Effective Ways to Teach Decimals

Summary: Many students get confused when asked to compare or order decimals. In an article for *Teaching Children Mathematics*, two professors discuss effective strategies for helping students draw representations of decimals that will advance their deep understanding of the concepts involved.

Practical Applications

The authors focus specifically on the use of decimal grids, which are a commonly used teaching tool around representing decimals visually. The authors suggest that unless used properly, grids can foster confusion especially when a more complex decimal emerges, such as 0.808. They suggest that students should be taught to use the grids in a way that reinforces the relationship between the decimal place values. For example:

- Have students write the decimal in the form of fractional addition – so, 0.808 become 8/10 + 8/1000. When using the grids to show these amounts, students will understand the additive relationship (and be better able to compare it to, say, 0.8, which is just 8/10).
- Show students the holistic relationship between the place values – so, in a drawing of ten ones, you might circle a single unit and then draw an arrow to ten tenths, then circle a single unit and draw an arrow to ten hundredths, etc. [watch this edition's video for a visual example of this]. This, again, helps students see that decimal place values do not exist in isolated grids, but rather show continued subdivision of the same whole.

Other best practices the authors note are:

- Don't rely on procedures or tricks to help students with comparison/ordering of decimals – adding zeroes so that each number has the same number of place values, or having students use exponents to eliminate the decimals altogether, for instance, can detract from students' understanding of how decimals actually function.
- Only give students grids for one or two of the place values you're asking them to represent – "by making the grids available for each of the different decimal places (for example, hundredths to represent 0.43 and thousandths to represent 0.432, connections among the grids are not needed, and students may not development them."
- Use follow-up activities such as subdivisions with real object (packages into boxes into crates, e.g.) to continue building conceptual understanding.

Conclusion and Citation

Decimals are a difficult concept to represent and understand. Teachers must understand what makes it so tough on their students, and utilize teaching tools like decimal grids in a way that forces students to engage deeply with the ideas rather than rely on tricks and crutches.

D'Ambrosio, B. & Katsberg, S. "Building Understanding of Decimal Fractions." *Teaching Children Mathematics* (May 2012), pp. 558-564. http://bit.ly/KOmOwJ (subscription only).