Overview of Differentiating Instruction

Differentiation is the act of including strategies to support the range of different academic backgrounds in classrooms (Tomlinson, 2001). The Mathematical Practices and the *Shifts in Classroom Practice* essentially describe a differentiated classroom—one in which students can select strategies to solve problems, demonstrate understanding in a variety of ways, and so on. Such a problem-based approach to teaching attends to the range of learners, while a teacher-demonstration approach to teaching tends to treat all learners the same.

Differentiating Instruction: The Basics

Differentiating instruction means thinking of the students as a set of individuals, each with his or her own strengths and learning needs, and trying to make sure that the lesson is designed in such a way that each student has access to the content. This includes accommodations and modifications for students with special needs, gifted students, students who are ethnically and culturally diverse, **emergent multilingual students**, and students who are struggling. (Note that we use the term *emergent multilingual students* [discussed more in Chapter 9] to describe students who are learning English as they are learning content. The term replaces the more commonly used phrase *English Language Learners [ELLs]* because it is a more accurate and inclusive description of these students.) Differentiating instruction is based on these three essential elements (Small, 2017; Smith, 2017a; Smith 2017b; Sousa & Tomlinson, 2011):

1. ***Focusing on meaningful content, including authentic contexts***. An **authentic context** is a situation or story that is familiar to the lived experiences of a student and that is an actual context in which the selected mathematics would be used. Content must be developmentally appropriate and emphasize the Mathematical Practices (see Chapters 1 and 2).
2. ***Recognizing each student's readiness, interests, and learning preferences***. These are the resources students bring to learning. In planning, we consider these questions:
   - *Readiness:* What do students know related to the topic, including the topic itself and any prerequisite knowledge?
   - *Interest:* What books, activities, and hobbies do students enjoy, and what personal, school, and community issues might they want to explore mathematically?
   - *Learning preferences:* In what ways does a student like to work (independently, in groups), and what modes support her or his thinking (visual, concrete, auditory, etc.)?
3. ***Connecting learner to content, including choices in content, process, and products***. Differentiation in a lesson includes providing options for students in any or all of three domains—content, process, and product. In planning, we consider these questions:
   - *Content:* How might I modify or adapt the content of a lesson? *Modify* means changing the actual lesson or task. For example, a task of ordering fractions, decimals, and percentages may be modified so that some learners are ordering fractions only. Modifications must not be simplifications! Simplifying is not going to lead to increased learning. *Accommodations* leave the task unaltered, but change how it is enacted in order to ensure that the task is accessible and effective. Accommodating the lesson on fractions might include using manipulatives or representations, providing non-examples and examples, and increasing attention to mathematics language (Cassone, 2009).
   - *Process:* How might students engage with the content? Tomlinson (1999) described this as taking "different roads to the same destination" (p. 12). In giving students choice, the process connects to students' readiness, interests, and learning preferences (Tomlimson & McTighe, 2006). Students, for example, might select representations, solution strategies, or tasks.

- *Product:* What will students show, write, or tell to demonstrate what they have learned? The products for a single task are the ways students share their ideas at the end of a lesson, which might include students showing (e.g., with graphing technology or manipulatives), writing, or telling. The products related to the unit or project might offer choices, such as presentations, written projects, or a test.

1. ***Creating differentiated tasks in manageable ways***. Descriptions of differentiated instruction can sound like three times the work, creating three lessons for one class. This is not reasonable, given the lack of planning time in US classrooms! It is important to have efficient strategies for differentiating instruction, such as open questions, **tiered tasks**, and **parallel tasks**. *Open questions* are broad-based questions that invite meaningful responses from students at many developmental levels (Small, 2017). A question is open when it is worded in such a way that a variety of approaches or answers are possible (see also the worthwhile tasks discussion in Chapter 2). For example,
    - Rather than simply directing *Find the area of the rectangle*, ask *What options are possible for a rectangle with an area of 24 square units?*
    - Rather than instructing *Write _______ in scientific notation*, ask *What two numbers are easier to add when in scientific notation than in standard form?*

This general strategy is to use the "answer" and seek a possible "problem" to go with it. Another quick strategy is to ask students to describe similarities and/or differences between two problems; this has the added benefit of moving from a low-level task to a high-level task (Small, 2017).

Tiered lessons have a series of options for students, and those options might vary in terms of the structure, complexity of the task, complexity of the process, and degree of assistance (Kingore, 2006). Figure 8.1 provides an example that was created in about 15 minutes. The point is that it doesn't have to be perfect or fancy, but opening this task and varying its structure has resulted in a lesson that will teach the content more deeply and be accessible to all students.

Parallel tasks, like tiered lessons, involve students working on different tasks all focused on the same learning goal, but with parallel tasks, the focus is on *choice*. Consider this example, based on Small and Lin (2010):

Find the equation of the line that completes the polygon.

Option 1: A parallelogram with three sides formed by $y = 2$, $y = 5$, and $y = -2x + 1$

Option 2: A right triangle with two sides formed by $y = -2x + 8$ and $y = \frac{1}{3}x$

There are often two textbook exercises that can be selected to become parallel tasks (e.g., solve either #5 or #8). The key is that the two tasks both address the same mathematical goals and that questions can be discussed that apply to both. In this case, for example, the teacher might ask *Is there more than one possible line?*

Figure 8.1 **Example of Textbook Task Modified Into Tiered Lesson**

Textbook task: For each shape, tell how many angles and how many vertices (five polygons are illustrated, including a triangle, parallelogram, square, pentagon, and hexagon).

Observation: This is closed and is lower level.

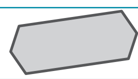
Goal: Open it and tier how much structure is provided.

Redesigned tiered task:

Less structured: Explore your shapes and write three things you notice about their sides and their angles. Use words and pictures to illustrate what you notice.

Medium structured: Think of a rule you can use to sort your shapes. Record the rule. Draw a picture of a shape that fits the rule and a shape that does not fit the rule.

Highly structured: Sort your shapes using the table. After you have completed the table, describe patterns you notice about the sides and angles.

Shapes	Number of Sides	Number of Angles
	3	
		4
	5	
		

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