



23–26 May

MELBOURNE

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Phil Warrick

Saturday 24 May

**The Art & Science of Teaching
1- Day Institute**

PHIL WARRICK

Dr Phil Warrick, EdD, is associate vice president of Marzano Research Laboratory. He was an award-winning administrator for nearly 12 years, most recently as principal of Round Rock High School, which serves approximately 3000 students. Dr Phil Warrick has been an adjunct professor of Peru State College since 2005. In 2010, Dr Warrick was invited to participate in the Texas Principals' Visioning Institute, where he worked with other principals to develop model practices for Texas schools. He is a past regional president for the Nebraska Council of School Administrators (NCSA). He also served on the NCSA legislative committee and was elected chair.

Dr Warrick was named 2005 Nebraska State High School Principal of the year, 2004 Nebraska Secondary School Principals Region One Principal of the Year, and 1998 Nebraska Outstanding New Principal of the Year and Nebraska Secondary School Principals Region One Assistant Principal of the Year. Dr Warrick is part of the Australian based Marzano Research Laboratory team working exclusively with Hawker Brownlow Professional Learning Solutions.

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The Art & Science of Teaching

A Common Language of Instruction



MARZANO INSTITUTE

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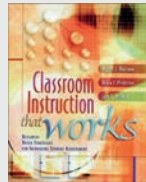
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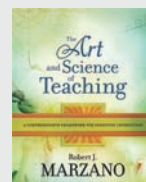


Development of The Art and Science of Teaching

From.....



To.....



- Classroom Instruction that Works—9 High “Yield” strategies
- The Art and Science of Teaching—puts them in a framework based on the research...and provides many more...
- High **Probability** strategies....when they are used in their most effective context instructionally.
- Creates a Research-Based, Common Language for Instruction

Art and Science of Teaching By The Numbers:

41:

9:

3:

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LESSON SEGMENTS INVOLVING ROUTINE EVENTS	
Design Question 1	What will I do to establish and communicate learning goals, track student progress, and celebrate success?
Design Question 6	What will I do to establish or maintain classroom rules and procedures?
LESSON SEGMENTS INVOLVING CONTENT	
Design Question 2	What will I do to help students effectively interact with new knowledge?
Design Question 3	What will I do to help students practice and deepen their understanding of new knowledge?
Design Question 4	What will I do to help students generate and test hypotheses about new knowledge?
SEGMENTS ENACTED ON THE SPOT	
Design Question 5	What will I do to engage students?
Design Question 7	What will I do to recognize and acknowledge adherence and lack of adherence to classroom rules and procedures?
Design Question 8	What will I do to establish and maintain effective relationships with students?
Design Question 9	What will I do to communicate high expectations for all students?

The Art and Science Instructional Framework:

Routines and procedures are at the heart of everything that occurs in a classroom. Without them, things are clunky at best.

When routines and procedures are in place a teacher can effectively teach content in one of three specific ways.

Classrooms are dynamic and active settings that require teachers to have strategies at the ready so they can enact them on the spot as they monitor learners and learning.

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Design Question 6: What will I do to establish or maintain classroom rules and procedures? (ASOT pp.117-130)

Elements	Notes
4. Establish classroom rules and procedures	
5. Organize the physical layout of the classroom	

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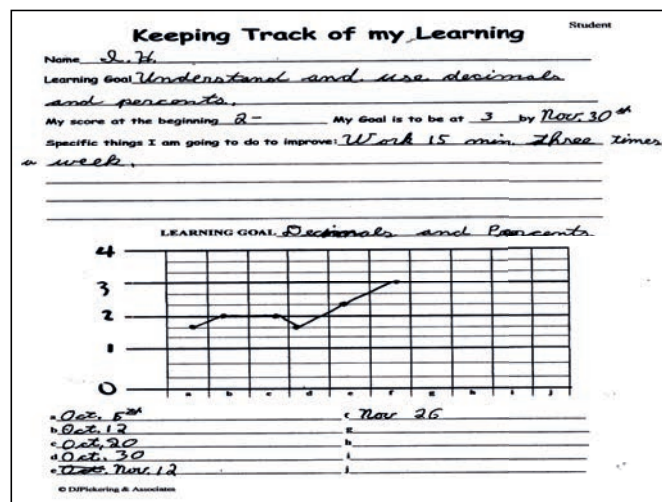


Design Question 1: What will I do to establish and communicate learning goals, track student progress, and celebrate success? (ASOT, pp. 9-18)

Elements	Notes
1. Provide clear learning goals and scales	
2. Have students track their own progress	
3. Celebrate success	

Learning Goals vs. Activities

Having students track progress on their own learning goals results in a ____% increase in student achievement.



Recognize and Celebrate Growth



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December 2009/January 2010 | Volume 67 | Number 4 **Health and Learning** Pages 86-87

When Students Track Their Progress

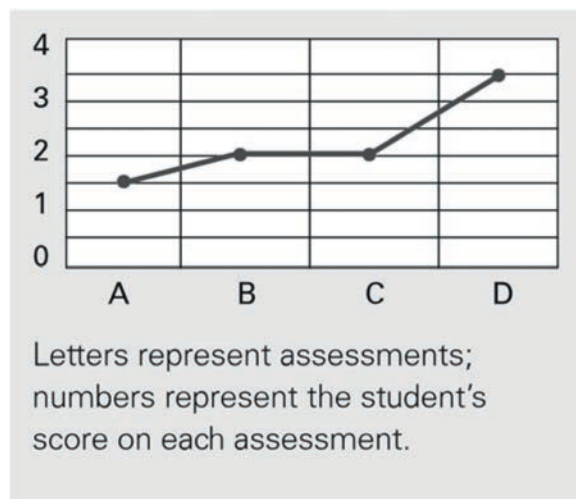
Robert J. Marzano

The strategy of tracking student progress on specific learning goals is well supported. For example, Fuchs and Fuchs¹ found that providing teachers with graphic displays of students' scores on formative assessments was associated with a 26 percentile point gain in achievement. Unfortunately, this strategy has not received the attention it deserves.

When students track their own progress on assessments using graphic displays, the gains are even higher. Over my many years of working with teachers, I have had the opportunity to examine the effects of such an approach. In 14 different studies, teachers had students in one class track their progress on assessments; in a second class, these teachers taught the same content for the same length of time without having students track their progress (see www.marzanoresearch.com/research/strategy20_trackingprogress.aspx). On average, the practice of having students track their own progress was associated with a 32 percentile point gain in their achievement.

In the studies, students recorded their scores on a chart after taking each assessment. Figure 1 shows how a student tracked her progress on the topic of habitats using her scores on four different assessments. Using a rubric with a rating scale of 0 to 4 to score the assessments, this student began with a score of 1.5 on the first assessment and ended with a score of 3.5 on the fourth assessment.

Figure 1. Student Progress Chart



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This approach provides two kinds of information for students and teachers. First, the rubric provides a description of the levels of performance that the teacher expects of the students. Second, the graph provides a representation of each student's progression of learning. The combination of these two types of information produces the powerful effect.

What Produces the Best Results?

Given the expected 32 percentile point gain, one might assume that this strategy is a sure thing in terms of enhancing student achievement. As is often the case, however, the details of the studies clarify the circumstances under which the strategy produces strong, as opposed to mediocre, results.

- **Address a single goal in all the assessments.** To track student progress in the manner depicted in Figure 1, all assessments must address the same learning goal. For example, assume that a teacher has two learning goals that relate to the topic of habitats. One learning goal might be, "The student will understand that habitats provide plants and animals with the things they need to survive." A second learning goal for this same topic might be, "The student will understand how a local habitat of his or her choice supports specific local animals." The assessments should clearly differentiate between these two goals. One assessment can address both goals, but only if the teacher assigns two scores to the assessment—one for each learning goal.
- **Use rubrics instead of points.** Across the 14 studies, teachers obtained the best results when they scored assessments using a rubric instead of points. Teachers typically assign a certain number of points to each answer on a test and then convert the total points to a percentage score. When teachers use this approach, they tend to change the type and difficulty of items from test to test, even when those tests measure the same topic. The first test might include all easy items, but the second test might include all difficult items. Consequently, a student might receive fewer points on the second test even though he now knows more than he did when he took the first test. A graph of his test scores would make it look as though he had decreased in knowledge when he had actually gained in knowledge. In fact, in the two studies that did *not* show positive effects for students tracking their own progress, the teachers used points instead of rubric scores. A rubric I have found useful involves five values, 0 through 4, with the score of 3 meaning the learner has mastered the content that is the target of instruction—the specific learning goal that the teacher wishes to assess and track. The teacher would state the learning goal in a form that describes what he or she expects students to do to demonstrate their understanding: "Students will explain and illustrate how habitats provide plants and animals with the things they need to survive." A score of 4 indicates that students have mastered score 3 content and can also use that content to make inferences. For example, to earn a score of 4 on the habitat learning goal, students might be required to explain what would happen if the number of animals that the habitat typically supported increased dramatically over a short period of time. A score of 2 indicates that students know simple details and processes that relate to the learning goal (score 3 content) but not the more complex information and processes that the learning goal involves. In this case, a score of 2 might indicate that students recognize some basic facts and terminology associated with habitats even though they cannot explain and illustrate how habitats provide plants and animals with the things they need to survive. A score of 1 indicates that students cannot produce any of the content on their own but can do so with some help from the teacher. Finally, a score of 0 indicates that

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even with help, students cannot produce any of the content.

- **Use different types of assessments.** The paper-and-pencil test is only one of many options that teachers can use with rubrics. Other types of assessments include demonstrations, probing discussions, unobtrusive observations, and student-generated assessments. A well-constructed rubric allows for a relatively accurate measure of a student's level of understanding through both a demonstration, in which students demonstrate their skill at a procedure or their understanding of information, and a probing discussion, in which the teacher asks individual students to explain their understanding. Unobtrusive observations involve a teacher observing a student demonstrating a procedure without the student being aware of the observation. For example, a physical education teacher might observe a student demonstrating the overhand throw on the playground. If the teacher has designed an appropriate rubric for this process, he or she can assign a score to the student without interrupting the student's play. Finally, student-generated assessments are those that students have designed to demonstrate that they have met the requirements of a specific score on a rubric. For example, to show that she has attained score 3 status, a mathematics student might decide to explain how to solve a specific type of problem and demonstrate her explanation using selected problems from the end of a chapter in the textbook.

Benefits for All

When it comes to using classroom assessment to enhance student achievement, having students track their progress using rubrics is a hidden gem. This strategy involves multiple types of assessments, increases interactions between teachers and students, and provides students with clear guidance on how to enhance their learning.

Endnote

¹ Fuchs, L. S., & Fuchs, D. (1986). Effects of systematic formative evaluation: A metaanalysis. *Exceptional Children*, 53(3), 199–208.

Robert J. Marzano is Cofounder and CEO of Marzano Research Laboratory in Denver, Colorado. He is the author of *The Art and Science of Teaching* (ASCD, 2007) and coauthor, with Mark W. Haystead, of *Making Standards Useful in the Classroom* (ASCD, 2008). To contact Marzano or participate in a study regarding a specific instructional strategy, visit www.marzanoresearch.com.

Design Question 2: What will I do to help students effectively interact with new knowledge? (ASOT pp. 29-57)

Elements	Notes
6. Identify critical information	
7. Organize students to interact with new knowledge	
8. Preview new content	
9. Chunk content into digestible bites	
10. Process new information	
11. Elaborate on new information	
12. Record and represent knowledge	
13. Reflect on learning	

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Design Question 3: What will I do to help students practice and deepen their understanding of new knowledge? (ASOT pp. 58-85)

Elements	Notes
14. Review content	
15. Organize students to practice and deepen knowledge	
16. Use homework	
17. Examine similarities and differences	
18. Examine errors in reasoning	
19. Practice skills, strategies, and processes	
20. Revise knowledge	



Identifying Similarities and Differences

Comparing is

- the process of identifying similarities and differences among or between things and ideas.

Classifying is

- the process of grouping things that are alike into categories based on their characteristics.

Creating Metaphors is

- the process of identifying a general or basic pattern that connects information that is not related on the literal or surface level.

Creating Analogies is

- the process of identifying the relationship between two sets of items.

Sentence Stem for Comparing

_____ and _____ are similar because they both

_____.

_____ and _____ are different because

_____ is _____, but _____ is _____.

_____ is _____, but _____ is _____.

_____ is _____, but _____ is _____.



Comparison Matrix

	Rectangle	Square	
Definition of the shape			Similarities
			Differences
How to find the area			Similarities
			Differences
How to find the perimeter			Similarities
			Differences
Conclusions and observations			

Classification Chart

Characters that Overcame Hardship	Characters that Had Unique Personalities	Characters that Experienced Significant Change



Design Question 4: What will I do to help students generate and test hypotheses about new knowledge? (ASOT, pp. 86-97)

Elements	Notes
21. Organize students for cognitively complex tasks	
22. Engage students in cognitively complex tasks involving hypothesis generation and testing	
23. Provide resources and guidance	

Problem-Based Learning

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***Design Question 5: What will I do to engage students? (ASOT, pp. 98-116)***

Elements	Notes
24. Notice when students are not engaged	
25. Use academic games	
26. Manage response rates	
27. Use physical movement	
28. Maintain a lively pace	
29. Demonstrate intensity and enthusiasm	
30. Use friendly controversy	
31. Provide opportunities for students to talk about themselves	
32. Present unusual or intriguing information	

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Teachers ask many questions. Most teacher questions are at the lowest cognitive level—known as fact, recall, or knowledge.

Not all students are accountable to respond to all questions. Teachers frequently call on volunteers, and these volunteers constitute a select group of students.

What are you currently doing or seeing in your classroom(s) in relationship to the research on questioning?

Teachers typically wait less than one second after asking a question before calling on a student to answer. Teachers wait even less time before speaking after the student has answered.

Teachers often accept incorrect answers without probing; they frequently answer their own questions.

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Design Question 7: What will I do to recognize and acknowledge adherence or lack of adherence to rules and procedures? (ASOT, pp. 131-148)

Elements	Notes
33. Demonstrate “withitness”	
34. Apply consequences for lack of adherence to rules and procedures.	
35. Acknowledge adherence to rules and procedures.	

NOTES



Design Question 8: What will I do to establish and maintain effective relationships with students? (ASOT, pp. 149-161)

Elements	Notes
36. Understand students' interests and background	
37. Use verbal and nonverbal behaviors that indicate affection for students	
38. Display objectivity and control	

NOTES

Design Question 9: What will I do to communicate high expectations for all students? (ASOT, pp. 162-173)

Elements	Notes
39. Demonstrate value and respect for low-expectancy students	
40. Ask questions of low-expectancy students	
41. Probe in-correct answers with low-expectancy students	

Teacher Behaviors Associated with Low Expectancy Students

Affective Tone:

- Making less eye contact.
- Smiling less
- Making less physical contact or maintaining less proximity
- Engaging in less playful or light dialogue

Quality of Interactions:

- Calling on them less
- Asking them less-challenging questions
- Not delving into their questions as deeply
- Rewarding them for less-rigorous responses

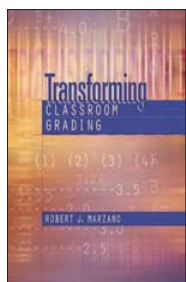
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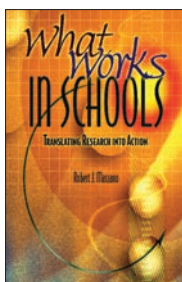


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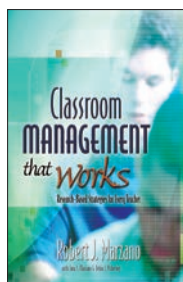
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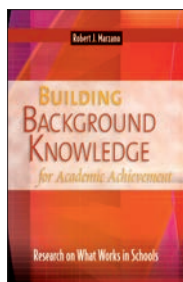
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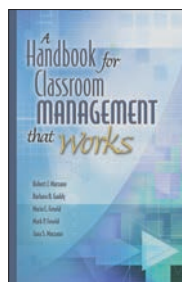
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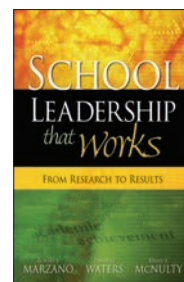
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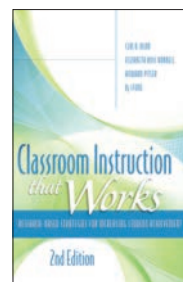
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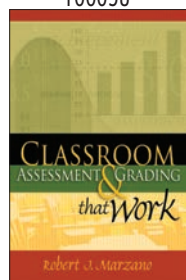
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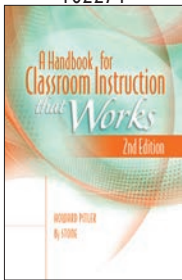
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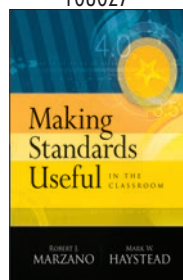
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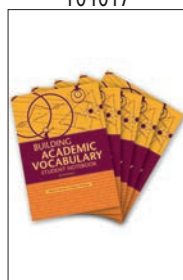
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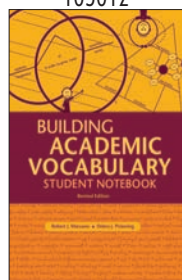
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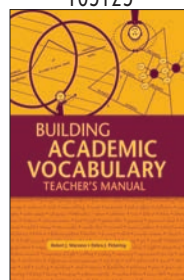
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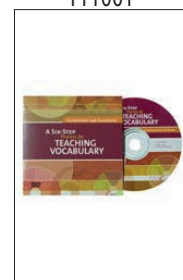
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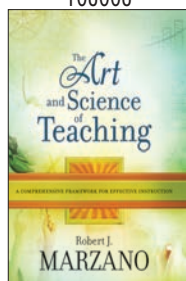
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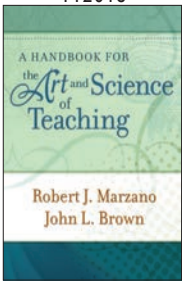
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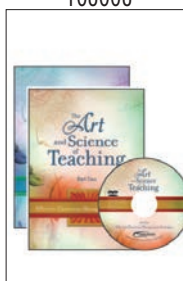
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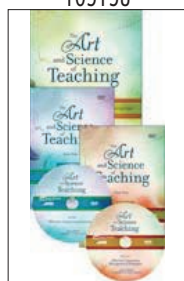
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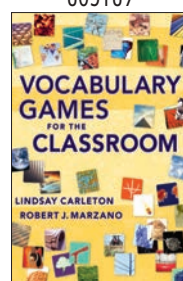
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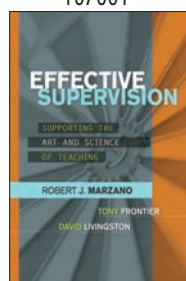
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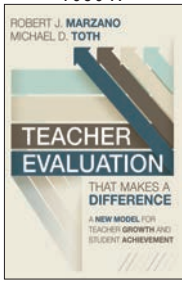
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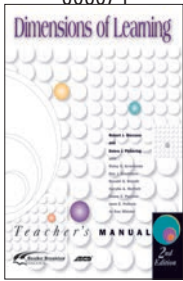
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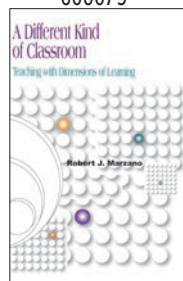
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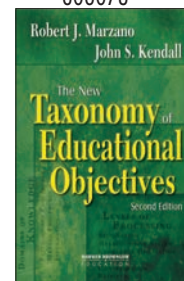
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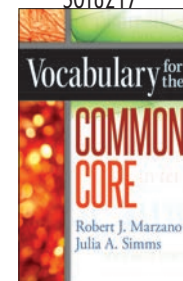
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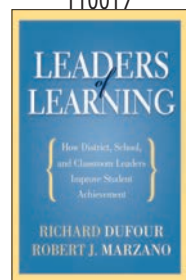
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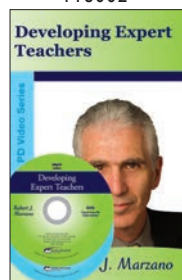
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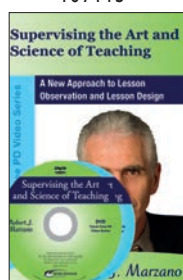
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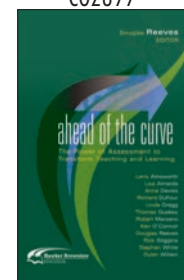
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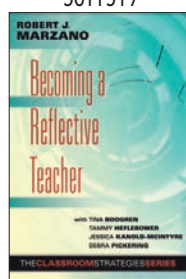
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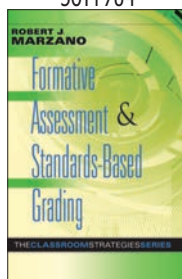
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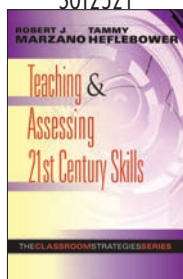
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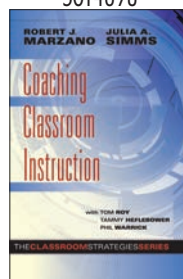
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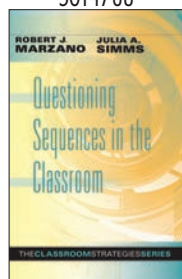
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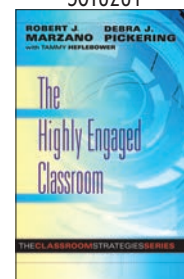
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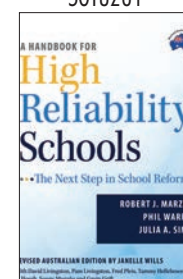
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