

Addressing Parents' Concerns about Mathematics Reform

Although NCTM's *Standards* documents have been around for more than a decade, teachers still frequently encounter resistance when attempting to implement reform-oriented instruction and curriculum materials that are aligned with the Standards. Unfortunately, some of the strongest critics of reform are parents. Most have never experienced the type of mathematics instruction that the Standards recommend. The open-ended, conceptually oriented tasks that students bring home are different from their previous experiences and may be confusing. Parents' own anxiety toward and traditional beliefs about mathematics can further heighten their concern about the mathematics their children are now doing.

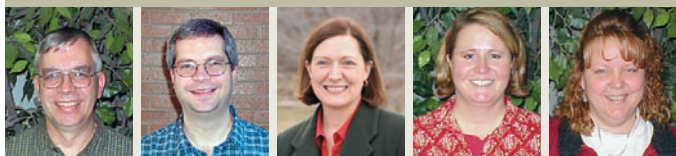
Our experience suggests that teachers can do several things to help ease parents' concerns about Standards-based mathematics instruction and curriculum materials. During the past three years, we have worked with hundreds of parents as we have

assisted in implementing the adoption of reform-oriented mathematics curriculum materials in twenty-six elementary schools and five junior high schools. Two types of settings—evening meetings with groups of parents and informal, one-on-one conversations with parents—have been particularly productive in our efforts to address parents' concerns. This article shares our experiences with both types of settings and describes what we did to make these settings successful for us and for the parents with whom we worked.

Addressing Parents in Groups: Evening Meetings

We knew when we started reforming mathematics instruction that we would have to provide support not only for teachers but for parents as well. We anticipated that parents would not naturally understand the purpose of the new curriculum materials or the assignments that their children were bringing home. We decided that evening meetings at each school would provide a forum for supporting parents that was within the bounds of the resources available to us. Our objectives for these meetings were to introduce the new curriculum, explain the purpose for the changes, and answer parents' questions about the new curriculum. We began holding the meetings about one week after the start of school and completed all the presentations by mid-October. Our format for the evening meetings underwent many changes as we attempted to better meet parents' needs. About halfway through the twenty-six presentations, we developed a format that seemed to yield the best results. This format consisted of a general presentation, a handout on homework, parent visits to classrooms, and a question-and-answer period with district and school representatives.

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General presentation

We began every meeting with a forty-five-minute general presentation on the new curriculum materials and their intended impact on children's learning. The goal of this presentation was to show how the new curriculum could help children develop powerful ways of reasoning and thinking about mathematics. We often began with a brief testimonial by a teacher from that school, who talked about the exciting mathematics that her students had developed during the past few days or weeks. Next, a district leader presented several multidigit addition and subtraction problems and invited parents to do some of the problems and consider a variety of children's solutions for the others. One example of multiple solutions that we used is the six different student solutions to $25 + 37$ on page 85 of *Principles and Standards for School Mathematics* (NCTM 2000; see **fig. 1**). We found that by actually engaging parents in doing mathematics and sharing their solution strategies, parents were better able to appreciate the flexibility and understanding that come from invented solution methods.

We followed parent participation with two video clips. The first clip was produced by the

developers of the curriculum materials and showed examples of the children doing fraction activities. In our first few evening meetings, we discovered that many parents did not notice the children's deep, insightful thinking; they noticed only that the children took a long time to get an answer. We found it necessary to point out what we saw and valued in the video and contrast that with traditional instruction so that parents could value what they were seeing. Our second video clip was much more successful in helping parents understand the benefits of the new curriculum. It showed individual interviews with two children, one from a traditional classroom and one from a classroom using the new curriculum and taught by the third author. Although each student achieved the same high score on the statewide mathematics test, the child using the new curriculum showed much greater understanding in his solutions than did the other child. The contrast in the outcomes of these two students' learning experiences was clearly evident to many parents and evoked criticism of the statewide exams that had not disclosed the differences between these children's understandings.

Handout on homework

During the first few meetings, we encountered a lot of parental concern about the homework from the new curriculum. Parents were unprepared for the open-ended, contextualized problems students were asked to solve, as well as the detailed reasoning and explanations that students were to employ in solving these problems. Parents' difficulties were further exacerbated by the tendency for the problem contexts and methods in the early homework assignments to be an extension of what students had learned the year before. Naturally, because this was our first year using the curriculum, neither parents nor students were prepared adequately for these homework assignments.

To address these issues, we prepared a handout in the form of a bookmark on parental involvement with mathematics homework. The content of the handout was adapted from the Connected Mathematics Project Web site (2002) about communication with parents. The bookmark included four types of questions that parents could ask, depending on at what stage in the problem-solving process the student needed support. The categories include questions to help students think about how to start a problem ("What information seems to be important?"), how to get "unstuck" while in the middle of a problem ("Can you organize the information differently to show important patterns or relationships?"), how to critically analyze the solution ("Is there a way you can check to see if your answer is reasonable?"), and how to extend their thinking ("Is there another way to solve the problem?"). We distributed this handout after the general presentation.

Parent visits to classrooms

After the general presentation, parents were able to go directly to their children's classrooms and visit with the teachers. To help parents better understand the mathematics curriculum, the teachers often prepared display tables with the textbooks, manipulatives, and samples of students' work. This allowed parents the opportunity to actually handle the materials their children were using. Many teachers also provided a brief presentation or activity in which they invited parents to participate in the mathematical games and classroom routines their children engaged in during mathematics instruction. After the activity, the teachers discussed how these activities and routines help children learn mathematics, often sharing students' work to demonstrate their points. The commitment of the teacher, the rich activities, and the discussion of mathematics learn-

ing often helped reassure parents that the new curriculum would be beneficial to their children.

Handling vocal parents through a question-and-answer period

During the first few meetings, we encountered a small but vocal group of parents who opposed the reform curriculum. These parents often asked so many questions during the general presentation that we were unable to offer a coherent overview of the new curriculum. Moreover, the questions and comments from these parents were often inflammatory and emotionally charged. Their questions prevented us from achieving our goal of giving parents adequate information about the curriculum, because they interrupted the flow of the presentation and often stirred up unnecessary negative feelings and emotions.

To address this issue, we decided to accept parent questions only after we had completed our initial forty-five-minute presentation. Furthermore, we attempted to anticipate the common questions that parents had and to address these questions systematically and coherently in the presentation and the handout on homework. We found that most parents were satisfied by the presentation and were eager to either visit the classrooms or go home. We therefore created a ten-minute intermission immediately following the general presentation. We invited parents to go directly to the classrooms or stay for a question-and-answer period. Usually, 90 percent of the parents left immediately after the general presentation. Some parents used the intermission to approach district and school leaders to ask questions. These informal conversations seemed particularly productive in addressing parents' concerns. After all the parents who wanted to visit the classrooms had left, we held our question-and-answer session and stayed as long as there were questions. This left the vocal parents with a much smaller audience and prevented many of the antagonistic feelings that had been unexpectedly generated during the first few meetings.

Addressing Parents Individually: One-on-One Conversations

During our many conversations with parents, we began to see common themes emerge in their questions. They typically asked about the nature of mathematics, the learning of mathematics, and the

implications of the curriculum for the traditional high school mathematics sequence, college entrance examinations, and employment.

Nature of mathematics

Many parents were concerned about their children learning the basic facts and traditional procedures, often because they viewed mathematics as consisting of a set of facts and procedures to be memorized and mastered. Common questions from these parents included the following:

- How does the new curriculum address basic mathematics facts?
- Are the traditional algorithms taught in the new curriculum?
- Why is it important to know more than one way to solve a problem?

Underlying each of these questions is the assumption that knowing and doing mathematics consists of using basic facts and traditional procedures to correctly compute answers to routine problems.

To respond to these questions, we typically began by acknowledging the importance of computation in mathematics. Then we attempted to help the parents understand that computational fluency is also important. By *computational fluency*, we mean that students could (a) demonstrate flexibility in the computational methods they chose, (b) understand and explain their methods, and (c) produce accurate answers efficiently. We tried to illustrate these principles with a problem that is more easily solved with an invented procedure than with a traditional one. For example, $376 - 99$ is much easier to compute by first subtracting 100 from 376, then adding 1 back than by using the traditional borrowing procedure. Similarly, we also tried to point out that a flexible knowledge of basic facts might be more advantageous than rote memorization. For example, if a student forgets what 9×8 is, she might compute 10×8 and then subtract the extra 8. Lastly, we assured parents that children would learn powerful strategies for solving arithmetic problems and that they may even invent the standard algorithms as they searched for more efficient ways to compute. Likewise, students would learn flexible methods for deriving basic facts and most likely would memorize many of the commonly used facts.

Learning mathematics

Many parents were concerned about the types of activities their children were using to learn mathe-

tics. These parents typically encountered only traditional mathematics instruction when they were in school, and therefore they believed that mathematics must be taught and learned this way. Common questions included the following:

- Why change the instruction? It worked for me.
- Why give only two or three problems? Doesn't practice make perfect?
- Won't all the different invented procedures be confusing?
- Why do students have to show how they solved the problem? Why do they spend so much time talking and writing about mathematics?

In response to these questions, we drew on the research base supporting reform-oriented curricula. Research has documented that traditional instruction fails to help students develop computational fluency and understanding (Boaler 1998; Erlwanger 1973; Sowder 1988). In particular, the teaching of traditional procedures often obscures the meanings of numbers and operations. Consequently, students do not learn why traditional procedures work or in what contexts they may be used. This makes it difficult for students to remember the procedures or apply them flexibly to problems that differ only slightly from the pages of exercises they completed for practice. Students' lack of understanding also prevents them from knowing whether their answers are reasonable, leaving them insensitive to answers that are obviously wrong. For example, $14 - 9 = 15$ can result from operating on the ones and tens separately and subtracting the lesser number, 4, from the greater number, 9. Because traditional instruction does little to help students develop understanding, number sense, or computational fluency, it leaves students vulnerable to mathematics anxiety and failure. Hence, developing understanding is an important goal of current reform efforts.

We also point out to parents that much research has investigated the development of children's understandings of number, measurement, and operations. Reform-oriented curricula are based on the findings of this research and are geared toward helping students develop understanding and computational fluency. The instruction is grounded in contexts that are familiar to students and that allow them to build on the knowledge and intuitions they have developed from their experiences outside school. Furthermore, grounding problems in contexts familiar to children makes it possible for them

Figure 1

Six students' solutions to $25 + 37$

25 See I know thirty
 $+37$ + twenty = fifty
 62 seven + five = 12
 fifty + 12 = 62.

Student 1

25 62
 $+37$
 33 40 45 50 55 60 62

Student 2

25
 $+37$
 62
 10 10 10 10 10
 10 10 10 10 10
 15 02

Student 3

25 I added the
 $+37$ 5 and the 7
 62 together that
 is 12 so I
 carried the 1
 and put down
 the 2. 1 2 3 =
 6. I put down
 the 6 so it
 62

Student 4

25 $2+3=5$ and
 $+37$ $5+7=$
 53 12
 50 I had 512 I add
 two to the one
 and made 53

Student 5

25
 $+37$ 5+7 is 12
 125 is 5
 " " " " " " " " " " " "

Student 6

to judge the reasonableness of their answers and solution methods. Students are given fewer problems so that they have time to reason, build and test conjectures, try multiple solution strategies, and make connections between what they are learning and experiencing and what they already know. Because learning with understanding is now more important than speed of computation, students do not need as much practice as in traditional instruction. Furthermore, to help ensure that students are learning with understanding, a significant amount of instructional time focuses on sharing solution methods, both orally and in writing, so that students can organize their thinking through expression, receive helpful feedback, and be exposed to new ideas. This process of allowing students to

work for longer periods of time on context-rich problems and to communicate their solutions enables them to develop many different solution methods they can use efficiently and flexibly.

Implications for future learning and employment

The last category of questions involves parents' concerns about the long-term consequences of the new curriculum. Parents are worried that reform-oriented instruction will not prepare their children adequately for future mathematics courses, college entrance examinations, or real-world uses of mathematics. Parents are particularly concerned that if children take higher-level courses in traditional mathematics, they will not have the requisite

knowledge of traditional procedures and facts that they must have to keep up with their classmates.

To respond to parents' concerns about the long-term implications of using a reform curriculum, we focused on the understanding that students develop and the contextualized nature of their knowledge. Because reform-oriented instruction focuses on computational fluency, students who complete a reform-oriented curriculum are likely to have a better understanding of and more flexibility with the procedures they have developed for computation. Furthermore, the procedures they have learned may also include the traditional procedures. When students have not learned traditional procedures, they have invariably learned other powerful and efficient procedures on which they can draw to achieve the same results. Finally, because much of the mathematics is learned from solving problems situated in real-world contexts, students from reform-oriented courses are much more likely to be able to see how they can apply their knowledge to situations they encounter in their personal lives and employment.

Making These Ideas Work for You

The strategies and ideas in this article are not meant to serve as a template for you to follow closely in your interaction with parents. Instead, we hope that you will view these strategies and ideas as a starting point for developing your own approach to working with parents. Because your situation is undoubtedly different from ours, you will need to tailor your approach to meet the specific needs of your students' parents. An important part of your success will depend on your ability to obtain feedback from parents, other teachers, the principal, and district leaders. This feedback is crucial in helping you continually adjust and change your strategies and approaches to better meet parents' needs. As you address parents' concerns and help them see the benefits of understanding mathematics, we are confident that you, like us, will be able to relieve parents' concerns and help them support implementation of reform-oriented instruction and curriculum materials.

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