Pre-teaching

Why Is This Strategy Useful?

One instructional factor that affects a child's mathematical performance is the utilization of prior knowledge. Preteaching is the teaching of skills prior to the activity that utilizes them. Research shows that when the component skills of mathematical procedures are pretaught, children learn to solve math problems much faster than when the components and the procedure were learned at the same time. Preteaching components of a skill is efficient because integrating recently mastered components is easier than simultaneously mastering the components and integrating them to form a more complex skill. This strategy is appropriate for elementary school students of all abilities. Often, pre-teaching is a strategy used with English language learners who may benefit from early exposure to key skills and vocabulary.

Description of Strategy

Preteaching usually includes teaching key component skills prior to working with the lesson or unit. Preteaching works best when paired with direct instruction. For instance, consider the way the count-by strategy can be taught with examples that are written on a chalkboard. The instructor preteaches this skill by writing a problem, such as 2 x 3, on the board. Then, the instructor may say, "We count by two three times, so I hold up three fingers. Now I count by two for each finger." The experimenter then counts each extended finger: "Two, four, six. When I count by two, three times, I end up with six. Your turn. Hold up three fingers. Now count by two each time you touch a finger." The instructor should correct errors by modeling the answer and repeating the instruction. After a student responds without a mistake to all the instructions in the procedure for three different problems, the preteaching of the component skill is completed. The pretaught count-by strategy can then be applied to arithmetic problems that the student will encounter.

Research Evidence

At least one randomized controlled design study supports the use of this strategy, while a second study found that pre-teaching resulted in achievement gains for low-achieving math students, but there were no differences between the effects of pre-teaching and re-teaching. In one study, fifteen below-average graders judged by the teacher as able to benefit from the multiplication instruction were included in the study. These students were randomly assigned to either the preteaching group or the concurrent instruction group. In the intervention group, students were separately pretaught skills prior to learning to work with multiplication problems. In the concurrent instruction group, all skill components were learnt simultaneously. Results indicated that children in the preteaching group acquired the component skills in significantly less time than children in the concurrent instruction group. The second study included 24 low-achieving third grade students who were randomly assigned to pre-teaching or re-teaching treatment groups. Students who received pre-teaching were exposed to math curriculum one to three days prior to subsequent presentation of the material in the classroom by the classroom teacher. Both groups demonstrated achievement gains.

Sample Studies Supporting this Strategy

Carnine, D. (1980) Preteaching versus concurrent teaching of the component skills of a multiplication algorithm. *Journal of Research in Mathematics Education, 11*(5), 375-378.

The purpose of the present study was to determine whether the time at which component skills are taught is a significant instructional variable. The time at which component skills are taught is studied to see whether it is a significant instructional variable. This research involved the instruction of a multiplication algorithm to 15 below-average first graders. These students were randomly assigned to either the preteaching group or the concurrent group. Results indicated that children in the preteaching group acquired the component skills in significantly less time than children in the concurrent group.

Lalley, J.P. & Miller, R.H. (2006) Effects of pre-teaching and re-teaching on math achievement and academic self-concept of students with low achievement in math. *Education, 126*(4), 747-755.

The purpose of the present study was to examine and compare the effectiveness of pre-teaching and re-teaching on math achievement and academic self-concept of third grade students identified as low achievers. A pretest-posttest experimental design was used to conduct the study. Results indicated that both pre-teaching and re-teaching resulted in significant increases Math Concepts, Math Problems, and Math Computation. Although both were found to produce significant gains in overall math achievement, comparative analyses indicated no differences between the groups. In the area of academic self-concept, a significant within-subjects increase was found for the pre-teaching group only. Despite the significant increase in math related self-concept for the pre-teaching group, no significant between-group differences were found.

Additional Resources

Putting It All Together: Integrating Academic Math Language into Math Teaching. Available at:
http://www.coursecrafters.com/ELL-Outlook/2007/nov_dec/ELLOutlookITIArticle2.htm

Sample Activity

Source: Teaching ESL Elementary Math.
http://www.otal.umd.edu/wiki/methods/index.php?title=Teaching_ESL_Elementary_Math

Pre-teaching math words/sentence structures for ESL students:

Students might have already understood the new math concept but because they lack the support of terminology and sentence structures in English, it is not easy for teachers to determine each student's level.

Pre-teaching the math words/sentence structures can make it easier for students to initiate academic conversations in their groups. For example, the teacher can offer students the sentence pattern like: "Where does the red triangle go? It goes here." Through this process, students can learn about classification as well as colors and shapes. Additionally, teachers can write math words on the board or make posters to let students review and learn anytime they want.