Have We Been Sold a Story in Math?

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Everyone listened to the podcast, *Sold a Story.* The podcast presented a narrative on how the education community had been sold on teaching kids how to read, based on three-cueing, instead of phonics. But, honestly, I think we have been sold a bigger story in Math instruction. Despite the fact that explicit and systematic reading instruction has become the norm, the same ideas which propelled “balanced literacy” are alive and well in the Math education community.

The majority of authors, influencers, and coaches have been selling the same story at Math PD events, for over a decade. Ironically, they also view this story as counter culture, despite being the mainstream. We’re told that there is too much skill and drill in Math, that there is too much procedural instruction, that kids need to build problem solving skills and that teachers should be fostering creativity in Math. If you’re really unlucky, you will be told that we should stop teaching Math formulas all together. I once even attended a PD event that touted the benefits of numberless Math instruction. You’re often told that these ideas are based on evidence or science. Here’s the thing, there is no meaningful scientific research to support any of this. These claims are not based on meta-analyses or RCTs, they are based on opinion papers, books, and blogs.

Let’s break these myths down into a few specific claims and explore the research.

Myth 1: Conceptual Math instruction drives Math achievement

Myth 2: Students must develop conceptual understanding first

Myth 3: Skill and drill kills motivation

Myth 4: Explicit Math instruction is bad

Pedagogy Non Grata

Myth 1:

The most comprehensive literature review of this topic was conducted by Durkin, Rittle-Johnson, and Star (2011). Their paper found that Math achievement was highest when both procedural and conceptual Math were taught at the same time. Indeed, teaching both iteratively had a positive effect size of .54.

Myth 2:

The mainstream Math education community often operates on the assumption that students face a deep conceptual deficit that must be cured before any procedural instruction can begin. However, empirical data shows that these two domains are not separate, sequential steps. In a seminal study on the topic, Schneider, Rittle-Johnson, and Star (2011) used latent factor modeling to analyze how conceptual and procedural knowledge interact. Rather than finding that one precedes or dominates the other, they discovered a stable, bi-directional relationship. This means that improvements in procedural skill directly drive gains in conceptual understanding, and vice versa. The benefits flow both ways, regardless of a student's prior knowledge level. Treating procedural instruction as an enemy to conceptual depth ignores the reality of how the human brain processes mathematics, as an iterative loop where skills and concepts strengthen one another simultaneously.

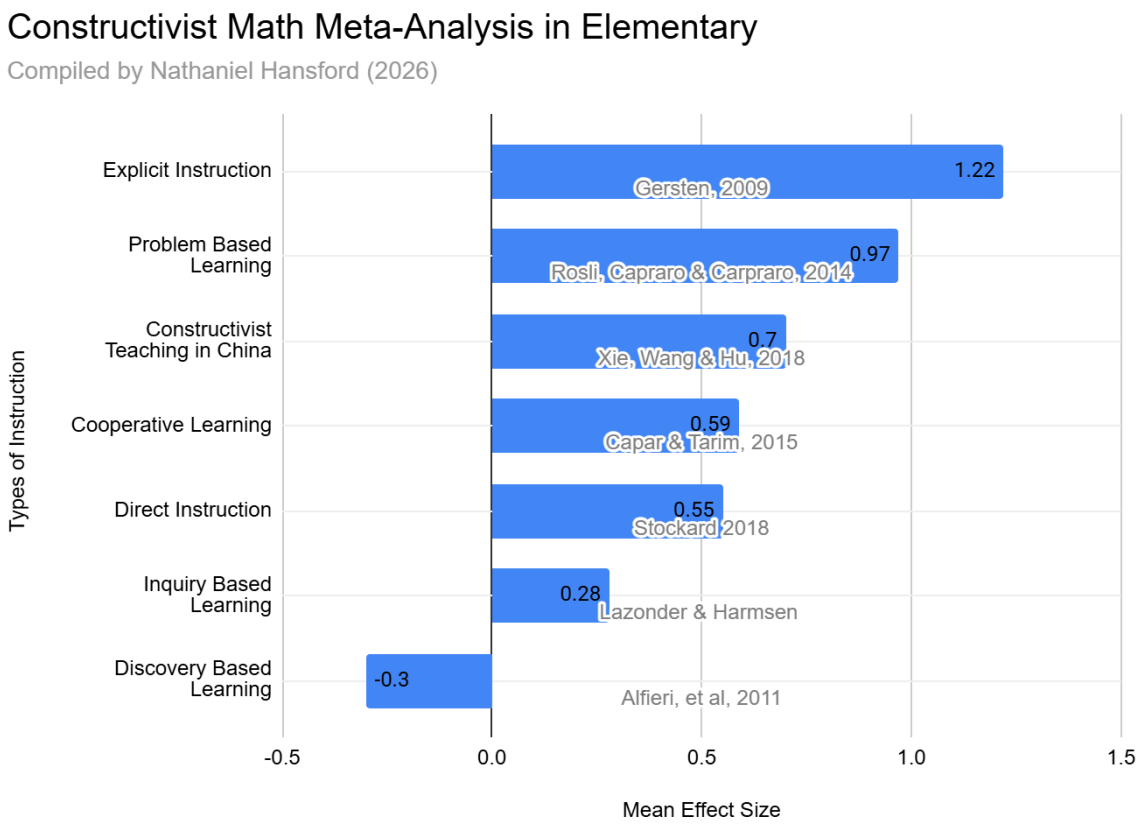
Myth 3:

While constructivists commonly claim that skill and drill or Math fluency instruction kills motivation, a study by Deen, Van den Beemt, and Schouten (2015) showed that intrinsic motivation actually increased over time for skill-and-drill activities, whereas it decreased for problem-based learning. Moreover, (Douglas, et al., 2026) found large effect sizes for Math fluency instruction (d = .76).

Myth 4:

While there are no meta-analyses or large scale RCTs showing discovery based Math is a

superior approach for Math instruction, there are multiple meta-analyses showing that explicit instruction can support Math achievement (Watkins, 1997; Gersten, et al., 2009; Stockard, et al, 2019). Moreover, meta-analyses on inquiry based teaching have shown higher effect sizes for approaches that use more guidance (Lazonder & Harmsen, 2018; Xie, Wang & Hu, 2018).



The parallels between the reading wars and the current state of mathematics instruction have been strangely ignored. For decades, the literacy establishment ignored the empirical science of reading in favor of a romanticized, student-led guessing game, until the voice of advocate voices became impossible to ignore. Today, the Math education community is trapped in its own version of that very same loop. We are being sold a story that treats formulas as enemies, fluency as a threat to creativity, and explicit guidance as a

relic of the past. But as the data clearly demonstrates, this story is a myth. There is little to no research to support these ideas and decades of research to refute it.

True mathematical proficiency is not a choice between understanding a concept and mastering a procedure; it is an iterative loop where the two forces constantly build upon and strengthen one another. If we want to genuinely improve mathematics achievement, we have to stop chasing romanticized ideologies and ground our professional development in what actually works: systematic, explicit, and evidence-backed instruction. It is time for the Math community to stop selling a story and take a hard look at the evidence.

Want a systematic and explicit Math program? **Check out SAGE Online Academy**, the entire base Math program is now **FREE**. LINK

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