

A Cross-Cultural Approach for Communication in the Mathematics Classroom and Beyond

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It can be challenging to draw connections between mathematics content and elementary students' experiences in ways that makes sense for each and every learner. Through this paper, we highlight several strategies for being a culturally responsive teacher in elementary mathematics classrooms and beyond. We critically focus on classroom based language and outline several pedagogical practices that support culturally inclusive learning. Culturally responsive teaching tips are shared for educators to use and adapt for their own classrooms.

Privilege, oppression, and power differentials exist in elementary education. As an education community, we must continue to redefine classrooms as spaces where students' identities are shaped as doers and achievers of mathematics and beyond (Martin, 2013; National Council of Teachers of Mathematics [NCTM], 2020). It is our job in the elementary grades to ensure students' experiences foster the development of positive mathematical identities.

It is important to disclose that I am a White male educator. In the following sections, I (the first author) discuss many of the strategies that I have employed in my own teaching for K-5 students (as well as preservice teachers). I am not, and do not wish to present myself as an expert on the topics discussed. I encourage readers to explore the work of Battey and Leyva (2016), Gay (2018), Gutiérrez (2017; 2018), Martin (2013), NCTM's Catalyzing Change (2020) as well as the impactful work of others scholars cited throughout this article and beyond.

One of the many teaching practices that I continually work on is creating authentic contextual understanding for each and every one of my students. Within the teaching and learning of mathematics, contextual

understanding is a cornerstone of making sense of mathematics (NCTM, 2014). It can be challenging to draw connections between mathematics and students' past experiences in ways that makes sense for each and every learner (Matthews, 2017). To better meet the needs of students, researchers and educators have identified effective teaching practices. Aronson and Laughter (2016) refer to these practices as Culturally Responsive Education (CRE). CRE is often proposed as a way to address the systemic and oppressive powers that suppress the achievement and potential of underserved populations in education (Neri, Lozano, & Gomez, 2019). There are two prevailing theories associated with CRE: Culturally Relevant Pedagogy, as outlined by Ladson-Billings (1995); and Culturally Responsive Teaching (CRT), as outlined by Gay (2018). Aronson and Laughter (2016) distinguish between CRP and CRT, stating that Ladson-Billing's focus is on pedagogy and is primarily seeking to influence attitudes and dispositions, ultimately describing a position a teacher might adopt to be culturally relevant. Gay focuses on the act of teaching as a means to influence the methods in the classroom, or in other words, what a teacher should do to be culturally responsive. The purpose of this paper is to build from Gay's

(2018) work to propose teacher actions for implementing culturally responsive communication in 3-5 elementary classrooms. Three communication strategies are shared, with four tips for teachers to implement in classroom mathematical learning spaces.

Culturally Responsive Teaching is the use of cultural characteristics, perspectives, and experiences of ethnically diverse students as the vehicle for teaching underserved students in a way that uses their strengths to guide instruction. CRT is based upon the assumption that when academic knowledge is situated within the lived experiences of the students the learning is more meaningful and rich (Gay, 2013). In essence, we as educators must position the cultural strengths of underserved students in such a way that the academic content is seen as a part of their culture and lived experiences. Gay (2018) outlines eight qualitative attributes of CRT in classroom spaces: validating, comprehensive and inclusive, multidimensional, empowering, transformative, emancipatory, humanistic, and normative and ethical. Gay (2018) describes CRT as anchored on four teacher practices: develop a cultural knowledge base, design culturally relevant curriculum, demonstrate cultural caring and build a learning community, and engage in cross-cultural communication. While each of the four main practices are important to incorporate into our everyday lessons, we will focus exclusively upon cross-cultural communication for the remainder of this paper to further elaborate upon and show connections specific to mathematics education instruction in elementary classroom.

Engaging in Cross-Cultural Communication

A distinctive relationship exists between communication, education, teaching, and

culture. How we communicate with our students in mathematics profoundly influences culturally responsive spaces for learning (Gay, 2018). We cannot continue to operate under the assumption that there is only one acceptable way of communication across all settings, audiences, and contexts (Gay, 2018). How we communicate with our students matters; it is the way we make connections and communicate compassion, love, encouragement, and learning. Thus, languages and communication styles are a part of cultural systems through which meaning and ideas are expressively transferred and embodied by students.

A concern among K-12 educators is how to teach students who are not proficient in academic or standard English (Gay, 2018; Lee & Oxelson, 2006). However, the relationship between culture and language is much too complex to be simply reduced to an English-only mentality (Gutiérrez, 2005). This wealth of linguistic knowledge is often drastically viewed as a deficit and not a strength to be used in positioning our students as intelligent and capable learners (Delpit, 2012). Instead of focusing on perceived deficits, we should provide students with culturally responsive supports to help them better access content and foster mathematical understanding, as well as draw upon their strengths. To do so, we must begin to analyze language and address how we communicate with our students. As such, we explore several key strategies for cross-cultural communications in elementary classrooms. While many of these strategies focus on mathematics, these can be employed in the different subjects found in the elementary classroom.

Cross-Cultural Communication in Elementary Mathematics

Recently, I (the first author) have intentionally incorporated CRT in the teaching and learning of mathematics in my

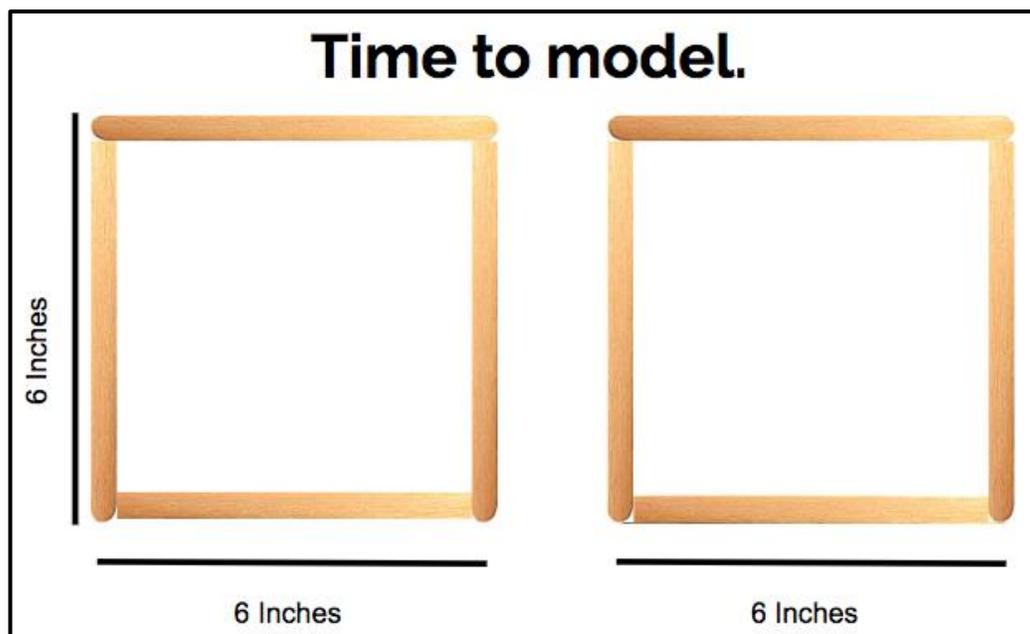
teaching. First and foremost, I began with reflecting on my past practices, and how I have presented myself to students during times of instruction. While I will continue to practice, and hopefully grow, it is important to acknowledge that it is our collective responsibility to shape how students identify with mathematics, and to nurture and provide the instructional supports students need to be successful in mathematics. To seek further growth, I have critically selected three specific CRT ideas as the central focus of my communication and teaching within mathematical learning spaces. The three CRT communication strategies from researchers who have demonstrated a wealth of knowledge, understanding, and guidance are as follows:

Use multiple modes of information presentation (Bartell, Wager, Edwards,

Batthey, Foote, & Spencer, 2017; Gay, 2018; Hammond, 2015). When we think about communicating with our students, immediately the spoken language comes to mind. I have learned that we must move beyond this idea and be inclusive with the non-verbal supports we can offer students. In mathematics, we can accomplish this by providing visual supports in accompaniment of our verbal explanations.

Within my classroom, I have found that when I incorporate real-life pictures or videos within mathematical modeling problems, students are enriched in their learning. Students are able to refer back to the pictures or videos as they were attempting to model and make sense of the current situation. Importantly, this adds another level to the concrete and direct modeling opportunities in mathematics classrooms.

Figure 1
Craft stick representation for mathematical modeling



For example, in a recent mathematical modeling task, students were asked to create a tiny home to scale. Students were provided with craft sticks to build the frame of the home. Figure 1 was displayed and used to ask students several prompting questions, such as “If the house is two sticks long, how many inches in all will be it be?” and “How can we represent the number of craft sticks with mathematics to find out how many sticks we would need to frame the home?” By providing the visual and tactile representation of the mathematical situation, students were able to ground their thinking in a real way. It also gave myself, as the teacher, the opportunity to gesture at the sticks throughout my questioning to ensure that I was communicating beyond simply using words. In the case of this example, the students were positioned in such a way that I was not the *keeper* or *evaluator* of the mathematics content because they were able to evaluate their own work through the picture and concrete representations. One of the classroom shifts that I have noticed because of this positioning is that students do not rely on me as the teacher to repeat parts of questions. They are able to refer back to displayed pictures to make sense of the mathematical situation; thus, removing some teacher-student power differentials.

Provide moments for authentic student voice (Hammond, 2015). As teachers, we must move beyond the idea that students are passive receivers of information and therefore must include vast opportunities for students to be agents of their own learning. Students are capable of discussing high level mathematics, as well as communicating content with others. We should encourage students to bridge the gap between their at-home language and school language in daily mathematical classroom conversations and discourse both between student-to-teacher and students-to-students.

I have found that when I remove myself from the traditional teacher as authority role and present myself, to my students, as discovering the mathematics with them, their learning is much deeper. In an elementary classroom, this is achieved by incorporating genuine student argument and justification around authentic problems. This means that I do not position myself as the expert in the classroom but instead choose mathematical tasks that are based on the students’ experiences. In doing so, the students are positioned as the experts of their own experiences and they discover how mathematics can and should be used to not only help make sense of their worlds but to also make informed decisions around social justice concerns (see NCTM, 2020).

Recently, I have also practiced the physical removal of myself from the front of the classroom and have positioned myself at the back of the room. I maintain frequently that my students are the mathematicians and I simply am present to guide their discoveries. This shift has been impactful for student autonomy in the classroom. Representation is important for underserved populations, I cannot always provide that as a white male, so I have chosen to remove myself and guide their understanding from the sidelines and rightfully position them as the learners and doers of mathematics. By physically moving myself, I have worked to have students lead mathematical discussions, arguments, and justifications. Sometimes this means they physically occupy the space that I used to at the front of the classroom. Many of the mathematical tasks that I work to create, and co-create with my students, are not based on my experiences but instead on their worlds, the students should be positioned as the leading the mathematical discussion. This has been a key area for me as I reflect on my practices, as it is important to be equitable in which students are leading classroom discussions (see Wood, Sheldon,

Felton-Koestler, Oslund, Parks, Crespo, & Featherstone, 2019).

Attend to Students' Racial and Mathematical Identities (Battey, 2013; Bartell et al., 2017). As teachers, we must build connections between the mathematics being proposed and the racial and mathematical identities of our students. Admittedly, this is difficult, and it is impossible to do without first acknowledging that certain groups have been historically positioned as unintelligent (Delpit, 2012). We, as educators, must challenge this notion every chance we get. To encourage our students to see themselves as doers of mathematics, we must first acknowledge that all students as intelligent and position them to see the usefulness of mathematics in their own lives, both inside and outside of the classroom. This is where representation is key for our students. Again, when choosing mathematical tasks, we posit that these should be representative of your students' experiences and worlds.

This is one of the most important strategies and honestly, one that I still seek to improve daily. I routinely try to position my students as intelligent. I have made it a habit to foster a culture of mathematical exploration and de-emphasize correctness. I do not want my students to constantly see me, as a white male, correcting them or directing them on a singular path towards one collective answer. Instead, I praise them for their problem solving, productive struggles, and most importantly, their desire to learn while continuing to push them to further their understanding and maintaining high expectations for each and every student. I have found this to positively impact how my students think about themselves in mathematical spaces. Anecdotally, I have seen them become more engaged in learning and persevering through difficult mathematical tasks because they are not concerned with correctness but instead

focused on growing to be better mathematicians.

Tips for the Classroom

In the following section, we share four tips for the classroom. These are tips that I have been working on implementing within the classroom on a regular basis. These tips maintain my focus as I continue to grow and work towards being more inclusive in the mathematical (and other) spaces that I occupy and create. While we feel these tips are mostly generalizable, we also suggest that you reflect on your own students and consider what works best to meet their needs.

1. Build from Students' Strengths

- Provide positive feedback to students. We can highlight their strengths first and then provide feedback for how they might continue to grow in their mathematical journey.
- Take cultural language seriously. We are not proposing that students do not need to learn academic language (e.g., mathematical vocabulary); in fact, learning such vocabulary may very well be tied to their academic achievement in mathematics. We as educators must value the students' language and not make academic judgments based on students' language proficiency.

2. Critically Preplan for Questions and Explanations

- Acknowledge the cultural wealth that each student brings. We suggest writing down the questions or prompts that you plan to use to engage your students, and reflect upon whether or not the questions are relevant to students' cultures and experiences (and how to make them more so).
- Focus on our current students, first and foremost, when planning upcoming lessons. We must seek to

understand our students' unique backgrounds and prior knowledge of mathematics before implementing instruction.

- Give special attention to our students' experiences and cultures. This attention allows us to reflect upon how we will communicate content to our students.

3. Address Power Differentials

- Pay close attention to the discourse in the classroom. This includes student-to-student discourse, as well as teacher-to-student discourse. Give specific attention to how students speak to one another. Strive to cultivate a classroom where students learn together and position each other as intelligent problem solvers.
- Begin with yourself. Ask questions such as, "Are we presenting ourselves as the keepers of all knowledge?" A simple switch is a good start. We can communicate to our students that "we will discover and learn together;" in doing so, we are showing our students that they are capable of doing mathematics without being subservient to dominate persons in power. Then we have to follow through on this belief by ensuring the mathematical authority in the classroom is shared between the teacher and students as well as amongst the students.

4. Speak Less

- Create opportunities for students to explain concepts or draw connections. Each and every student is capable of justifying, debating, and discussing mathematics, and it our job to position them to do so routinely.
- Develop a positive classroom culture in such a way that students will be able to present on their own or in

group discussions. Positive classroom cultures do not simply happen; they are developed through careful cultivation and consistency.

- Practice with your students how to speak in culturally responsive manners to each other and during whole class discussion. For example, practicing how to agree or disagree without attacking character or background ensures students are valued for their growth and contributions.
- Take the time at the beginning of the year to create an inclusive environment. It will pay off throughout the year as your students begin to see themselves as learners and doers of mathematics.

Conclusions

This article addresses only a small aspect of the work being conducted by experts in CRT and learning. We, as educators, must continue to grow and develop, just like our students. Throughout this article, we have attempted to share some resources that we found have been instrumental in our own teaching and learning. Importantly, these strategies might not work exactly in the same way for your students. Being culturally responsive must begin with knowing your students. As teachers, we spend time with our students to get to know them as intelligent developing individuals. We should ensure that the strategies we use with our students are what is best for our current group of students. I am by no means an expert on these topics, and as I continue on this journey, I hope that you will continue to grow with me for the betterment of all students.

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