Suggestions for Using *Common Mistakes in Teaching Elementary Math* with Study Groups

While readers may find this book a perfect resource guide and use it individually as they progress through the school year, it may serve as a book for study groups equally well. If you are a principal or instructional coach acting as facilitator of such a group consisting of teachers in your building, you may find the following steps easy to implement and yet highly effective. Such study sessions will have a direct, positive impact on your faculty’s daily teaching of some fundamental math content, which, in turn, will lead to better student performance.

Because all sections in this book are structurally similar—namely, each section begins with Jane saying something problematic, followed by analysis of what she said and then advice on how to avoid making this mistake—a group study session may be conducted by following these steps:

1. Decide on a topic discussed in the book that fits the grade level of and is of particular interest to your group members as a whole.
2. Show on a smartboard Jane’s way of presenting that specific topic. Ask if any of your group members teach the same way as Jane does and, if so, why it is problematic to teach that way.
3. Set aside about 20 or 30 minutes for reading the analysis part of the selected section.
4. Start a roundtable discussion on the ill effects of presenting the content in Jane’s way. Have your group members reflect on how to avoid making such mistakes in their own teaching.
5. Resume reading, this time the advice part of the selected section. Ask your group members if they have come up with, while reflecting, the same strategy as suggested in the book or share their strategies if they have come up with different ones.

You may want to ask your group members to not read the selected section ahead of time. A discussion with varied opinions on whether Jane’s way of teaching is problematic and why or why not it is so can be lively and thus its effect will be maximal. Such a desired effect may not be as easy to achieve when all members already have consensus on the issue being discussed.

Here are two examples.

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Example 1

The following paragraph is from the beginning of “Don’t Ever Say ‘Subtract the Smaller Number from the Larger One’” in Chapter 4 (p. 27):

This is what Jane did in her classroom one day. She presented a 1-digit subtraction problem, 9 − 4, to her children and said, “Let’s solve this problem. Now subtract the smaller number from the larger number. Tell me your answer.”

Project the paragraph quoted on a smartboard. Lead the group discussion by asking these questions:

1. Is there anything problematic with what Jane said? Why or why not?
2. (If different opinions on this question have been voiced) Can you convince those holding the opposite idea from yours of why you think it’s (or not) problematic to say that?
3. Can you say something similar in division, as “For 12 ÷ 6, divide the larger number by the smaller number”?

After some discussion on these questions, possibly with different opinions expressed, devote about 30 minutes to reading the analysis part of the chosen section (pp. 27–28).

Before assigning the last part of the advice section, you may also want to conduct some discussion first. Pose such questions as:

◆ Now that we know what Jane said is problematic, can you suggest a proper way of explaining how to solve this problem?
◆ How can you avoid this way of teaching in the future?

Example 2

The following problem is from the beginning of “Aunt Sally Is Evil—The Order of Operations” in Chapter 7 (p. 54):

7 − 2 + 3 = ?

Here’s a suggested sequence of steps for conducting the group study on this topic:
1. Pass a pencil and a small piece of paper to each group member.
2. Project the example problem \((7 - 2 + 3 = ?)\) on the smartboard and ask your group members to solve it without using a calculator, searching on the Internet, or consulting with each other. Ask them to write the answer on the paper just distributed. Half a minute is sufficient.
3. Collect all the pieces of paper. If there are six, seven, or more members in your study group, it is likely that while most members will arrive at the correct answer, a few may get it wrong.
4. Ask those who got the wrong answer to justify what they got, and this will invariably lead to the mention of “PEMDAS” or “Please Excuse My Dear Aunt Sally.”
5. Start book reading. Devote about 30 minutes to reading, individually, the analysis part of this section (pp. 54–56, from “But the right answer is not 2” till “you got the picture”).
6. As added proof, project the screen of a calculator showing the execution of \(7 - 2 + 3 = \). Most calculators designed for students, such as TI-15 or higher models, are good to use, but avoid using any primitive-type ones, usually the size of a sticky note or even smaller (such calculators may execute operations in a from-left-to-right manner because they do not have sufficient memory).
7. Ask if the mnemonic “PEMDAS” is the primary reason for arriving at the wrong answer for \(7 - 2 + 3 = \).
8. Go back to the reading of the book, this time focusing on the last section, on how to avoid making this mistake (p. 56).
9. Suggest these topics for discussion:
   - Why did “PEMDAS” lead some people to the wrong answer?
   - What effect does “PEMDAS” have on children if they are told this is the order of operations?
   - What’s the key difference between “PEMDAS” and the actual rules concerning the order of operations, presented on page 56?
   - Can you solve the problems presented in the Math in Action boxes on pages 56–57 using these rules?
   - What lessons can you draw with regard to creating your own mnemonics on some mathematical rules?

All the other sections in this book can be handled in a similar manner. The idea is, discourage your group members from reading the selected section ahead of time such that the discussion will be more effective than when there is consensus. For a few sections, though, a little preparation on topics for discussion other than what’s suggested in this appendix may be necessary.