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5

ENGAGING CHILDREN IN THE TMSJ CLASSROOM

In the previous chapter, we focused on the first three cornerstones of a TMSJ environment: cultural responsiveness, community, and collaboration. We now focus on the fourth cornerstone: the importance of engaging our children in the TMSJ classroom. This work begins with a commitment to

- ▶ equitable mathematics teaching;
- ▶ a balanced instructional approach that includes building procedural fluency, conceptual understanding, and problem-solving;
- ▶ utilizing rich problem-solving tasks; and
- ▶ showcasing children’s thinking.

Equitable Mathematics Teaching

The foundation for equitable teaching is rooted in research-informed mathematics teaching practices that consider the behavior and actions of teachers and children. We offer that the NCTM Mathematics Teaching Practices and Standards for Mathematical Practice (or similar process and practice standards), when integrated with the five equity-based mathematics teaching practices (Aguirre et al., 2013), form a solid foundation for the equitable teaching and learning of mathematics (see Table 5.1).

Table 5.1 Foundation for Equitable Teaching

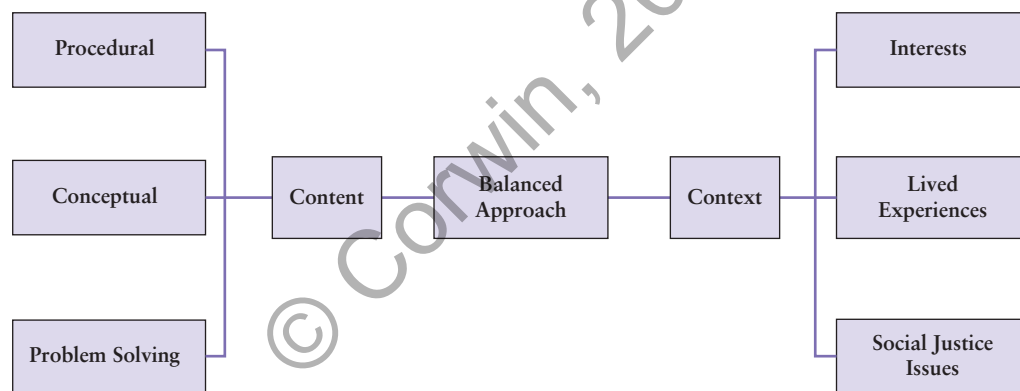
Equity-Based Mathematics Teaching Practices (Aguirre et al., 2013)	Mathematics Teaching Practices (NCTM, 2014)	Standards for Mathematical Practice (SMP) (NGACBP & CCSSO, 2010)
<ul style="list-style-type: none"> • Go deep with mathematics. • Leverage multiple mathematical competencies. • Affirm mathematics learners’ identities. • Challenge spaces of marginality. • Draw on multiple resources of knowledge (math, culture, language, family, community). 	<ul style="list-style-type: none"> • Establish mathematical goals to focus learning. • Implement tasks that promote reasoning and problem-solving. • Use and connect mathematics representations. • Facilitate meaningful mathematics discourse. • Pose purposeful questions. • Build procedural fluency from conceptual understanding. • Support productive struggle in mathematics. • Elicit and use evidence of student thinking. 	<ul style="list-style-type: none"> • Make sense of problems and persevere in solving them. • Reason abstractly and quantitatively. • Construct viable arguments and critique the reasoning of others. • Model with mathematics. • Use appropriate tools strategically. • Attend to precision. • Look for and make use of structure. • Look for and express regularity in repeated reasoning.

Equitable mathematics teaching is the foundation for creating a mathematics classroom with a balanced pedagogical approach that utilizes rich problem-solving tasks and showcases student thinking.

A Balanced Approach to Nurturing Children's Understanding

Children are just like adults in that they have a genuine desire to engage in activities that pique their interests. As discussed in Chapter 3, children enter our classrooms with a multitude of interests and experiences, but during mathematics lessons they often must suppress these interests as they grapple with unfamiliar contexts and abstract concepts that are hard to make sense of when disconnected from their interests and experiences. Often, teachers unwittingly attempt to intertwine contexts based on their own interests and project onto children their excitement for the interest. In addition, many teachers focus on ensuring the daily content is aligned to the standardized assessment, and they often unconsciously neglect the role of context to support children with gaining an understanding of the mathematics concept for the lesson. When this happens, the purpose of the learning becomes about passing an assessment rather than allowing children the opportunity to fully make sense of a concept through the lens of their own interests. It is imperative that both context and content receive equal intensity as it relates to creating engaging experiences. Figure 5.1 describes this balance in more depth.

Figure 5.1 A Balanced Approach for Engaging Students



BALANCING CONTEXT WITH CONTENT

When thinking about the problems or tasks your children are challenged to solve, ask “Are the contexts contrived by a textbook publisher, based on teacher interests, or based on children’s interests? Are you authentically including children’s interests or making assumptions?” A context-first approach focuses on the scenarios that will be used to engage children in the content by tapping into their actual interest. This approach de-emphasizes the role of content and values the children’s voice when determining context for the lessons. We suggest that you use information gathered about your children (see Chapter 3 for My Children’s Background) to identify topics that connect to your children’s interests, lived experiences, and school or community issues. When considering a social justice context, it is critical to focus on children’s interests and not assumed interests. In mathematics class, teachers may be tempted to use social justice contexts they deem exciting, important, or both. These topics are often areas the teacher can connect to their prior experience or interest. When this occurs, it often requires children to figure out a way to make sense of the issue, especially if they have no prior knowledge of or interest in the topic. Take a moment to complete the Check In to identify examples of context you have used in your classroom.



Check In

Non-Textbook Examples

List the last three non-textbook examples you have used in your classroom.

- What was the context?
- Did the children or you as teacher choose the context?
- How engaged were the children in the mathematical task? In the context?
- Going forward, what can you do differently?

Using children’s interests and lived experiences for context will require you to be intentional and strategic about when to do this as you consider your curriculum materials. Some materials may have problems and tasks with context that makes it easier for you to make the connections and, at times, you may need to adjust a curricular task context for the lesson. For example, contexts that are relevant to the children under your purview can easily be incorporated, while others will need to be modified to provide children an entry point of understanding into the task. Almost any problem can be recontextualized into something children are interested in. Use the following questions as you consider context to use in the lesson:

- ▶ Is there a contextual example (connected to my children) in my curriculum materials that can be used?
- ▶ If using a non-textbook example, is this context children or teacher generated?

It is important to maintain the level of rigor of the content when incorporating context from your children, especially when a social justice context is used (see Chapter 6 for more details). In the next section, we turn our attention to the mathematical content.

BALANCING INSTRUCTIONAL APPROACHES FOR CONTENT

In a content-first approach, one focuses on “the mathematics” as it relates to the numbers, operations being performed, and the intrinsic value of the material being covered. The content-first approach assumes the child will find joy in performing the mathematics itself and finding a solution to the given task. According to Boaler (1993), this de-emphasis on the context aligns with a mathematics educator traditionalist mindset that regardless of the context “the mathematics” content takes precedence, which is contrary to a TMSJ educator approach.

Trends in teaching and learning mathematics have historically shifted back and forth from a procedural to a conceptual focus, shaped by accompanying classroom pedagogies that have also shifted. Today’s classrooms tend to fall more heavily into one of three pedagogical approaches based on the beliefs of the classroom teacher, the teacher’s experiences as a learner, selected curriculum resources, or the dictates of the district or school in which they work. Understand that each approach has value, but to create the ideal TMSJ environment teachers must establish a balanced approach that incorporates all three. Take a moment to explore the three pedagogical approaches—procedure-driven, concept-focused, and problem-solving—and how they come together to create a balanced instructional approach for content that is grounded in the grade-level standards and designed to support your children’s needs (see Table 5.2).

Table 5.2 Pedagogical Approaches for TMSJ

Pedagogical Approach	Teacher Look-Fors	Children Look-Fors
<p>Procedure-Driven Classrooms</p> <p>A procedure-driven classroom focuses on children learning the appropriate procedures and applying them to mathematics tasks.</p>	<p>Uses a transmission method: first, telling and demonstrating to children what needs to be done by sharing the steps or procedures to complete a problem.</p> <p>Focuses on the correct solution, not the process of finding the solution.</p> <p>Children are often taught “tricks,” mnemonic devices, and other strategies to quickly find answers to tasks.</p>	<p>Children have a collaborative opportunity to engage in a mathematics problem-solving process.</p>
<p>Concept-Focused Classrooms</p> <p>A concept-focused classroom centers on children gaining an understanding of the relationships or foundational ideas of a mathematics concept.</p>	<p>Acts as the facilitator, allowing children space and opportunity to explore the beauty of mathematics, look for patterns, use multiple representations (e.g., concrete materials, illustrations or diagrams, symbols, words, and actions) to work through problems that have multiple possible solution pathways, and form generalizations about the mathematics.</p> <p>Asks thought-provoking questions to challenge and encourage children’s thinking and helps them consolidate what they have learned once they’ve had an opportunity to explore together.</p>	<p>Use sense-making skills and strategies to approach a given task.</p>
<p>Problem-Solving Classrooms</p> <p>Problem-solving classrooms unlock mathematics through an interconnection of children’s knowledge and understanding of mathematical ideas.</p>	<p>Classroom environment is rooted in children’s engagement in rich problem-solving tasks.</p> <p>Tasks are open-ended and provide children the space and opportunity to showcase their thinking.</p> <p>Encourages diversity of thought and new ways of thinking and approaching the task.</p>	<p>Collaborate with others and share their thinking.</p>

A balanced instructional approach—pursuit of conceptual understanding, procedural skills and fluency, and application with equal intensity—is needed to help children gain a deep understanding of the content and make sense of relevant context. The balance of context and content requires you to be intentional when selecting tasks as you design lessons that enable your children to experience the wonder, joy, and beauty of mathematics. In this chapter’s Reflection and Action, you will have an opportunity to analyze several units of instruction to determine the level of instructional balance in your mathematics experiences.