

Best Practices for Conceptual Math

Summary: There are numerous strategies that have been proposed over the years for building students' conceptual understanding of math. In an article for *Better: Evidence-Based Education*, professors James Hiebert and Douglas Grouws synthesize current research on best practices for helping students gain a deep and lasting understanding of math.

Practical Applications

The authors note that, overall, contemporary research has found that strategies which build conceptual understanding and strategies which build basic math skill and speed are not as separate as previously thought; in fact, these best practices help both aspects of math ability. The two overarching best practices are:

- **Work and Talk: “Teachers and students should intentionally and explicitly talk about, and work on, important mathematical relationships.”** Specifically, time should be spent:
 - “Examining relationships between facts, procedures and ideas within a lesson and across lessons.” In other words, how do problems connect, how are they different, and how might they be different versions of the same idea?
 - Digging into why procedures work the way they do, and why they can't work in other ways. For instance, “why do we usually add from right to left”?
 - Solving problems using different procedures and comparing/contrasting results
- **Work and Wrestle: “Teachers should provide opportunities for students to wrestle with key mathematical ideas...”** Specifically, time should be spent:
 - Posing problems to students that are just past what they can easily handle, specifically problems that take skills they have mastered and add a twist.
 - Having students present their solutions to difficult problems and letting the class discuss the validity of the solution and offer alternative methods.

The authors also offer these best practices for building basic math skill and speed:

- Have classes that are “well organized, fast paced and focused on mathematics [as opposed to passing in/out papers, discipline, etc.]”
- Teachers should model new information clearly and concisely
- Once the students have been set up for success, “significant time should be allotted for error-free practice”

Conclusion and Citation

While strategies such as class discussion are well-known, the authors' summary of current research shows that the type of questions posed to students, the type of math problems they are asked to wrestle with and the role of students in the lesson are all key aspects to how well students' grasp math conceptually. The more thoughtful teachers are in designing their math lessons, the deeper the students' understanding will go.

Grouws, D. & Hiebert, J. “Which Instructional Strategies are Most Effective for Math?” *Better: Evidence-Based Education* (Fall 2009), pp. 10-11. <http://bit.ly/qyE3P4>