DEVELOPING A SURVEY TO ACCESS MATHEMATICS TEACHERS' PERCEPTIONS TOWARD STUDENTS WITH DISABILITIES

DESARROLLANDO UNA ENCUESTA QUE ACCEDA A PERCEPCIONES DE DOCENTES MATEMÁTICOS HACIA ESTUDIANTES CON DISCAPACIDAD

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Negative perceptions held by teachers toward students with disabilities create environments that make students feel uncomfortable and often incapable of participating actively in classrooms. Much of the research about these perceptions is focused on teachers of students with learning disabilities, which leaves out teachers' perceptions toward students with other disabilities. We are developing a responsive online survey to access what mathematics teachers identify as disabilities and their behavior toward students with disabilities in their classroom. In this paper, we describe the process we have developed for constructing this survey. We also share our conceptualization of the relationship between teachers' perceptions and equity affirmations toward disability, and the results of applying that conceptualization to our research context.

Keywords: Equity, Inclusion, and Diversity; Students with Disabilities; Teacher Beliefs.

Purpose of the Study

Teachers' perceptions affect their students' development because teachers are the instructional leaders of their classrooms. Unfortunately, these perceptions can create an environment where students receive mathematics content, rather than having the opportunity to make mathematical contributions themselves. Tan and colleagues (2019), refer to this as "mathematics for students" instead of "mathematics of students" (Tan et al., 2019). This type of environment does not allow for the wealth of ideas and ways of thinking that students who have disabilities can bring to classroom discussions about mathematics, and thus shortchanges the learning of everyone in the classroom. Therefore, the vision is inclusive mathematics classrooms where each student is considered able to engage in mathematics learning and enrich the learning of others.

Reaching this vision requires that teachers develop perceptions that provide an inclusive environment toward all types of disabilities in schools. An important starting place is to find out the extent to which mathematics teachers are already considering the complexity of disability as part of the human identity of any student, and how they see disabilities as affecting students' participation in their classroom. For this reason, our focus is on describing mathematics teachers' current perceptions towards disabilities in mathematics classrooms. Understanding these perceptions will support work with teachers to develop positive perceptions that provide an inclusive environment to disability in schools. A first step of this work is to provide a process for accessing teachers' perceptions toward disabilities and toward students with disabilities—the focus of this paper.

Literature Review & Theoretical Framework

Our work is guided by two equity affirmations that we identified in the work of Tan et al. (2019). The first one is related to perceptions toward disabilities and includes information about which conditions teachers consider as disabilities and the extent to which they interpret life with

disabilities through an ableist lens (e.g., in relation to what a person is unable to do). This affirmation embraces the complex nature of disabilities as being part of students' human identities. The second affirmation is related to perceptions toward students with disabilities and includes information about teachers' consideration toward students with disabilities and comparison to students without disabilities. This affirmation establishes that every student, regardless of whether they have a disability, has an important voice within the classroom. Gutiérrez (2012) wrote about four dimensions of equity; the two dimensions composing the critical axis are directly related to the equity affirmations we established. Gutiérrez's *identity* maps to disability as part of human identity and *power* maps to every student having a voice in their classroom. Figure 1 graphically presents the relationship between the different types of perceptions and the equity affirmations.

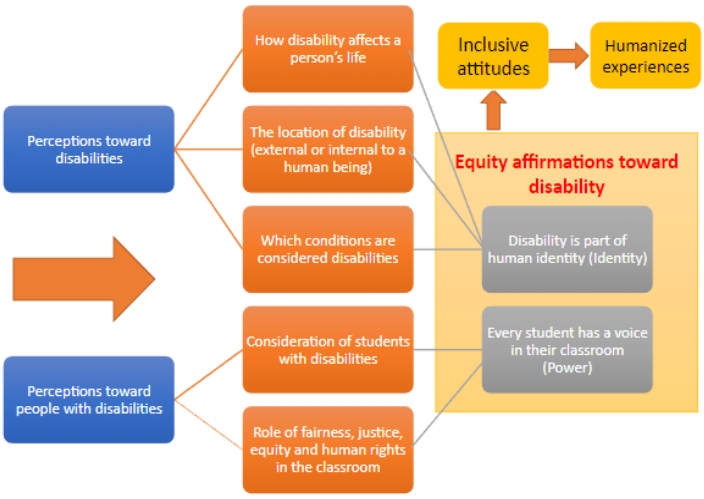

Figure 1: Relationship between Teachers' Perceptions and Equity Affirmations toward Disability

We take the perspective that if teachers have perceptions toward disabilities and students with disabilities that embrace the equity affirmations, then they will have inclusive attitudes that promote humanized experiences for every student in their classrooms. We take a *participationist* approach to learning (Sfard & Cobb, 2023; Vygotsky, 1987). This means that we see student learning as taking place through students' interactions with more knowledgeable others, such as the teacher and their peers. Following Tan and colleagues (2019) specifically, and NCTM (2000, 2014) more generally, we hold that all students (with or without disabilities) can contribute to the mathematical learning of others. This is because we see disabilities as part of students' human identities rather than something that sets them apart from other students.

We are particularly interested in how teachers' perceptions toward disability affect which students they choose to include in their enactments of the *teaching practice of building* (henceforth referred to as *building*). The MOST project defines *building* as making a Focal Student Contribution (FSC) "the object of consideration by the class in order to engage the class in making sense of that thinking to better understand an important mathematical idea" (Van Zoest et al., 2017, p. 36). They describe building as being comprised of four elements: "(1) *Establish* the student mathematics of the [FSC] as the object to be discussed, (2) *Grapple toss* that object in a way that positions the class to make sense of it, (3) *Conduct* a whole-class

discussion that supports the students in making sense of the student mathematics of the [FSC], and (4) *Make explicit* the important mathematical idea from the discussion" (Leatham et al., 2021, p. 1393). We used the information in Figure 1 in conjunction with the four elements of building to develop a framework for designing questions to assess perceptions about disabilities related to these critical aspects of student-centered teaching. For our purposes, we also added a zero element: the selection of the FSC.

Methods

To guide the development of a survey to assess teachers' current perceptions about disabilities, we did the following:

1. Identified key equity affirmations toward disabilities (Figure 1).
2. Developed a schema for the relationship between teachers' perceptions and equity affirmations toward disability (Figure 1).
3. Investigated what international organizations have identified as disabilities.
4. Applied the equity affirmations toward disabilities to our research situation (see the resulting matrix in Figure 2 below).

We are using the United Nations and World Health Organization (2001) document, *Functioning and Disability: The International Classification of Functioning, Disability and Health* (found in step 3 above) to design questions that reveal what teachers identify as disabilities. This is important because we want to both better understand the range of official disabilities that teachers recognize and ask questions relating to their practice that include disabilities that they recognize as such. We are using the matrix in Figure 2 to design scenarios with responsive questions that reveal teachers' application of the two critical dimensions of equity (Identity and Power) toward students with disabilities.

Results & Discussion

In addition to the initial results that are represented in Figure 1, we share the results of applying the equity affirmations towards disabilities to our research situation in Figure 2.

	Dimensions of Equity	
Elements of Building	**Identity**	**Power**
In relation to a Focal Student Contribution (FSC)	***Disability is part of human identity***	***Every student has a voice in their classroom***
Select	Disability does not prevent a student from making a high-leverage mathematical contribution.	High-leverage contributions of students with and without disabilities are promoted, recognized and selected to be the focus of classroom discussion.
Establish	Disability is not an obstacle for a student's mathematical contribution to be established as an object to be discussed (FSC).	High-level mathematical contributions of students with and without disabilities are established as an FSC.
Grapple Toss	Disability is not a restriction for positioning students to make sense of the mathematics in an FSC.	Students with and without disabilities are positioned to make sense of the FSC.
Conduct	Disability is not a restriction for making sense of an FSC in a whole-class discussion.	Students with and without disabilities are important contributors to the sense-making discussion about the FSC.
Make Explicit	Disability is not an obstacle for summarizing the important mathematical ideas of the discussion.	Students with and without disabilities are important contributors to making the important mathematics of the discussion explicit.

Figure 2: Critical Axis of Equity toward Disability in the *Building on a Focal Student Contribution (FSC)*

Figure 2 provides us with descriptions of teaching-related equitable thoughts that we are using to guide the development of our survey scenarios. Figure 3 shows the structure of the scenario component of our survey development.

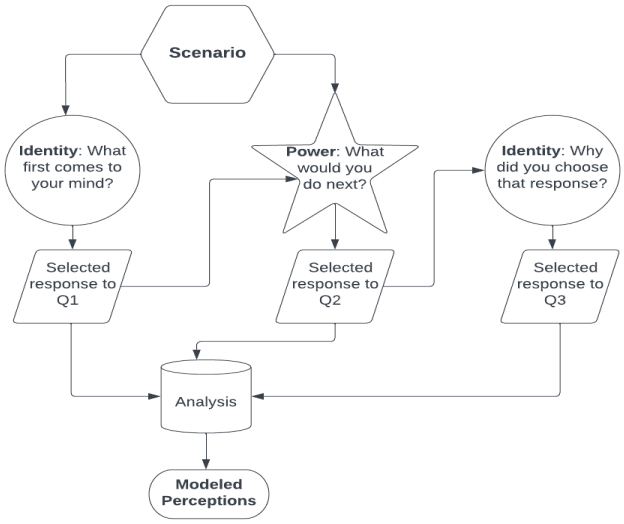

Figure 3: Structure of the Scenario Component

Each scenario is followed by a series of three questions, with each question having three to four choices and the option to write one's own response. Question 1, "What first comes to your mind?" is intended to access the extent to which teachers embrace the complex nature of disabilities as being part of students' human identities. Question 2, "What would you do next?" is intended to access the extent to which students with and without disabilities have a voice in the classroom. The response to Question 1 informs the response choices to Question 2. Question 3, "Why did you choose that response?" is designed to access their justifications for their answer in

Question 2 through a view of the student's identity. Our analysis of the set of teachers' responses for each scenario will provide a model of their perceptions towards students with disabilities. The collection of modeled perceptions that emerge from our analysis of all the data will be compared with the equity affirmations and their application in Figure 2 to provide information about the current state of mathematics teachers' perceptions toward disabilities.

Conclusion

In this paper we have shared our process for developing a survey for accessing teachers' perceptions toward disabilities and students with disabilities using a specific context—the teaching practice of *building*. The structure of our scenario component reflects the interrelationship between both types of perceptions. Our expectation for the survey is that it can be used as a tool for teachers, researchers, and educational administrators to access teachers' perceptions toward disabilities and use what they find to inform professional development oriented to developing inclusive mathematics classrooms.

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