Choice

The third category of engagement strategies is choice. Any time that a student can make his or her own choice about learning, engagement is increased. The homework menus presented in Chapter 7 are a great example. Figure 16.2 shows a menu for math.

In addition to menus, tiered math problems provide choices with just the right amount of challenge for individual students. For any math problem, provide options of increasing difficulty from an introductory level to a more sophisticated level. Wormeli (2007) provided an example for finding the surface area of three-dimensional solids. From least to most sophisticated, the tiers could be: determine the surface area of a cube; determine the surface area of a rectangular prism; determine the amount of wrapping paper needed to cover a rectangular box; determine how many cans of paint you’ll need to buy to paint a house with given dimensions, if one can of paint covers 46 square feet (p. 84). Once students choose a starting point, the teacher can guide them through increasing levels of mastery.

Another way to offer choice to students is to allow them to work in different group sizes. Activities can be done by the whole class or half the class, in small groups or teams of various size, partners, triads, or by individual study (Wormeli, 2007). Fitzell (2005) offered some examples of ways to collaborate on math problems:

- Solve problems with a partner; one solves while one explains
- Solve complex story problems in a small group; make sure everyone contributes
- Have teams construct problems linking many math operations, then solve them (p. 158).
Self-Regulation Strategies

The last category of engagement strategies is ways to help students regulate and monitor their own understanding and work. The first part of this is to make sure that students are working in a setting that is free of as many distractions and threats as possible. By threats, we mean anything that might make the student feel uncomfortable—physically or emotionally—frustrated, or insecure. The case of Beth's fourth-grade classroom in Chapter 8 included many strategies for keeping discomfort and distraction to a minimum. The quiet area where students can choose between various seating options or use a clipboard under softer lighting is just one example. Allowing students the opportunity to share their thinking can be engaging, but demanding that they present orally to the class unexpectedly can be threatening.

Gargiulo & Metcalf (2010) shared examples of strategies that increase engagement because they help students regulate their own learning. Teachers can provide graphic organizers to fill out, mnemonics to rehearse, and strategy posters to review. Silverman (2002) also encouraged the use of mnemonics. OnlineMathLearning.Com at http://www.onlinemathlearning.com/math-mnemonics.html includes several mnemonics for many different math concepts. LINCS is a research-based mnemonic strategy to assist in remembering new vocabulary: list the parts; imagine a picture; note a reminding word; construct a story; and self-test your memory.

Input
There are many different ways that you can represent math concepts to students to increase their understanding. This section covers multiple representations of math concepts in three categories: visual, auditory, and tactile input; teaching math language; and anchoring activities.

Visual, Auditory, and Tactile Input
The first category of representation or input strategies includes ways that make math visual, auditory, and tactile so that different v

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