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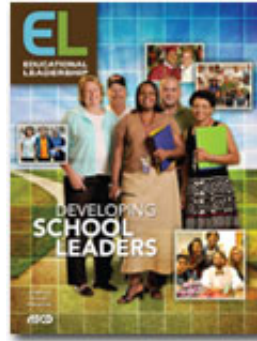
October 2009 | Volume 67 | Number 2

Developing School Leaders Pages 86-87

Helping Students Process Information

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During the course of a typical lesson or unit of study, teachers regularly present students with new information. Sometimes the information is peripheral—even if students do not understand it, they can still grasp the overall goal of the lesson or unit. However, sometimes the information is essential—without it, students will have little chance of comprehending the overall goal.



October 2009

Five Avenues to Understanding

To help students process information that is essential to understanding specific content, teachers can use an effective strategy that involves the following five elements.

Chunking

Chunking means presenting new information in small, digestible bites. This requires carefully examining the manner in which students will experience new content. If the teacher intends to present content in the form of a lecture, he or she needs to determine the crucial points at which to pause so students can interact with one another about the new information.

For example, for a lecture on the topic of theoretical probability, the teacher might decide to make her first stop after she has discussed some basic differences between theoretical and experimental probability. If she's using a videotape or a video clip she's downloaded from the Internet, she might decide to stop the video about two minutes into the discussion of how theoretical probability is used in games of chance. This idea of stopping so that students can digest the information also holds true for demonstrations, exhibitions, guest speakers, reading content in a textbook, and the like.

Scaffolding

Whereas chunking involves the *size* of the bites for new content, scaffolding involves the *content* of the bites and their logical order. To illustrate, let's say that a teacher is showing students a strategy for editing a composition for overall organizational logic. The teacher might organize the steps in that strategy into three chunks. The first chunk would involve steps that deal with determining whether the composition has good transitions from paragraph to paragraph. The second chunk would involve steps that deal with determining whether the major sections of the composition (that is, its beginning, middle, and end) logically flow into one another. The third chunk would involve steps that deal with determining whether the composition as a whole sends a unified message. Each chunk logically sets up the next chunk.

Interacting

Interacting refers to how students process the information in each chunk. One common way to facilitate processing is to organize students in groups and ask each group to summarize the content in the chunk, identify what was confusing, try to clear up the confusion, and predict what information might be found in the next chunk.

It's important that as many students as possible respond. Teachers can increase the response rate to questions in several ways. One technique, *response chaining*, involves having students respond to the answers of other students. Students can agree with, disagree with, or add to a response. Another technique is to use the voting technologies that frequently come with interactive white boards. These allow students to electronically cast their vote regarding the correct answer to a question. Their responses are immediately displayed on a pie chart or bar graph, enabling teacher and students to discuss the different perceptions of the correct answer. If voting technologies are not available, students can record their responses on inexpensive slates.

Pacing

As its name implies, pacing involves the extent to which a teacher moves through chunks at an appropriate pace—not too fast and not too slow. The teacher will need to slow down if students do not understand the content in a particular chunk or speed up when student engagement in a chunk begins to wane.

Monitoring

Monitoring involves continually checking for student understanding. If students do not understand the content in a particular chunk, the teacher revisits or reteaches that information before moving on to another chunk.

What Teacher Research Found

This information-processing strategy comprises a set of component strategies, each of which has its own research support (Good & Brophy, 2003; Marzano, 2007; Mayer, 2003). Simply executing the strategy in the basic sequence described is effective in and of itself. However, research studies I conducted in 85 elementary, middle school, and high school classrooms, each of which was videotaped and analyzed regarding the relationship between teacher behaviors and student achievement (Marzano & Haystead, 2009), reveals nuances regarding how best to use this strategy:

1. Scaffolding is the keystone of the entire process. If the content of the chunks does not follow a logical progression to a clear goal, the rest of the process is not as effective in enhancing student learning.
2. A necessary component of interacting is keeping the student response rate high. By the time a class period ends, all students should have responded to multiple questions or been asked to explain their summaries of the content. Students should discuss all answers and summaries as opposed to just moving on in response to a correct answer.
3. Monitoring should be a natural outcome of effective interaction. If the teacher asks many students to report on how they summarized, cleared up confusions, and so on, he or she should have a good sense of how well students understand the new content. Likewise, if a number of students have responded to questions about the new content, the teacher should have a good sense of the entire class's level of understanding.

4. Teachers cannot easily predetermine their pacing. Rather, they must continually read student engagement levels and adjust the pace accordingly.

When executed well, this process dramatically increases students' understanding of new information across content areas and at every grade level, which makes it a strategy that all teachers can use to great benefit.

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