Appendix D:
## Additional Findings on Textbook Coverage of Strategies

Reviews of 48 textbooks assigned by programs in the sample are a central part of this report. The primary purpose in examining textbooks was to determine the *fidelity* with which each strategy was presented, by looking for evidence that the texts convey the majority of key elements that are essential to understanding each strategy. Appendix C provides more information on the methodology of textbook evaluation.

As noted in the report, no strategy was covered by more than 41 percent of texts.[1]

What key elements are taught?

A breakdown of the key elements of each strategy helps to explain how descriptions of the strategies typically fall short. Figure D1 shows that a basic statement describing a given strategy is included in the average text about 30 percent of the time, and the purpose of the strategy (to improve learning, retention, etc.) is described with approximately the same frequency. However, texts are much less likely to include the details important for effective classroom use, such as the fact that the delay between sessions of **distributing practice** should be weeks and months long instead of just a few days.

Figure D1. Percent of key elements for all strategies included in average text (n = 816 possible key elements)
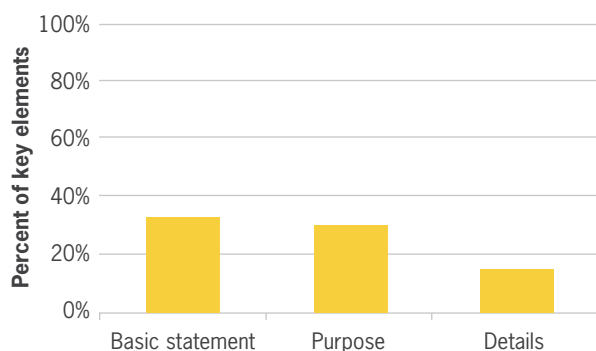
Texts often allude to strategies without describing the nuts and bolts of their use.

### How does coverage of the strategies differ by type of textbook?

The texts that we examined can be sorted into three basic types: (1) texts focused on educational psychology that cover a range of topics but have significant sections on instruction, (2) texts only addressing instruction and doing so in a way that is applicable to any subject, and (3) texts only addressing instruction in the context of teaching a single subject.

The different types of texts tend to emphasize different instructional strategies, as shown in Figure D2. The strategy of **distributing practice** is almost three times more likely to be taught in educational psychology texts than in other types of texts, while general methods texts are twice as likely to teach **posing probing questions** as educational psychology or subject-specific methods texts.

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1   Data related to textbooks in this appendix, and in other parts of this report, were weighted to take into account the number of programs in the sample in which each textbook was assigned.

In addition, educational psychology texts tend to cover the largest number of strategies, an average of 1.22 strategies, followed by an average of 0.88 strategies for general methods texts and 0.67 strategies for subject-specific methods texts.

Figure D2. Coverage of fundamental instructional strategies, by type of textbook (n = 48)
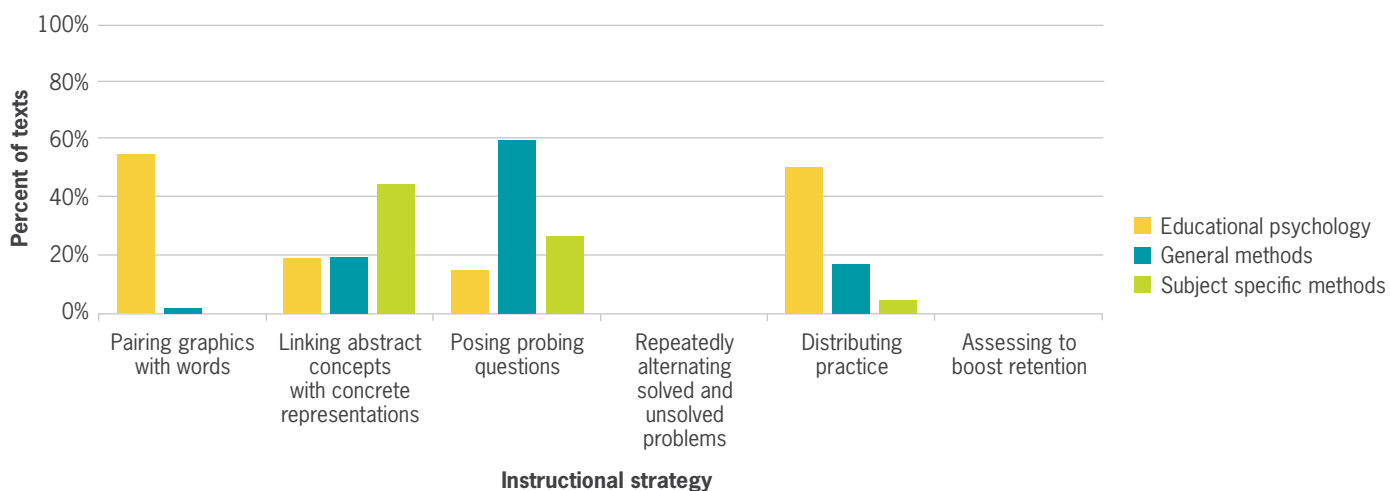
Different types of courses assign textbooks that cover different strategies.

As figure D2 points out, each strategy is likely to appear in textbook readings in at most one type of course. In other words, it is entirely possible that a teacher candidate will read about **distributing practice** and **pairing graphics with words** in an educational psychology class, **posing probing questions** in a general methods class, and (for secondary candidates only) **linking abstract concepts with concrete representations** in a subject-specific methods class, *but those topics will not be reinforced in textbooks for other courses.*[2] While our analysis gives credit to programs for teaching a strategy even if it is included in only a single class, the fundamental instructional strategies are so important that they should be practiced and reinforced repeatedly throughout coursework and student teaching.

The fact that different types of texts tend to teach different strategies, and the influence that texts have on the content of the courses in which they are assigned, reduce the likelihood that teacher candidates will have sufficient opportunities to learn about and practice any given strategy — much less all of them — throughout their preparation.

What do texts say about the cognitive processes underlying learning?

The fundamental instructional strategies are not cookbook formulas; instead, they are lesson-design approaches that can used to teach myriad topics across all grade levels and subjects. Understanding basic principles of how people learn will help teachers to make better choices as they incorporate the strategies into their lessons. To provide a snapshot of what texts teach about how the brain works, we tracked coverage of two topics related to how people learn — the information-processing model and learning styles. The first is science, the second is pseudo-science.

As Figure D3 shows, the average text is more likely to encourage teacher candidates to adapt their instruction to students' "learning styles" (auditory, visual, kinetic, etc.) — an idea which has no support in research — than to explain the information-processing model, which explicates learning processes.

2   Elementary textbooks did not meet our standard for accurate presentation of strategies because they do not convey that the strategies are effective in all subject areas.

Figure D3. Information-processing model or learning styles?
What's discussed when texts address cognitive processes?
(n = 48)
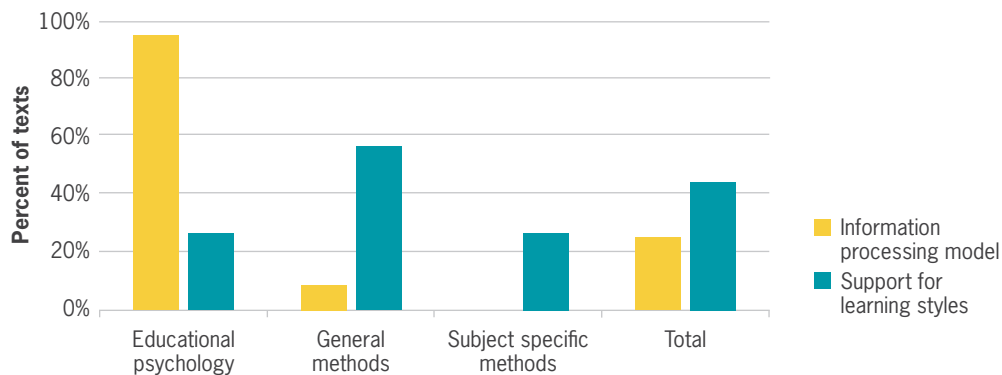
Texts are more likely to teach pseudoscience than science when explaining how people learn.

Do newer editions of texts contain more information about the fundamental instructional strategies?

The fundamental instructional strategies identified by the IES rest on research dating back, in some cases, for more than a hundred years. The majority of the research cited in *Organizing Instruction and Study to Improve Student Learning* dates from 2000 and before, early enough that the information gained from this research, and the work that proceeded it, should have been prominently featured in our original sample of textbooks, which were published from 2001-2011. However, to understand whether authors have incorporated more information about the six fundamental instructional strategies into more recent editions of their work, we examined the newest versions of six of the most commonly used texts in our sample, as well as any accompanying online videos and exercises that appeared relevant.

We found that three textbooks made minor changes in their presentation of one of the fundamental strategies, although the information still was not sufficient to deem the strategy "covered." Two of the three texts added less than a page of new content relevant to the strategies. Two texts made no significant changes related to the strategies. The last text, giving the findings of a single study as support for the change, significantly downgraded its former endorsement in previous editions of the strategy of **pairing graphics with words**.

The videos and other media did not add any information about the strategies that were not already available in the text, and questions and exercises accompanying the videos did not directly address the fundamental strategies even when it would have been easy to do so. For example, **distributing practice** was not addressed in the questions for viewers accompanying a video demonstrating the use of various types of practice within a lesson.

Figure D4. Changes in recent editions of texts in our sample

Three texts slightly improved their coverage of one of the strategies:

Comparing the 2nd ed. of Dean et al.'s *Classroom instruction that works* (2012) with the 1st ed. (2001) by Marzano *et al.*

Fundamental Instructional Strategy	Discussion in 2001 edition	Change in discussion in 2012 edition?	Reader's take-away on the importance of use?
Pairing graphics with words	Not mentioned	↔	↔
Linking abstract and concrete representations	Not mentioned	↔	↔
Posing probing questions	Covered	↔	↔
Repeatedly alternating solved and unsolved problems	Not mentioned	↔	↔
Distributing practice	Covered	↔	↔
Assessing to boost retention	Not mentioned	↑ *	↑ **

Comparing the 5th ed. of Guillaume's *K-12 Classroom Teaching: A Primer for New Professionals* (2015) with the 3rd ed. (2008)

Fundamental Instructional Strategy	Discussion in 2008 edition	Change in discussion in 2016 edition?	Reader's take-away on the importance of use?
Pairing graphics with words	Covered	↔	↔
Linking abstract and concrete representations	Mentioned	↔	↔
Posing probing questions	Not mentioned	↑ *	↑ **
Repeatedly alternating solved and unsolved problems	Not mentioned	↔	↔
Distributing practice	Not mentioned	↔	↔
Assessing to boost retention	Not mentioned	↔	↔

Comparing the 11th ed. of Slavin's *Educational Psychology: Theory and Practice* (2015) with the 9th ed. (2009)

Fundamental Instructional Strategy	Discussion in 2009 edition	Change in discussion in 2015 edition?	Reader's take-away on the importance of use?
Pairing graphics with words	Covered	↔	↔
Linking abstract and concrete representations	Mentioned	↔	↔
Posing probing questions	Not mentioned	↔	↔
Repeatedly alternating solved and unsolved problems	Not mentioned	↔	↔
Distributing practice	Covered	↔	↔
Assessing to boost retention	Not mentioned	↑ *	↑ **

* Discussion is more accurate, but does not constitute coverage of the strategy.
** While there is discussion of the strategy, it is still minor.

Two texts made no significant changes:

Comparing the 10th ed. of Kellough and Carjuzaa's *Teaching in the Middle and Secondary Schools* (2013) with the 9th ed. (2008)

Fundamental Instructional Strategy	Discussion in 2008 edition	Change in discussion in 2013 edition?	Reader's take-away on the importance of use?
Pairing graphics with words	Mentioned	↔	↔
Linking abstract and concrete representations	Not mentioned	↔	↔
Posing probing questions	Covered	↔	↔
Repeatedly alternating solved and unsolved problems	Not mentioned	↔	↔
Distributing practice	Covered	↔	↔
Assessing to boost retention	Mentioned	↔	↔

Comparing the 5th ed. of Santrock's *Educational Psychology* (2011) with the 4th ed. (2009)

Fundamental Instructional Strategy	Discussion in 2009 edition	Change in discussion in 2011 edition?	Reader's take-away on the importance of use?
Pairing graphics with words	Not mentioned	↔	↔
Linking abstract and concrete representations	Covered	↔	↔
Posing probing questions	Mentioned	↔	↔
Repeatedly alternating solved and unsolved problems	Not mentioned	↔	↔
Distributing practice	Mentioned	↔	↔
Assessing to boost retention	Not mentioned	↔	↔

One text made changes for the worse:

Comparing the 13th ed. of Woolfolk's *Educational Psychology* (2016) with the 11th ed. (2010)

Fundamental Instructional Strategy	Discussion in 2010 edition	Change in discussion in 2016 edition?	Reader's take-away on the importance of use?
Pairing graphics with words	Covered	↓	↓
Linking abstract and concrete representations	Not mentioned	↔	↔
Posing probing questions	Mentioned	↔	↔
Repeatedly alternating solved and unsolved problems	Not mentioned	↔	↔
Distributing practice	Not mentioned	↔	↔
Assessing to boost retention	Mentioned	↔	↔