

Research on Teaching

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How Teachers Implement Change

Although most teachers are receptive to suggestions and mandates from parents, other teachers, their principal, and the school hierarchy about what to teach, they implement content changes on their own terms.

IRT researchers surveyed 66 fourth-grade teachers, asking them if, given pressures from various sources, they would add new math topics to their curriculum. The teachers indicated willingness to add new topics under very little pressure. But this does not mean that teachers are certain to comply completely with any suggestion or mandate for changing what they teach.

Researchers found that teachers seem to weigh any suggested or mandated change against other suggestions and mandates as well as their own idea of what is right for their students, implementing only those aspects that seem reasonable and workable. The same program, therefore, implemented by different teachers, may have quite different results.

For example, in one of several studies on teachers' content decisions, two teachers taught fourth grade in a district that had just mandated a Management by Objectives (MBO) system for teaching mathematics. Each complied with the mandate differently.

One teacher used the MBO system "by the book." His students worked individually and at their own pace through the district-mandated objectives in the prescribed order. This teacher followed the system and actively promoted its use because he liked it, not for fear of reprisal for not following a district mandate.

Because of the way he used the MBO system, some of his students whizzed through all the fourth-grade objectives and additional material as well, while other students were not able to get nearly as far.

The other teacher dealt with the mandate by teaching two separate math lessons: individualized work on objectives four times a week and whole-class instruction every day, based on systematically going through a fourth-grade textbook. She would have dropped work on the objectives if she felt they were not helpful.

In her classroom, all the students, many of whom were working below grade level on the objectives, were exposed to normative grade-level content through her additional lessons using whole-class instruction.

None of the seven case-study teachers resisted school policies on what should be taught in elementary school mathematics. Nevertheless, there was substantial leeway for teachers to be compliant and still differ in what they taught. Thus, while a Management by Objectives system, a district-mandated textbook, and testing programs all influenced teachers' content decisions, each by itself provided only a partial explanation of students' opportunities to learn.

For more information about the IRT Content Determinants Project, write to Andrew Porter, 319 Erickson Hall, Michigan State University, East Lansing, MI 48824.

Misconceptions Interfere With Learning

You've probably heard that a child is not an empty vessel to be filled with knowledge, but what does this mean in terms of teaching? It means that what children already know, or think they know, may interfere with what they are taught.

Edward Smith and Charles Anderson of the Institute for Research on Teaching found that misconceptions of fifth-graders interfered with their learning about two science topics. Both before and after studying a unit on light, most of these students believed that we see objects themselves, rather than the light objects reflect. Of the fifth-graders observed studying plants, most believed, even after instruction, that plants get their food from the soil. Apparently, instruction was unable to overcome these misconceptions.

Smith and Anderson suspected that this was because the children's misconceptions were not directly challenged during instruction, and their misconceptions made more sense to them than the scientific explanations.

The two researchers then asked teachers to try teaching a different way, using materials they had developed. In the light and plant units, teachers explicitly contradicted the most common student misconceptions and showed their students why the scientific conceptions made more sense. This time, most of the students learned the scientific conceptions.

For more information write to Edward Smith and Charles Anderson, Institute for Research on Teaching, Michigan State University, East Lansing, MI 48824.

Why Is Peer Tutoring Helpful?

When an older student tutors a younger student having trouble with some academic area, both benefit, especially the tutee. The reason seems to be the friendly give-and-take nature of their relationship, which enables the tutee to take an active role in his or her own learning.

Joan Fogarty and Margaret Wang of the Learning Research and Development Center, University of Pittsburgh, noticed this in an intensive study involving 12 tutors and 18 tutees who are learning math skills or computer literacy.

"The tutor's role is based more on friendship than on a traditional, teacher-like authority," note the researchers. The tutor neither dominates nor directs the sessions. The tutee asks frequent questions, often initiating discussion of a topic, and "seems to feel free to take an active role in the learning process." Much recent research shows that the most productive learning takes place when students are actively engaged in learning.

The tutees in this study learned a lot from their tutors, but the researchers offer a few words of caution. If a tutoring program's goal is to introduce or expand on concepts, tutors will need training in a variety of teaching skills. If such training cannot be provided, tutoring programs should concentrate on skill review and practice. The researchers also caution that, as was the case in their own study, some tutors may be reluctant to work with a child of the other sex.

For more information, see J. L. Fogarty and M. C. Wang, "An Investigation of the Cross-Age Peer Tutoring Process: Some Implications for Instructional Design and Motivation," *Elementary School Journal* 82, 5(1982): 451-469.

Principles of Small-Group Reading Instruction

Based on an experimental study conducted at The University of Texas at Austin, a list of general and specific principles for teaching first-grade reading groups effectively has recently been revised. Following are the general principles:

1. "Reading groups should be organized for efficient, sustained focus on the content to be learned." Not only should reading-group students be taught to focus on the task at hand, but, to prevent time-wasting disruptions, the rest of the class should be occupied with meaningful seatwork they can understand and do on their own.

2. "All students should not be merely attentive, but actively involved in the lesson." Each student should be given

opportunities to read and to ask and respond to questions.

3. "The difficulty level of questions and tasks should be easy enough to enable the teacher to move the lesson along at a brisk pace and the students to experience consistent success." When new tasks are presented, students should be able to answer about 80 percent of the teacher's questions correctly. A 95 percent student success rate is appropriate during reviews.

4. "Students should receive frequent opportunities to read and respond to questions, and should get clear feedback about the correctness of their performance."

5. "Skills should be mastered to over-learning, with new ones gradually phased in while old ones are being mastered."

6. "Although instruction takes place in the group setting for efficiency reasons, the teacher monitors the progress of each individual student and provides whatever specific instruction, feedback, or opportunities to practice that each student requires."

For information on the study that tested the effectiveness of these principles, see L. M. Anderson, C. M. Everson, and J. E. Brophy, "An Experimental Study of Effective Teaching in First-Grade Reading Groups," *Elementary School Journal* 79 (1979): 193-223.

For the recently revised list of principles, send for IRT Occasional Paper No. 58, *Principles of Small-Group Instruction in Elementary Reading*, by the same authors, 1982, \$2. Order it from IRT Publications, Institute for Research on Teaching, Michigan State University, East Lansing, MI 48824.

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—Harold Howe II, *Harvard University*

Managers of Virtue

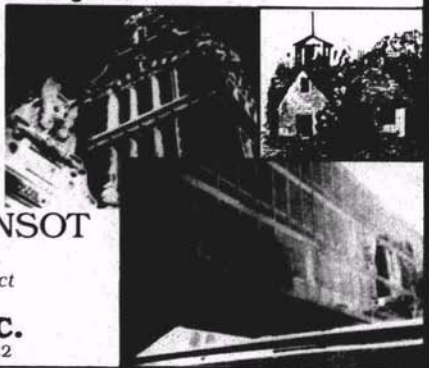
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