

NEWSLETTER

Issue 5 · 2024 · Math Success with DMTI



WHEN A GOOD IDEA IS USED IN THE WRONG PLACE

What misconceptions tell us about student thinking.

In today's edition, we explore:

- Why a misconception survives being corrected
- How to tell a systematic error from a careless slip
- Three classroom moves that turn a wrong answer into teaching
- What the research says

Educators!

Not every wrong answer is a misconception. Sometimes a student makes a mistake, and those are usually easier to address. A misconception is different. The student uses an idea that makes mathematical sense, but applies it in a situation where it no longer applies. A student says 0.45 is greater than 0.7 because 45 is greater than 7. That reasoning is not random. It works for whole numbers. The misconception comes from carrying the idea into decimals without attending to the unit.

That is why correcting the answer is rarely enough. We have to address the conception that produced it.

Classroom Tips

1. **Ask what makes the answer reasonable.** Before correcting it, ask: "Tell me how you were thinking." A misconception usually has logic underneath it.
2. **Find where the idea works.** If a student says multiplication makes numbers larger, do not begin by saying that is wrong. Find examples where the idea does work, then compare them with multiplication by one-half.
3. **Change the conception, not only the answer.** Use a model or contrasting example that makes the limitation visible. Then give a new problem to see whether the student's reasoning, not just the answer, has changed.

A Teacher's Perspective

"Encouraging my students to see mistakes as learning tools has transformed the way they approach math. They're now more engaged, confident, and willing to take risks with their problem-solving. This has led to deeper understanding and better performance in the long run."

— Missy R., 2nd Grade Teacher

Missy is describing what changes when errors stop being something to hide: students start offering the thinking you need to see.

What Does the Research Say?

Mistakes give a teacher evidence of how a student is reasoning, which makes them diagnostic rather than simply wrong, and instruction built around that reasoning leads to deeper understanding than correcting the answer does (Borasi, 1987, 1994). A task that surfaces a student's existing idea before formal instruction gives both teacher and student something specific to examine; research on productive failure offers one example (Kapur, 2014). Alvidrez (2019) adds that how a teacher positions a wrong answer determines whether students will show their thinking at all.

Keep developing mathematical thinkers.

More Information

This is a quick overview. To download the full research overview on harnessing misconceptions and watch the short video, go to Research Overviews at dmtinstitute.com/research.

Do you want to share ideas or contribute a teaching tip or story for the next newsletter? Please email us at mathsuccess@dmtinstitute.com.

For more information on professional development and curricular resources, visit mathsuccess.io.



 | mathsuccess.io |  | mathsuccess.dmtinstitute.com

CONNECT WITH DMTI

 [@dmtinstitute](https://www.facebook.com/dmtinstitute)

 [DMT Institute](https://www.linkedin.com/company/dmt-institute)

 [@dmtinstitute](https://www.youtube.com/dmtinstitute)

 [@dmtinstitute](https://www.instagram.com/dmtinstitute)

 [@dmtinstitute](https://twitter.com/dmtinstitute)

 [@math.success](https://www.tiktok.com/@math.success)

 [@DMTInstitute.bsky.social](https://bsky.app/profile/DMTInstitute.bsky.social)