

NEWSLETTER

Issue 49 · 2026 · Math Success with DMTI



From Drawing the Bar Model to Reasoning With It

DMT Insight 49 · Why Students Struggle with Word Problems and How Bar Models Help

In today's edition, we explore:

- **The Classroom Reality:** Why students who compute fluently still stall on word problems
- **The Structure:** How one bar model shows part-whole, comparison, equal groups, and an unknown
- **Classroom Tips:** Three moves that turn the drawing into reasoning

Educators!

A student reads, “Maria has 47 stickers. Her brother has 25. How many more does Maria have?” She knows how to subtract. She does not know whether to. Nothing is on her paper but the two numbers. A second student draws a bar model with two equal parts labeled 47 and 25 and asks whether it is correct. The drawing is a step she has completed rather than something she is thinking with.

A bar model represents a quantity as a length, so a longer bar model means a larger quantity. That one convention lets students see which quantity is the total, which are the parts, and by how much one exceeds another, before anyone chooses an operation. When the bar model is taught as something to produce, students collect a way to draw it and no way to use it; when it is taught as something to reason with, the drawing shows which operation fits.

Classroom Tips

1. **Draw before deciding.** Ask what the bar model looks like before asking which operation to use—the structure of the bar model shows which operation fits.
2. **Let the proportions carry the relationship.** A bar model for 47 should be visibly longer than one for 25, with no ruler or measuring. Equal-sized bars for unequal quantities hide the relationship the model exists to show.
3. **Teach the family of structures together.** Part-whole, comparison, equal groups, and algebraic bars belong side by side, so that students see one tool taking different shapes rather than four separate procedures.

A Teacher's Perspective

I used to check whether the bar model was drawn correctly. Now I ask why one bar model is longer, and I find out in

about 10 seconds whether the student is reasoning or copying.

What Does the Research Say?

Schema-based instruction, which teaches students to recognize the underlying structure of a problem, produces large gains for elementary students in both problem solving and transfer to unfamiliar problems (Peltier & Vannest, 2017). The drawing matters. Representations that encode the relationships in a problem are associated with success, while pictures of the objects in the story are associated with failure (Hegarty & Kozhevnikov, 1999). Among Primary 5 children in Singapore, the model method provided a way to represent and solve algebraic word problems before they had access to letter-symbolic algebra (Ng & Lee, 2009).

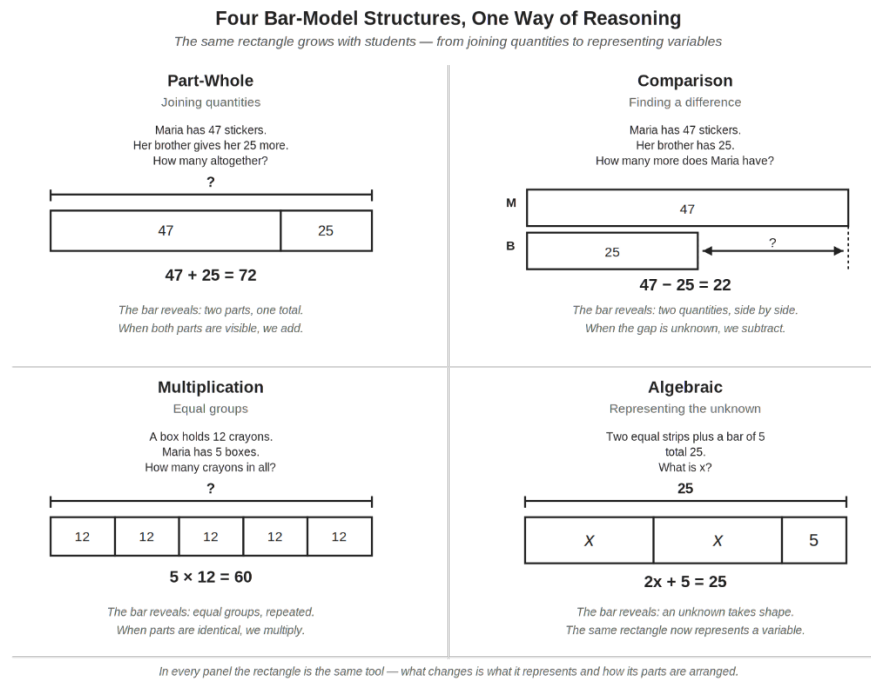


Figure 1. Four bar-model structures: part-whole, comparison, multiplication, and algebraic. The rectangle is the same tool across all panels, and only its contents and arrangement change.

Keep developing mathematical thinkers.

More Information

For the full research overview and the accompanying video, visit the DMT Insights page at mathsuccess.io/dmtinsights. You will find the Insight, the Companion, classroom resources, and related materials there.

Have a classroom story, tip, or question to share? We feature educator voices and ideas. Email us at contact@dmtinstitute.com to contribute a teaching tip or share your experience.

For ongoing support and practical updates, join the DMTI community on social media, or visit mathsuccess.io and dmtinstitute.com.



mathsuccess.io



facebook.com/dmtinstitute



mathsuccess.dmtinstitute.com/



linkedin.com/company/dmt-institute



youtube.com/@dmtinstitute



instagram.com/dmtinstitute/



x.com/dmtinstitute



Tiktok.com/@math.success



@DMTInstitute.bsky.social