, (b) supported assignment completion, and (c) simplification and grouping. Teachers were not directly asked in the survey to describe instructional practices they utilize; thus, the findings are only from the interviews.

Engaged Students in Learning

Practices that engaged students in grade-level learning and participation was one major theme that emerged from the teachers' responses with 87% (*n* = 13) of interviewed teachers mentioning these practices. The purpose of these strategies was to make the grade-level content taught accessible and engaging to all students. Strategies included making the content relevant to real life and connecting to students' interests and language. For example, although Angela described a Latinx student with LD as low, she provides an example of making grade-level content accessible, "Sometimes when I have kids, especially when they are really low…so I make pancakes in my class and that's how they learn fraction. You know it's a ratio." Ashley explains an instructional practice she has found helpful is allowing for interdependence through group work instead of emphasizing independence. "Definitely working in groups. I never have students working completely individually unless it's a test."

Eight-seven percent of teachers (*n* = 13) mentioned building relationships with students and creating a welcoming environment, so students feel comfortable and confident engaging in math activities. It was essential for teachers to form relationships with students and to create a classroom climate where everyone felt respected, comfortable enough to participate, and felt like contributing members of the classroom learning. Hannah, explains how she forms relationships students by connecting to their language and immigrant identities:

> I think what I had the most success with is just building relationships with students. I think that goes such a long way because I don't think kids are gonna learn from someone they don't like. I think especially [since] English isn't my first language as well, and I'm also an immigrant, and a lot of students do have that background in common with me. I think sharing that with kids, making that [sic] connections and just being like "yeah, I understand this is hard, but it's ok we're in this together. We can do this.

Fifty-three percent (*n* = 8) of teachers mentioned strategies that supported language learning and allowed students to participate in classroom mathematical discourse, providing space where students can utilize language in a purposeful yet supported way. Christopher's statement was similar to how other teachers approached this:

> I always tell students like 'math is not a spectator sport. So, no one here is a spectator.' That includes the student that doesn't learn no English [sic], I'm still going to call on them but what I might need to do is support them. … I'll talk to them ahead of time to say like, 'Hey, I'll like to call on you about this.'… it's all about practice. … If I'm walking around and checking the warmups, and I see that they've done something special I know I'll actually take the warmup to show it to the class and ask them, 'can you talk about what did you do for this part of this part?'

Supported Assignment Completion.

Practices that supported students in assignment completion is the second major theme and differed from the first theme in that teachers did not necessarily discuss supporting the learning, but rather supporting the completion of the work. These practices included utilizing scaffolds and supports (*n* = 12, 80%) and providing accommodations (*n* = 10, 67%). For example, Michelle explains how posting her slides online on her learning management system is something she does for her Latinx students, "I post those on Google classroom, so that if the kids can't copy down quickly, they have it on Google classroom for them to look at, to refer back to if they want to like when they're taking a quiz or something or if they can't write real well." Just as Michelle provided supports to help with completing a quiz, Madison provided materials to assist students in completing math independently by going through steps, "[I] give [them] a (sic) structured materials to work with that will go through the same kind of steps then help them work from there, to be able to go through the material on their own." Furthermore, Lauren names preferential seating as an accommodation for students with IEPs without naming how it supports grade level learning or participation in the learning community, “Using preferential seating. Making sure that I know where all my students with IEPs are. Putting them in the front or around the perimeter so that it is easy for me to get to them if they need it.”

Simplification and grouping

The final theme, simplification, and grouping, covers a range of practices that, when not thoughtfully employed, could potentially hinder students’ math learning of grade-level content, meaningful inclusion, and engagement and identification with math. One example of such practices is targeted small-group instruction (*n* = 10, 67%). It is essential to clarify that targeted small-group instruction is not a problematic strategy. On the contrary, it is a recognized and beneficial practice in special education and inclusive classrooms, and it is frequently utilized in co-taught settings. When employed effectively, this strategy can enable personalized instruction, greater student-teacher interaction, and enhanced peer learning. However, the issue emerges when the use of targeted small-group instruction becomes excessive or is not effectively balanced with opportunities for whole class interaction and learning. Overreliance on small-group instruction could inadvertently create a sense of exclusion and limit the opportunities for students with disabilities to engage with their peers and access grade-level content. Thus, the key is striking the right balance. Teachers need to judiciously use targeted small-group instruction, ensuring it complements, rather than replaces, whole class instruction and promotes an inclusive learning environment where all students can thrive. Few teachers in this study elaborated on how they structured their small groups or whether they did so in an inclusive way to increase student understanding of grade level concepts. Teachers did mention reasons why they perceive small groups to be effective. Some of these reasons were because they can work on “their struggle areas” – Kayla, “what they need to know” – Amanda. Other teachers felt students were more willing to participate because “they know they’re all struggling, so there’s no smart kid judging them” – Jessica. Teachers who mentioned small groups to support students' conceptual understanding of math and development of math identity were the exception.

Lastly, a considerable proportion of teachers in our study, about 87% (n=13), admitted to simplifying mathematical content. Often, this simplification took the form of procedural memorization, allowing students to solve certain types of mathematical problems without a deep, conceptual understanding of the underlying processes. This approach, although seemingly effective in the short term, might impede a thorough comprehension of the mathematical principles at play. It presents the risk of reducing mathematics to a series of rote tasks, depriving students of the opportunity to understand and appreciate the discipline truly. Thus, while simplification can be an effective tool when used judiciously, its overuse could potentially limit students' holistic mathematical growth.

Teachers Perceived Sense of Self-Efficacy

Teachers’ responses to survey items provided insights into how teachers perceived their sense of self-efficacy. Teachers were asked to rate their level of comfort in their ability to adapt instruction in areas students may have difficulty with (see Table 3). The mean rating for each individual item ranged from 3.60 to 4.14. The item with the highest mean rating of teachers’ comfort in their ability to adapt instruction is adapting instruction for students with difficulty using a number line. Teachers rated their ability to adapt instruction as the lowest for students with difficulties with written communication in mathematics.

Table 3

Adapting instruction for areas of student difficulty

How comfortable do you feel in your ability to adapt instruction for students who have difficulty…	*M*	*SD*
Using a number line	4.14	0.76
With following a sequence of steps to solution	4.10	0.77
Attending to tasks	3.98	0.81
Recalling math facts	4.08	0.82
Understanding academic vocabulary	3.88	0.88
Correctly identifying symbols or numerals	4.03	0.78
Maintaining attention for the class period	3.97	0.78
Using academic vocabulary correctly	3.83	0.85
Interpreting pictures and diagrams	3.87	0.87
With oral communication in mathematics	3.72	0.85
Keeping place on a page in the text or workbook	3.89	0.76
Interpreting of given information in word problems	3.71	0.96
With written communication in mathematics	3.60	0.89

Note: 1 = strongly disagree; 5 = strongly agree

Teachers were asked to rate their comfort with their ability to adapt instruction for different math topics (see Table 4). The mean rating ranged from 3.28 to 4.34 for each math topic. Teachers rated locating points on a coordinate plane as the topic they felt most comfortable
with their ability to adapt instruction for both groups of students and felt least comfortable with using computer spreadsheets. Teachers were also asked to rate their abilities in various teacher competencies. The Likert scale for this section was from 1 to 9 as developed by the creators of the original measure (Paneque, 2004). Four items asked teachers to rate their abilities in teaching competencies specific to teaching a subgroup Latinx students with LD, those that were also EB. The mean rating for teacher responses to their perceived abilities in areas of teacher competencies ranged from 6.39 to 7.69 (see Table 5). Teachers rated their perceived ability as the highest with being sensitive to and aware of the needs of students. On average, teachers rated themselves the lowest on their perceived ability to get through to even the most difficult or unmotivated students. The mean ratings for four statements about competencies specific to teaching EB ranged from 5.08 to 6.22.

Table 4

Adapting instruction for specific math topics

How comfortable do you feel in your ability to adapt instruction for the following topics…	*M*	*SD*
Locating points on a coordinate plane	4.34	0.75
Solving one- and two-step equations	4.21	0.78
Solving one- and two-step arithmetic word problems	4.02	0.72
Identifying, describing, and creating patterns	4.00	0.81
Performing arithmetic operations on decimals and fractions	3.96	0.82
Measuring size, quantity, and capacity	3.94	0.85
Reading and writing integers, rational and irrational numbers	3.92	0.78
Describing equivalence of fractions, decimals, and percent's	3.92	0.78
Interpreting line and bar graphs	3.91	0.78
Understanding inverse relationships between multiplication and division, roots, and exponents	3.90	0.89
Understanding square and cubic units	3.89	0.85
Constructing scale drawings	3.88	0.97
Using different representations to describe a functional relationship	3.78	0.97
Using estimation as a problem-solving strategy	3.75	0.87
Using compasses, rulers, and protractors	3.75	1.02
Using graphing calculators	3.44	1.10
Using computer spreadsheets	3.28	0.92

Note: 1 = strongly disagree; 5 = strongly agree

Table 5

Self-efficacy of teaching competencies

To what extent can you…	*M*	*SD*
Be sensitive to and aware of the needs of ___?	7.69	1.59
Assess the academic progress of ___?	7.59	1.48
Contribute information in the development of appropriate Individual Educational Plans for ___?	7.53	1.59

To what extent can you…	*M*	*SD*
Recognize and use ___ strengths during instruction?	7.39	1.34
Teach ___?	7.38	1.41
Redirect students who are misbehaving or disruptive?	7.38	1.41
Evaluate the academic performance of ___?	7.13	1.75
Communicate with ___?	7.12	1.88
Improve the academic achievement of ___?	7.03	1.48
Adapt and modify lessons for ___?	6.98	1.47
Determine the needs of ___?	6.88	1.61
Motivate students no matter what their home environments are like?	6.88	1.57
Use traditional and alternative assessment procedures with ___?	6.74	1.72
Identify and utilize school/community resources for ___?	6.73	2.02
Communicate with parents and families of ___?	6.68	2.06
Help ___ develop social skills?	6.65	1.67
Get through to even the most difficult or unmotivated students?	6.39	1.55
Incorporate appropriate content and materials for students who are culturally and linguistically diverse? (EB)	6.22	1.45
Determine appropriate instruction according to the student's language ability and special need? (EB)	6.15	1.38
Support the native language(s) of children who do not speak English fluently? (EB)	5.33	2.27
Distinguish between a language difference and a language disability? (EB)	5.08	1.94

Note: 1 = nothing; 9 = great deal; EB = asked to consider only emergent bilingual students

Teachers discussed the importance of gathering knowledge about the students, including students' skill levels, interest, and cultural background was mentioned by mentioned by several teachers (survey *n* = 13, 22%; interview *n* = 10, 67%*)* impacted their sense of effectiveness. By having this knowledge, teachers were able to target specific skills that students needed to be able to learn grade level content. Also, knowing students' cultural backgrounds and personal interests allowed teachers to plan lessons that engaged students and that were relevant to students lives. Teachers (survey *n* = 13, 22%; interview *n* = 8, 53%*)* also mentioned having language skills in their students' native language as useful in teaching the subgroup of Latinx EB students with LD either because knowing the language facilitated communication or because it allowed teachers to relate to students. Having proficiency in the Spanish language allowed teachers to clarify mathematical concepts in students' native language which facilitated their sense of self-efficacy teaching math. Having some proficiency in the Spanish language, and actively trying to build their Spanish proficiency, was reported to be helpful for teachers whose native language is English. Brandon talks about building his Spanish math vocabulary:

> I took a lot of Spanish classes when I was in school and so I'm able to understand most of the time. I've kind of built up a mathematical

> vocabulary in Spanish because most of my students who've spoken another language speak Spanish. I'm able to allow them to respond in Spanish and I respond to them in English. I think that's a pretty good strategy.

Teaching dispositions, such as having high expectations, a commitment to learning for all students, and a respect for diversity, were also mentioned by teachers (survey *n* = 11, 18%; interview *n* = 10, 67%*)* as important in effectively teaching math to these groups of students. As Christopher noted, "I feel I am successful in the sense that I'm intentional about targeting students and having them talk in math, and having them discuss in math, and having them think in math." Amanda spoke of the importance of teaching dispositions but did so by explaining how she fell short, thus impacting her self-efficacy. Amanda, "I think that everything I said about teachers in general is still true for me. The intent is there to make the curriculum relevant. I've been to trainings…but the implementation is lacking."

Although teachers indicated feeling overall effective in teaching math to these students, several teachers' (survey *n* = 12, 20%; interview *n* = 11, 73%*)* also noted not having or lacking specified knowledge impacted their teaching of math. For example, teachers interviewed explained that they did not know how to reach Latinx students with LD because they did not have the adequate educational background or training. Frustrated, Michelle shared "I think there's a lack of training for learning disabled kids".

The second theme, system level characteristics, were aspects of the teachers' local school, district, or state that they felt were needed to be in place to be effective in teaching math. Teachers (survey *n* = 22, 37%; interview *n* = 11, 73%*)* mentioned having the support of other teachers, the school administration, or support at the district level helps. The specialized knowledge that teachers who specialized in special education (SPED) or English language development was useful for math teachers in meeting the unique needs of these students. Teachers found that having SPED teachers work directly with students during inclusion periods as effective in ensuring that Latinx students with LD were learning the material. As Ashley noted, "I have a teacher to work with who is specifically trained for math SPED. That's very helpful and she doesn't just stay with those students [students with LD]. She moves around." Ashley, as well as others, found that having a SPED teacher in the classroom beneficial for all students, not just students with LD.

Some teachers (survey *n* = 2, 3%; interview *n* = 14, 93%*)* mentioned state, district, or school level policies, or the specific math curriculum adopted by their school or district as posing a challenge to their teaching effectiveness. Mostly, teachers mentioned how certain policies made it difficult for teachers to be effective in teaching math to Latinx students. Teachers also explained how the curriculum adapted by the school either facilitated or hindered their ability to effectively teach these students. For instance, Hannah found that having to adapt a new curriculum every year limited her effectiveness, "For the past, oh man, since I started teaching, I had a new curriculum every year and it's always been a struggle."

Resources, including outside resources and material resources, also affected the teaching effectiveness of teachers (survey *n* = 2, 3%; interview *n* = 12, 80%*).* Time was mentioned as a valuable resource that teachers lack to effectively teach students. Teachers felt pressured to move through the curriculum even though some students had not mastered the grade level standards. Teachers wanted more time to plan for differentiation and ways to adapt the curriculum to make it more accessible and interesting to students.

Discussion

In this research, our objective was to delve into the perceptions of GE middle school math teachers regarding their instruction of Latinx students with LD. While our findings indicated that these teachers generally possessed constructive perspectives on their students, believing in their potential for success in mathematics, a nuanced examination revealed inconsistencies in these beliefs. Their beliefs were largely informed by their notions of math teaching and student identity often framed around normative ways of teaching. Furthermore, although the data suggested teachers felt competent teaching Latinx students, deeper scrutiny revealed mixed feelings or doubts concerning their self-efficacy in this context.

Beliefs About Students and Influences

In our research, we observed a divergence between the beliefs teachers stated in the quantitative data and the sentiments they expressed in the qualitative data about Latinx students with LD. The quantitative data highlighted teachers' positive inclinations towards these students, with many agreeing with optimistic statements about them. However, the qualitative insights illuminated a broader perspective. While teachers held a genuine belief in the potential of these students, they also noted areas where the students might benefit from further support, such as in knowledge acquisition and motivation. These insights offer a deeper understanding of the intricate tapestry of teacher beliefs and practices. By aligning our findings with existing literature focusing on the crossroads of race, ability, language, and math, we can appreciate the rich historical narratives surrounding marginalized groups and the prevailing philosophies in math education. This alignment offers a comprehensive view of the unique dynamics that resonate in inclusive educational environments.

All teachers in this study believed that Latinx students with LD were capable of math success by attributing difficulties to the learning context and classroom environment or social and structural concerns. In effect, under this type of understanding of students, the challenges students experience in the math classroom are not because of defects within the student or because of the students' background but are due to the learning context. Such beliefs about the source of difficulty can have a positive impact on the opportunities to engage in math learning afforded to students (Wilhelm et., 2017). Although all teachers in this study attributed students' difficulties to the learning context, teachers also framed students as not having the adequate knowledge nor motivation to do well, resulting in a lack of success for Latinx students. The deficits that teachers believed hindered student success also included deficiencies in their families and other explanations that did not relate to learning opportunities or nature of instruction e.g., poverty. This finding is a cause for concern given the literature on the potential negative impacts of framing student difficulty because of student deficiencies or their background on the opportunities afforded to them (Wilhelm et al., 2017).

Teaching Practices

Teaching practices GE middle school math teachers reported using to teach these Latinx students with LD included strategies that support grade-level learning and participation, strategies aimed simply at assisting learning of any kind and assignment completion, and teaching practices that had the potential to constrain student learning and development of a positive math identity. Practices that supported these students were ones that leveraged students' unique abilities and interests, utilized the power of student-teacher relationships, and provided optimal opportunities for Latinx students with LD in authentic ways (Ruef, 2021). Many of these specific practices provided opportunities for students to engage in mathematical practices such as reasoning and justification, which have been found to increase math learning while also affirming students' identity (Ruef, 2021).

However, the qualitative data indicated some divergence between reported teacher beliefs and the practices they reported using. Despite teachers' reported belief in the potential of their students and their positive attitudes toward inclusion, the specific adaptations to lessons they reported making, as indicated in the data, did not appear to be as effective as they could be in increasing learning and participation. This finding aligns with research by DeSimone and Parmar (2006), who observed a similar discrepancy between teachers who reported positive beliefs about inclusion and the adaptations they implemented in practice. The interviews noted that teachers used practices that could lead to constraining learning, participation, and the development of student math identity (Yakut, 2021). For example, simplifying content, although often recommended for students with disabilities (Wilhelm et al., 2017), can emerge into problematic practice if students are not provided with other opportunities to engage in more challenging content. However, it can also limit students' opportunities to learn by negating their participation in rigorous math content and negatively impacting their efforts in authoring themselves as doers of math (Kangas & Cook, 2020). This type of discrepancy between teachers' expressed beliefs and their actual practices, as well as the varying effectiveness of the teaching strategies reported, underscore the complex and sometimes contradictory nature of teacher beliefs and their manifestation in teaching practices.

Teachers' Sense of Self-Efficacy

Interestingly, most GE middle school math teachers perceived themselves to be efficacious in teaching Latinx students with LD. Survey results showed that GE math teachers felt moderately comfortable teaching these students different math topics. Interview findings provided more insight into teachers' perceived sense of self-efficacy teaching these groups of students. Most math teachers mentioned being effective, while some teachers mentioned feeling both effective and not effective in teaching math to this group of students. The importance of teachers believing that they are efficacious in their teaching efforts has been well documents. This includes being open to new instructional practices, willingness to create learner centered constructivist learning experiences, and influencing students' academic achievement are only a few (Fackler et al., 2021). Teachers mentioned individual characteristics and larger system level characteristics that impacted how effective they are in teaching math. Research shows that teachers who believe they can teach effectively persist through these barriers by engaging in professional learning and putting the learning into practice (Bray-Clark & Bates, 2003).

Limitations

There are some limitations to consider in this study including the sampling method, sample size, and a reliance on self-reported data add to the limitations of this study. A purposeful sampling method was utilized which is a nonprobability method that makes it difficult to generalize the findings to the larger population (Etikan et al., 2016).

Given the small sample size, there were limitations on the statistical analysis that could be conducted to allow more details to be explored since statistical power is a concern when calculating statistics with a small sample (Cohen, 1992). This study collected data that was self-reported which has inherent limitations that would have been enhanced with direct observations (Gaete et al., 2018).

Implication for Practice

This study points to the importance of providing spaces for math teachers to analyze their beliefs and perceptions and to critically reflect on practices and how it may impact students. This could include engaging in a professional learning community with the purpose of examining instructional practices and underlying beliefs (Tan & Thorius, 2019). Another way to facilitate teachers' reflection is by providing them tools to develop ways of understanding each student's strengths based on their different identities and ways to affirm those identities (Boaler & Greeno, 2000), which can have the potential of reshaping teachers' problematic beliefs.

Crucially, districts, schools, and teachers should re-envision mathematics teaching to empower every student to see themselves as active mathematicians. This journey requires celebrating and leveraging the diverse experiences and learning styles of Latinx students with LD who attend these schools (Moschkovich & Zahner, 2018; Ruef, 2021). A potent approach to champion teachers in this transformative journey is by offering continuous professional development aimed at enhancing their capacities to critically evaluate traditional teaching methodologies and explore innovative ways to engage all learners. Building on evidence-based strategies can significantly boost student learning and bolster their mathematical identity. Key strategies include prioritizing the quality of student tasks, fostering environments that encourage student dialogue, and emphasizing collaborative learning to pave the way for a more inclusive and effective mathematics education.

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