

Chapter 4

Curriculum Materials

Highlights of Findings

Although curriculum materials often play the major role in shaping instruction, many teachers reported grave concerns about the programs their districts have adopted and said that they use other programs instead.

At the fourth-grade level, the most commonly cited obstacles to mathematics teaching had to do with curriculum materials. The use of curriculum materials did not appear to be as problematic at the eighth-grade level as at the fourth-grade level, but materials were still an issue. A substantial proportion of survey respondents said that they use programs other than those adopted by their district as their primary curriculum resource, suggesting that caution should be exercised in attributing low student achievement to adopted materials, since these materials may not even be in widespread use. Programs from previous adoptions and supplementary materials are what many teachers use instead of or in addition to the programs from the current adoption. A lack of professional development in the use of the adopted materials may be partly responsible for teachers' preference for other materials.

Teachers' main concerns about curriculum programs had to do with usability, balance, and alignment.

One of the most commonly cited concerns about districts' adopted programs was that they are difficult to use—that they are “unfriendly,” hard to read, disorganized, or require too much photocopying. Another frequently mentioned concern about the adopted materials was that they lack a sufficient balance between computational skills and conceptual thinking. A third commonly cited concern about curriculum materials was that they are not aligned with standards and/or assessments.

Teachers do, however, appreciate the adopted curriculum programs for some purposes and would value *supplementary* use of these programs.

Many teachers believe that their district's adopted curriculum program works well as a supplement but not as a base text. Some teachers already use the adopted programs in this way, but other teachers feel they lack the freedom to do so or have difficulty finding appropriate alternate materials in sufficient quantities.

Background

Like several other states, California adopts instructional materials for the major subject areas, including mathematics, on a statewide basis. (However, whereas other states use such a process for all grades K–12, California’s constitution mandates statewide adoption only for grades 1–8.) In predetermined years on a multi-year cycle for each subject area, the State Board of Education adopts the instructional materials that are deemed suitable for use, based on prespecified evaluation criteria tied to the most recently adopted curriculum framework. In general, the State Board adopts only programs that are designed for use by students and teachers as a principal learning resource for a full-year course of study. The most recent major (“primary”) adoptions for mathematics programs were in 1994 and in 1999.

Until recently, there has been one major pool of state money from which districts could draw for the purchase of K–8 instructional materials: the Instructional Materials Fund (IMF). Districts are required to use at least 70% of their IMF funds (allocated to districts based on average daily attendance) for the purchase of instructional materials that have been adopted by the state. However, districts may spend up to 30% of their IMF funds on materials other than those adopted by the state, provided that these materials meet certain legal compliance criteria. Moreover, districts may petition the State Board of Education for approval to use up to 100% of their IMF allocations on non-adopted materials.

State-level changes over the past three years have significantly affected the nature and process of instructional materials adoption and purchase. In particular, the adoption of new state content standards and standards-aligned frameworks (see next chapter) instigated some changes to materials adoption. For future materials adoptions, adopted materials will be required to “help teachers present the content set forth” in the new standards. In an effort to facilitate the use of standards-aligned materials, the state legislature enacted AB 2519. This bill provided for a series of standards-based materials adoptions, including a special adoption for mathematics and language arts in 1999 and for mathematics in 2001. Unlike the usual adoptions, the 1999 AB 2519 adoption allowed for the adoption of partial or supplementary programs as well as basic full-year programs.

In addition, in 1998 the legislature appropriated \$250 million per year (for four years, beginning in 1998–1999) for the purchase of the newly adopted standards-aligned materials in the four core curriculum areas (reading/language arts, mathematics, history/social science, and science). Districts were permitted to use these funds (also allocated based on average daily attendance), known as the Schiff-Bustamante Funds, for purchase only of the specially adopted standards-aligned materials.

The data collection for this research study took place in 1998–1999, before most of the new changes affecting instructional materials went into effect. Thus the data do not reflect these

changes—in particular, the move toward materials that are aligned with the state standards. Most of the materials that teachers in this study reported using were among those adopted by the State Board in 1994, when the curriculum framework and adoption criteria were substantially different from those currently in place.

Curriculum Programs in Use

For many teachers, the textbook plays the major role in shaping curriculum and instruction.

One of the questions asked of teachers who were interviewed was, “How do you decide what mathematics to teach?” Although the range of responses given was fairly wide, one of the more common responses was along the lines of “I follow the textbook.” Two of these responses were as follows:

[from an eighth-grade teacher] How do I know what to teach? I basically just follow along through the book. That’s how I’m knowing what I should be teaching.

[from a fourth-grade teacher] I follow the book. The district said we have to use it. I occasionally use other texts too.

Clearly, instructional materials have a strong impact on what teachers teach. Of course, even when teachers “use the book” to guide their curriculum planning, they may be selective about the content they choose to emphasize and the exercises they decide to assign. Hence, two teachers “following” the same text may be teaching significantly differently curricula. This difference can be magnified when one or both of the teachers use supplemental materials of their own choosing, as indicated by the speaker of the second remark quoted above.

Moreover, teachers do not always think that the materials they are given to work with are the most effective or the easiest to use, and some of them primarily use materials other than those adopted by their districts. For example, one of the fourth-grade teachers who was interviewed stated, “The old textbook runs curriculum.” Here is a clear case of curriculum driven by a book, but perhaps not the book intended by the current district administration. These issues will be further discussed in the following sections of this chapter.

At the fourth-grade level, the most commonly cited obstacles to mathematics teaching had to do with curriculum materials. The use of curriculum materials did not seem to be as problematic at the eighth-grade level, but materials were still an issue.

When asked on the survey, “What are the biggest obstacles to your mathematics teaching?” nearly half of the fourth-grade respondents (105 out of 234, or 44.9%) mentioned something having to do with curriculum materials. Indeed, no other type of obstacle was cited by nearly as many teachers; the next most commonly discussed obstacle had to do with class size/ability range, cited by about one-quarter (26.5%) of the fourth-grade respondents.¹ (Class size will be discussed in the chapter on structural and student influences on instruction.)

Similarly, in response to the question, “If there are specific state, district, or school policies that have hindered your mathematics teaching, please describe,” the greatest number of fourth-grade responses (57 of 156, or 36.5%) had to do with curriculum materials.² Moreover, several teachers included comments about their curriculum materials in the survey’s final question, “Do you have any additional comments about any topic addressed by this questionnaire or any topic you think should have been included in this questionnaire?” Thus it would seem that, at the fourth-grade level, teachers perceive curriculum materials—and the adoption policies surrounding them—as a strong but often problematic influence on their instruction.

The matter of curriculum materials appeared to be slightly less of an issue at the eighth-grade level than at the fourth-grade level. Whereas over 40% of the fourth-grade teachers mentioned something having to do with curriculum materials as being one of the biggest obstacles to their mathematics teaching, only about 20% of eighth-grade teachers did so. However, curriculum materials still formed the second-largest category of eighth-grade responses to the obstacles question. Moreover, in the hindering policies survey question, curriculum materials constituted the largest category of eighth-grade responses, at 21.7%—not quite as large as the fourth-grade teachers’ 36.5%, but certainly still substantial.

Many teachers do not use the curriculum materials that have been adopted by their district as their primary curriculum resource.

In terms of the specific objections raised, the majority of respondents raised concerns about the nature of the particular mathematics curriculum program/textbook that had been adopted by their district (or, in a few cases, by their school). To place these comments in context, it is important to know what these texts were.

At the fourth-grade level, the most commonly adopted programs³ were *MathLand* (Creative Publications), adopted by three of the eleven survey districts, and *Quest 2000* (Addison

¹ See Figure E2 in Appendix E for a graph of responses to this survey question.

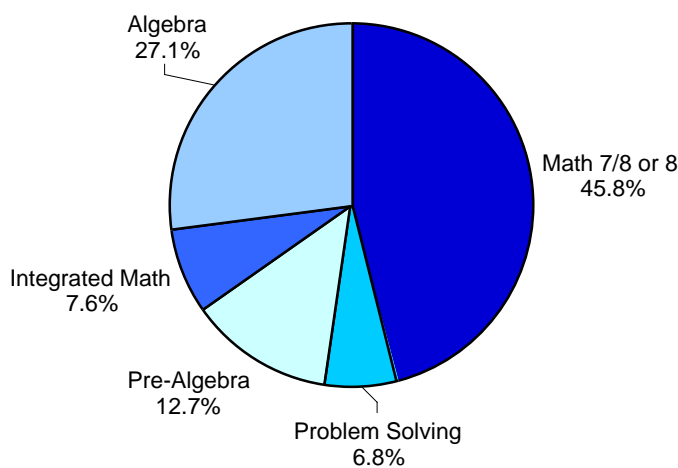
² See Figure E4 in Appendix E for a graph of responses to this survey question.

³ Here we are referring to the districts’ *primary* adoptions. Several districts also adopted supplementary materials.

Wesley), also adopted by three districts. Dale Seymour *Investigations in Number, Data, and Space*, meanwhile, was the adopted text in two of the other districts. Of the remaining three districts, one district had adopted Houghton Mifflin *Mathematics* and another district had adopted *Mathematics Plus* (Harcourt Brace)⁴. In the final district, there was no one single program that was adopted for districtwide use.⁵

The matter of curriculum materials adoption at the eighth-grade level is somewhat more complex, as not all teachers are teaching the same type of mathematics course. Some may be teaching Math 8, while others are teaching algebra, still others are teaching integrated math, and so on. (Figure 4.1 shows the percentage of different types of eighth-grade mathematics courses represented in the survey sample.) Each different course type may have its own adopted text; thus, the range of curriculum materials used and adopted at the eighth-grade level is quite wide—much wider than at the fourth-grade level.

Figure 4.1
Eighth-Grade Courses in Survey Sample
 (n=118)⁶



To simplify matters, the analysis of teachers' use of adopted curriculum materials at the eighth-grade level was limited to the eighth-grade teachers who filled out the questionnaire

⁴ Interviews indicated that this district also allowed the use of *MathLand*.

⁵ A curriculum administrator who was interviewed in this district indicated that the district had adopted three programs: *MathLand*, *Quest 2000*, and Dale Seymour *Investigations*. However, only a few schools in the survey sample from this district appeared to have adopted *MathLand*, and none seemed to have adopted either of the other two programs. According to the survey, the programs most commonly used by teachers in this district were Addison Wesley's *Mathematics*, Silver Burdett Ginn's *Mathematics: Exploring Your World*, and Holt, Rinehart and Winston's *Mathematics Unlimited*.

⁶ The one teacher not included answered the questionnaire for a geometry class.

about Math 8 or Math 7/8 (henceforth referred to as “Math 8”).⁷ As Figure 4.1 shows, such teachers constituted nearly one-half of the survey sample.

There were six survey districts in which five or more Math 8 teachers filled out the questionnaire. In all but one of these six districts, Glencoe’s *Interactive Mathematics* was the adopted curriculum program for Math 8. The Glencoe *Interactive* text was also the program most likely to be mentioned by name in the eighth-grade teachers’ written survey comments and in interview remarks. As a result, the analysis of eighth-grade teachers’ use of and concerns about their curriculum materials focused on this program.

Identifying districts’ adopted programs, however, is only part of the story in identifying what programs teachers use—a district’s adoption of a program does not guarantee its actual use by teachers in the classroom. As detailed in the text and Figure 4.2 below, many teachers indicated on the questionnaire that the text adopted by their district was not the primary text they themselves used.

Survey question #20b asked, “What mathematics textbook, published instructional program, or curriculum resource do you use the most in your class?” Although space was provided for only one program (teachers were asked to fill out the title, publisher, and copyright date if known), many teachers listed two, slightly complicating the analysis of the responses. If a teacher listed two programs, then use of each program was considered to be “in combination.” If a teacher listed only one program, then use of that program was considered “pure.” In reality, however, even teachers who listed only one program may have been using other programs as well, but they might have felt obligated by the phrasing of the question to list only one. This is a limitation of the data on what programs teachers were using.

As Figure 4.2 shows, in the one district where *Mathematics Plus* (Harcourt Brace) was the major adopted program, it appears to have been implemented to a relatively high degree, in terms of the number of teachers reporting its use as their primary program. Of 23 teachers in this district responding to #20b, 17 of them (73.9%) reported that this was their primary program. Three others indicated the use of *MathLand*, also allowed by this district. The fact that the district gave schools a choice about their program may help explain why such a high percentage of teachers in the district were indeed using the adopted programs.

The other districts—and programs—did not fare as well. In the district where Houghton Mifflin *Mathematics* was the adopted text, only 11 out of 19 teachers (57.9%) reported its use as the primary program, and only 9 of them reported using it “pure.”

⁷ Unlike the previous chapter, this discussion does *not* consider courses identified as pre-algebra or problem-solving to be Math 8.

Figure 4.2
Use of the Adopted Program in Selected Survey Districts,
as Reported in Survey Question 20b

| Program | Number of Survey Districts That Adopted the Program | Number of Teachers in Those Districts Responding to #20b | Number (and Valid Percent) of Teachers Reporting “Pure” Use of the Program in #20b | Number (and Valid Percent) of Teachers Reporting Combination Use of the Program in #20b | Total Number (and Valid Percent) of Teachers Reporting Use of the Program in #20b |
|--|---|--|--|---|---|
| Fourth Grade | | | | | |
| <i>MathLand</i> | 3 | 79 (of 85) | 45 (57.0%) | 6 (7.6%) | 51 (64.6%) |
| <i>Quest 2000</i> | 3 | 77 (of 83) | 36 (46.8%) | 10 (13.0%) | 46 (59.7%) |
| <i>Dale Seymour Investigations</i> | 2 | 33 (of 38) | 7 (21.2%) | 3 (9.1%) | 10 (30.3%) |
| <i>Mathematics Plus</i> | 1 | 23 (of 24) | 17 (73.9%) | 0 (0.0%) | 17 (73.9%) |
| <i>Houghton Mifflin Mathematics</i> | 1 | 19 (of 21) | 9 (47.4%) | 2 (10.5%) | 11 (57.9%) |
| Eighth Grade (Math 8) | | | | | |
| <i>Glencoe Interactive Mathematics</i> | 5 (for Math 8) | 30 (of 35 Math 8) | 10 (33.3%) | 0 (0.0%) | 10 (33.3%) |

The numbers are similar for the districts that adopted *MathLand* and *Quest 2000*. In the three districts where *MathLand* was the sole adopted text, a total of 79 teachers answered #20b. 45 of these teachers (57.0%) reported the “pure” use of *MathLand*, and another 6 teachers (7.6%) reported using it in combination. Thus, only about two-thirds of respondents (64.6%) in these three districts reported using *MathLand* as at least one of their primary programs.

In the three *Quest 2000* districts, a total of 77 teachers answered #20b; 36 of them (46.8%) reported *Quest 2000* alone, and another 10 (13.0%) reported using it in combination with another program, for a total of 59.7% using *Quest 2000* as one of their primary programs.

Dale Seymour Investigations was used by an even smaller proportion of teachers. In the two districts where this was the adopted program, 33 teachers answered #20b. Of these 33 teachers, only 7 reported “pure” use of *Dale Seymour*, with 3 others reporting use of the program in combination. Thus, only 10 of 33 teachers (30.3%) in these two districts indicated that the district-adopted program was at least one of their primary programs. In one of the two districts, only 3 of 20 respondents listed the program in their answer to #20b.

A similar picture exists for the one eighth-grade program included in the analysis, *Glencoe’s Interactive Mathematics*. Only 10 of the 30 Math 8 teachers (in the five *Interactive Mathematics* districts) who responded to the question about their most used program listed this text. In 2 of the 5 districts, no teachers listed it.

That many teachers are not primarily using their districts' adopted program comes as no surprise to most district curriculum and instruction administrators. For instance, in one of the *MathLand* districts, the district mathematics coordinator estimated in an interview that about 80 to 90% of district teachers were using *MathLand* to some extent, but that only about 15% had “fully implemented it,” and that most had implemented it “about 50% or less.” She suggested that since state frameworks and textbook adoptions are on seven-year cycles, teachers who don't like a particular approach or program have learned to “wait it out.”

These data suggest that caution should be exercised in attributing low student achievement to currently adopted materials. In fact, these materials may not even be in widespread use.

Older programs, from previous adoptions, are what many teachers use instead of or in addition to the programs from the current adoption. Some teachers, meanwhile, make supplementary materials the core of their instruction.

Since so many teachers did not report using the adopted text as at least one of their primary programs, the question arises as to what they were using instead (or, in the case of teachers who were using the adopted text as part of a combination, what else they were using). The answer, based on survey responses and interviews with teachers and principals, mainly appears to be textbooks from older adoptions. One relatively new teacher who was interviewed explained:

We're supposed to use MathLand as our text but my kids have a hard time using abstract examples and concepts. We end up using Math Unlimited; it's outdated but more concrete.... I found [it] in the closets.”

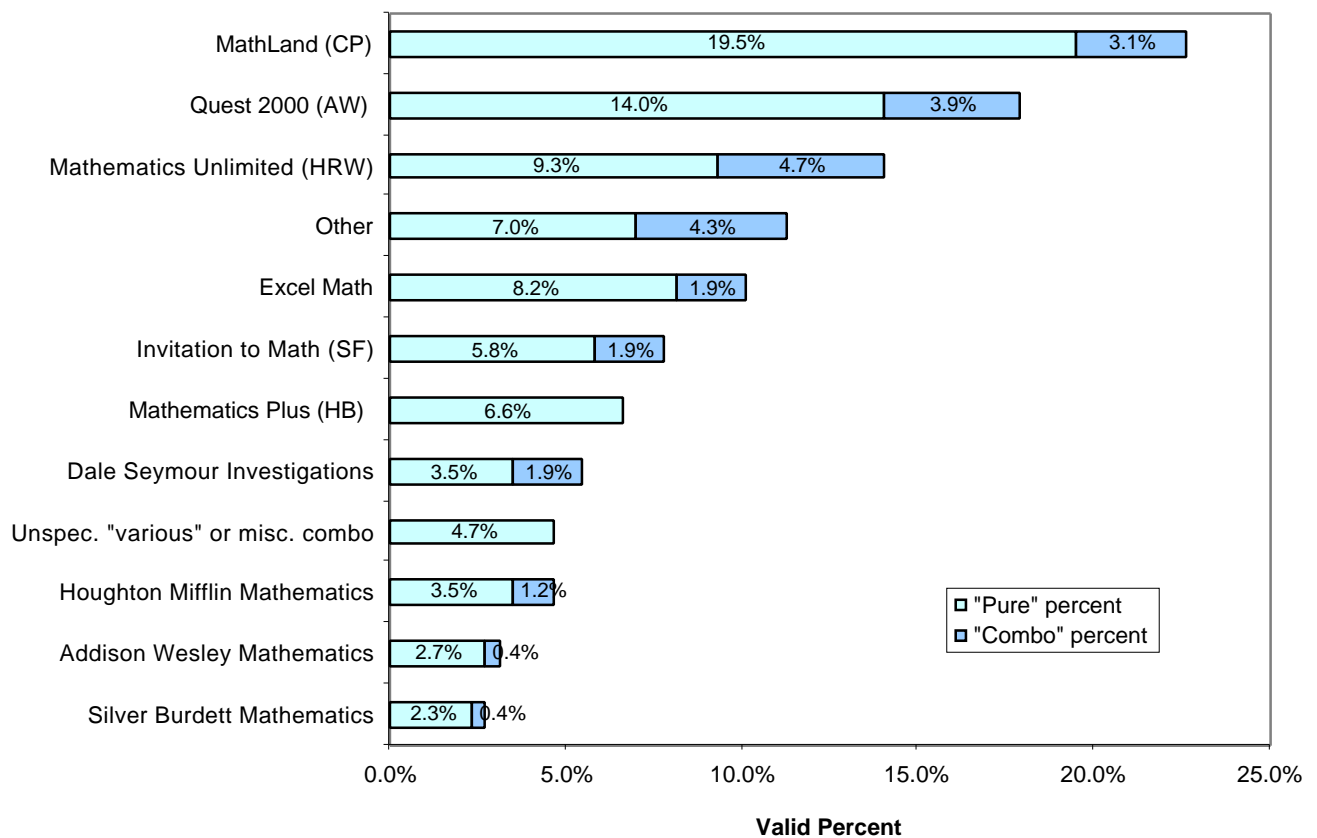
The text mentioned by this teacher—Holt, Rinehart and Winston's *Mathematics Unlimited* (1988)—was one of the most commonly mentioned older texts in use at the fourth-grade level, across all of the districts. In fact, as shown by Figure 4.3, this text was the third most commonly cited textbook used (behind *MathLand* and *Quest 2000*) among all 257 fourth-grade teachers who answered #20b, with 14% of teachers listing it as at least one of their primary texts (including 9.3% listing it as their only primary text).

The other older text that was cited by many fourth-grade teachers was Scott Foresman's *Invitation to Mathematics* (1988). It was the fifth most commonly cited text overall (not including the catchall “other” category), with 8.2% of teachers listing it as at least one of their primary texts, including 5.8% listing it as their only text.

Excel Math (Ansmar Publishers)—a curriculum that consists mainly of sets of “lesson sheets”—was the fourth most commonly cited text program in use among fourth-grade teachers, and represents an additional answer to the question of what teachers use instead of their district's main adopted program. In one of the *Quest 2000* districts, 9 out of the 24

teachers in the district listed *Excel* in their answer to #20b, and 7 of them listed it “pure.” The use of *Excel* was even more pronounced in the district where only 3 out of 20 teachers indicated using the adopted program, Dale Seymour *Investigations*. In this district, 17 out of 20 teachers listed *Excel* as their primary resource, 14 of them “pure.” While not the primary program in this district, *Excel* is made available by the district as a supplementary resource. It would appear, then, that many teachers are using materials intended as “supplementary” as the core of their program.

Figure 4.3
Percentage of Fourth-Grade Teachers Reporting Various Programs as Their Most Used Curriculum Resource (Survey Question 20b)⁸
 n=257



Note: For the “other” category, the “pure” percentage represents the use of a single curriculum program other than any named here. The “combo” percentage part of “other” indicates the use of one curriculum program named here and another one not named here. The “unspecified various or miscellaneous combo” category includes two different types of responses to question 20b: 1) responses that did not name any particular program but merely stated “various” or “several”; and 2) responses that named two (or more) programs, neither of which were named here.

⁸ At the eighth-grade level, too many different programs were named (largely as a result of the range of courses being taught) to construct a similar graph.

At the eighth-grade level, there was considerable variation to what teachers said they were using instead of *Interactive Mathematics*, but the general themes that emerge are similar to those found at the fourth-grade level. Among the 20 teachers in *Interactive Mathematics* districts who did not report using the adopted text, four of them listed Holt, Rinehart and Winston’s *Mathematics Unlimited*, and two listed Scott Foresman’s *Invitation to Mathematics*—both of which were programs from a previous adoption. Another five listed a different Glencoe program—*Applications and Connections*, and two more were using Glencoe *Pre-Algebra*.

Teachers may use programs other than the adopted ones for any number of reasons. For instance, they may have not received sufficient professional development on how to use the adopted programs.

The fact that so many teachers do not predominantly use their districts’ adopted programs could be attributable to a variety of reasons. One is that there may be a natural resistance to change that requires extra work, as changing from one program to another likely would, especially given that so many teachers rely on the text to guide their instruction. This natural resistance to change would be exacerbated if the purpose or the need for the change were not evident.

A second reason why teachers may avoid using adopted materials, particularly if the adopted materials are very different from the materials used previously, is that teachers may feel unsure of how to use them. For instance, “not understanding how to use the text [*Quest 2000*],” was one teacher’s response to the “obstacles” survey question; another teacher, in response to the “hindrances” survey question, wrote “I wasn’t told exactly what the *MathLand* curriculum was or how to properly teach it.” An administrator in this same district said in an interview that teachers who go to training sessions on *MathLand* (the district’s adopted program) and see how it works try it and like it, but that others resist using it. An interviewed eighth-grade teacher in another district said that she likes *Mathematics Unlimited* because it is “more like what I used when I went through school.”

Indeed, for teachers to use materials unlike those they have taught from before—and unlike those they learned from themselves as students—may require significant professional development. Yet 64% of fourth-grade survey respondents and 53% of eighth-grade respondents reported that since January 1998, they had had less than four hours of professional development on the “use of particular mathematics curricula or curriculum materials (e.g., a particular textbook.)” Admittedly, more professional development may have been available in years prior to 1998 when the materials were first adopted, but at the very least, it appears that materials-related professional development is not an ongoing activity for the majority of teachers. Moreover, new teachers would have missed out on earlier-provided opportunities.

A chi-square analysis did find a significant relationship ($p < .05$) between use of the adopted program and amount of materials-related professional development among fourth-grade teachers in the ten districts with clearly identified adopted programs. Teachers in these districts who had had more than 1 day of materials-related professional development since 1998 were more likely to report “pure” use of their district’s adopted program than were teachers who had had less than 1 day of such professional development.

A third possible reason that so many teachers do not primarily use the adopted materials is that they find the adopted materials inadequate in one way or another. This was supported by comments teachers made about the programs in response to the survey’s open-ended questions and in interviews.

While some of the comments about various programs were made by teachers who indicated that they did, in fact, use these programs, many of the comments came from teachers who said they used other programs (as their primary curriculum resource) instead. A brief numerical analysis of how many of the negative remarks came from users and how many came from non-users follows. Because *MathLand* and *Quest 2000* were the most commonly adopted and used fourth-grade programs, the numerical analysis focused on these two programs.

In the survey’s section of open-ended questions, 28 of 85 teachers in the three *MathLand* districts (32.9%) wrote negative remarks about the program. 14 of these teachers reported in #20b that they used the program “pure,” while 11 of the 28 teachers did not report any use of *MathLand* in #20b (presumably because of their objections to the program). Of the remaining 3 teachers, 2 reported using *MathLand* in combination, and 1 left #20b blank.

Meanwhile, in the three *Quest 2000* districts, 41 of 83 teachers—i.e., nearly 50%—remarked negatively on the program in open-ended comments. Of these 41 teachers, 18 were “pure” users, 5 were combination users, and 14 were non-users, according to #20b. (The remaining 4 left #20b blank.)

Despite the evidence that the adopted programs are problematic for teachers, it bears noting that many teachers do use their district-adopted programs without apparent complaint. Of the 45 reported “pure” users of *MathLand* in its three districts, 24 who also answered the open-ended questions did *not* comment negatively on the program.⁹ For *Quest*, meanwhile, 14 of 36 “pure” users did not comment negatively.¹⁰ Thus, not all users of these programs strongly objected to them, at least not in comparison with other items they felt were more important to comment on in their responses to the open-ended questions. A few teachers even wrote exclusively positive comments about the adopted programs.

⁹ The other 7 “pure” *MathLand* users from these three districts did not choose to answer any of the open-ended questions, so their opinions on the program cannot be inferred.

¹⁰ The other 4 “pure” *Quest 2000* users from these three districts did not answer any of the open-ended questions.

Nevertheless, because negative comments far outweighed positive comments and dominated the responses to the open-ended “obstacles” and “hindrances” survey questions, a closer look at these negative comments is warranted. The following section discusses the nature of teachers’ concerns about their curriculum programs based on these comments.

The Nature of Teachers’ Concerns with Adopted Curriculum Programs

One of the most commonly cited concerns about districts’ adopted programs was that they are difficult to use—that they are “unfriendly,” hard to read, or disorganized.

Having established that many district-adopted programs are fairly unpopular, naturally the next question is, why? What is it that makes these programs unpopular? The scope of this study did not allow for a review of the programs themselves. Thus, we can only present teachers’ perceptions, from their self-report on the survey and in interviews, of the problems with the various programs. *No independent confirmation or verification of teachers’ remarks was attempted, and the authors of this report do not necessarily share the opinions presented herein.*

Many teachers’ survey comments did not articulate specific objections to the adopted materials. For instance, “poor textbook selection by the district,” “no good district math program,” or “ineffective text” were among the obstacles and hindrances cited.

However, many other teachers did discuss the nature of their concerns about curriculum materials. One concern raised by many teachers is that the adopted programs are “unfriendly” or difficult to use. For instance, one teacher wrote, “The *Quest* series is extremely poorly organized. The T.E. [Teacher’s Edition] does not show me what students will see. The student text is almost useless.” Another teacher wrote, “Text [*Mathematics Plus*] is confusing and unclear at times.”

Similarly, one of the main concerns expressed about the eighth-grade Glencoe *Interactive* text had to do with its readability. Several teachers, both in survey comments and in interviews, indicated that the reading level of the text is too difficult for many of the students. As one teacher wrote in response to the hindrances survey question, the “Glencoe text that has been mandated by district” is “very difficult to read by students!”

Several elementary school principals who were interviewed commented that teachers find it difficult to use *MathLand* and Dale Seymour because these programs lack sufficient “structure.” In part, this may mean that they do not come with what many teachers consider to be a textbook— a traditional hard-bound pupil’s edition—but rather consist of booklets,

blackline masters, kits of manipulatives, and the like.¹¹ Some teachers in schools where these were the adopted programs bemoaned the lack of a textbook. “A textbook is tangible and is easier to give homework from,” wrote one teacher, “It is also good as a reference.”

Some teachers said that the adopted materials require too much photocopying, either because of the way the programs were designed or because of the way they were purchased.

The lack of a textbook *per se* lies at the heart of another usability concern mentioned by some teachers—the amount of photocopying necessary. For instance, teachers may receive a full classroom set of student workbooks, but because these workbooks will need to be reused in subsequent years, students cannot actually write in the workbooks. The following were cited as obstacles/hindrances on the survey from fourth-grade teachers in two different districts:

Having to photocopy so many materials because student copies are not available or can't be written in by children.

We can't use student workbook because we probably won't get more, so we have to copy them.

Similarly, one principal who was interviewed commented that the adopted program, *MathLand*, requires much duplication of materials for student use. He reported that over one million copies were made to service 480 students.

The need to make copies was also an issue for some of the eighth-grade teachers. Even if students each have their own copy of the text itself, they usually do not have their own copies of the ancillary materials that accompany the text. Many teachers like to assign homework from these materials, necessitating photocopying. For example, one interviewed teacher said that although each student has his/her own copy of the base text (*Glencoe Interactive*), the program's skills workbooks exist only as a single classroom set, so students cannot take them home for homework. “I spend an exorbitant amount of my budget, and of my time, making copies. Because I don't have a book to go out of here [for homework],” she explained. Hence, some teachers' concerns about the adopted materials are not about the mathematical content of the materials, but about the way the materials must be used because of how they were purchased.

¹¹ As of 2000, *MathLand* does have a student book, but this had not yet been published at the time of data collection.

Another frequently mentioned concern about the adopted materials was that they lack a sufficient balance between computational skills and conceptual thinking.

Another top concern about nearly all of the adopted materials, reported by both fourth- and eighth-grade teachers, was that they do not adequately address basic skills,¹² as demonstrated by the following representative survey comments, each about a different curriculum program:

The required curriculum materials: there is not an appropriate textbook which emphasizes basic computational skills.

Adherence to district curricula that doesn't respond to the needs of the child—requires higher order skills, but doesn't teach them.

I do not like the new math series [adopted by the district]—Too way out there! The book is assuming too much. Kids need more basic skills to use this book.

[Adopted] text...does not stress basics enough!

Teachers' desire for more coverage of basic skills does not, however, necessarily mean that they want their curriculum materials to be *exclusively* basic-skills oriented. Indeed, many teachers do appreciate the investigative, hands-on, activity-based approach taken by programs such as *MathLand*, *Quest 2000*, *Dale-Seymour*, and *Glencoe Interactive*, but have difficulty in implementing the approach for practical reasons (relating to the “usability” concerns discussed above):

I am not impressed with MathLand as a complete program. It's great to have the kids explore and discover but there is not enough time for them to discover everything.

[About Quest 2000] The manipulatives are good, and there are many good activities, but it is poorly written and hard to “read.”

The current math program [Dale Seymour] is great if I'm willing to give every waking moment to prepare for it, and use my own money to buy the extra supplies that are needed, but then I also need to do that for science and language arts.

Several teachers spoke of seeking a balance between basic skills and higher-order conceptual thinking and of wanting materials with such a balance:

¹² Again, this perception was not independently verified through an examination of the programs themselves.

[cited obstacle] Creating a balance in the curriculum and finding materials that support this kind of mathematics education.

[cited obstacle] The lack of an adequate text which combines real life applications with adequate computation.

The old Holt series was more sequential and provided lots of practice. Not open-ended, though. Quest too far out—did not cover a lot of material in a year. Excellent for constructing meaning, but took way too long. We seem to go from one extreme adoption to another.

As such, many teachers do not want to completely eliminate the adopted materials, but merely wish to supplement them (or to use them as a supplement) to provide the desired balance. This was particularly the case with MathLand, as represented by the following two comments:

MathLand adopted program cannot be used as a core with students who have not mastered the basics. As a supplement, fine—it works.

Our district has implemented MathLand as our only math resource. Teachers have found it ridiculous that one program can meet the wide range of classroom math needs. I wish we would adopt 2-3 programs to use and provide needed materials for an entire class (not just 20 ea. class).

Teachers’ desire for balance and their interest in using the adopted program as a supplement apply equally at the eighth-grade level, with Glencoe *Interactive*. As with the fourth-grade programs, one of the main reasons teachers dislike or avoid using the *Interactive* text is that they perceive it as too activity-oriented or theoretical, lacking a sufficient balance between computational practice and conceptual understanding. Teachers do see value in the program, but more as a supplement than as the base text. The district mathematics coordinator in one of the Glencoe *Interactive* districts spoke of how the district “ran into difficulties” when they adopted new materials in an attempt to implement the 1992 Framework and the NCTM standards:

*The change was tremendously dramatic for most teachers. The grades that shocked me the most were the middle school grades, where we had been using replacement units for a number of years.... I would say almost all our middle school math teachers were using [the replacement units] to a certain extent. Well, the Glencoe **Interactive** was almost taking those replacement units and putting them in book form. So, to me, that should have been the easiest one [of all of the newly adopted texts at various levels within the district] to implement. Well, that’s probably where we had some of the greatest resistance.... What teachers had had was predominantly computational kinds of materials, so they had been using these replacement units [as a rich supplement to make] mathematics almost come to life. Well, the whole thing just reversed. Now, those replacement units—the **Interactive** units—became the core. And teachers, they didn’t see a cohesive mathematics program. They had used the replacements for enrichment, and relied on the*

computational as their core, and when it reversed, it didn't quite work.... The foundation needs to be there, and then you build on the foundation.... Teachers are looking for something they can really get their hands on, and what they see is, the computation stuff is the stuff they can really hang on to, and you can build on that. You try to go the other way, and it's much more difficult.

In one of the other Glencoe Interactive districts, a teacher who was interviewed also spoke at length about the program and about her concerns that it lacked balance:

I do use the district-adopted curriculum [Glencoe Interactive], but I use it as supplementary material. I don't use it as the foundation of my program. And only because, all by itself, it's all theory. And there's really not a lot of practice involved. And I like the idea of interweaving the theory and the practice. So, if you have a book that's all skills and drills, it's not going to cut it. If you have a book that's all theory, it's not going to cut it. There needs to be a combination, a balance between the two.... The adopted text doesn't have the practice problems that I assign for homework.... My kids really like it because it's all fun and games, and they do get something out of it, but it's not as much as I would like. You really have to have the basic skills down in order to do this Interactive book, and I find a lot of these kids do not have their basic, basic skills, like long division—they do not have that down at the beginning of the year. So I can't even start this book until we've covered the basics.... There's a lot of parental concern with this Interactive book; I have a lot of concerns with it. I can't teach out of just the Interactive book.

When asked, “What, if anything, would help you improve your math instruction?” this teacher simply replied, “A textbook. One that has a balance between skills and theory.”

Another teacher who was interviewed said that the Glencoe text had influenced his teaching “in a positive way,” and he indicated that he had received considerable professional development and support on its use that he had found effective and helpful. Even so, on the survey this teacher listed the Holt, Rinehart and Winston *Mathematics Unlimited* as being his primary text.

A third commonly cited concern about curriculum materials was that they are not aligned with standards and/or assessments.

For many teachers, the concern about the curriculum materials was not necessarily about the materials *per se*, but rather about the materials' relationship to—and specifically, their lack of alignment with—state and/or district standards. This was particularly an issue at the fourth-grade level. On the survey, over one-third of fourth grade teachers (35.9%) said they disagreed with the statement, “Curriculum and instructional materials aligned with district mathematics standards are readily available for use in my teaching.” The level of disagreement on this item was much higher than for any of the other 12 opinion items relating to standards. (The item with the next highest level of disagreement was, “The

NCTM standards have influenced my teaching for the better,” with which 20.8% of responding fourth-grade teachers disagreed.)

Fourth-grade teachers’ open-ended remarks also reflected the concern about lack of alignment between materials and standards. The concern was widespread, found in nearly every district included in the study. Each of the following survey comments was made by a teacher in a different district:

...Our district is stuck with a \$1 million program that is ineffective and which doesn't address the state standards or our new district standards.

Lack of adequate materials to implement all of the Math Content Standards (1998)

Perhaps if we felt that the current program we are using corresponds with the state frameworks and state standardized tests.... Many teachers have felt that the two things [the program and frameworks/STAR test] don't support each other.

As with this last comment, several teachers also expressed concern that the curriculum materials were insufficient for preparing students to take the required assessments. Representative survey comments about this included:

District not aligning curriculum to state assessment instruments

Ineffective materials and adoptions with a very poor weighting of topics which doesn't relate to standardized tests in any way.

One teacher who was interviewed indicated that the lack of alignment between the approach of the adopted program (Dale Seymour) and the SAT-9 was the major reason why teachers at his school were using an older text:

We have a new math adoption; supposedly we were to throw away the old one. The new math is 100% manipulatives, but as we're working with this, a lot of the teachers are finding that, when the students go to take the SAT-9, it doesn't help them at all. So, a lot of [my use of materials] is taking things that we used from the old adoption, and trying to fit them in with the new adoption. But in all honesty, I end up using the old adoption probably more.

The issue of alignment will be discussed further in the subsequent chapters on standards and assessment.

Some teachers would like to have more freedom in their use of curriculum materials. Others indicated that they already have such freedom, supplementing liberally or choosing programs other than the adopted ones.

As some of the remarks in the preceding discussion suggest, several teachers indicated a desire to have more freedom in selecting the programs they use, and many objected to being, as they put it, “forced” or “required” to use a particular program. In response to the “hindering policies” survey question, one fourth-grade teacher wrote:

School selected (school-wide adoption) instructional materials/publishers programs. Choices that aren't individual but [made by the school or the district]. I feel limited and constrained by materials selected by someone else.... To improve my instructional effectiveness I would like to select the choice of materials/text for my classroom program in mathematics as well as some other academic areas.

Not every teacher, however, feels quite so constrained in the use of curriculum materials. While some districts or schools may strongly discourage use of materials other than the adopted programs, others appear to offer a bit more flexibility. Several teachers who were interviewed spoke of using many different programs or of supplementing heavily, and the following survey comments were made in response to the question, “If there are specific state, district, or school policies that have helped your mathematics teaching, please describe”:

Allow me to use the materials I choose, rather than requiring texts.

A shift from “one size fits all” attitude to “use what resources we have” to implement and meet math standards.

For some teachers, though, tracking down supplementary materials is a challenge—one that they would rather not have to face. The following remarks were among those made in response to the survey question about obstacles to mathematics teaching:

Cost of materials to enrich the program

The textbook our district purchased. Having to supplement on my own materials that will clarify and enhance the different math concepts.

Lousy curriculum—I mean lousy. As a new teacher who has had little instruction in math I am constantly forced to “pull” together curriculum and quite frankly feel like a failure most of the time (only in math).

As this last comment suggests, the level of teachers’ willingness to supplement may be a function of their experience level. Teachers who have been teaching for a while may have more of a “stock” of materials to use in supplementing (or, perhaps, in replacing) the adopted programs, while newer teachers may not. Indeed, one district coordinator who was interviewed even pointed out that new teachers seem to use whatever materials they are

given, while more experienced teachers pick and choose from a wide array of resources. However, an analysis of data on fourth-grade teachers' experience level and use of adopted materials did not reveal that "pure" users of the adopted materials had significantly fewer years of teaching experience, on average, than teachers who did not use the adopted materials or who used them in combination.¹³

Some fourth-grade teachers cited a shortage of materials as being an obstacle to their mathematics teaching. In many cases, however, the shortage is linked to the program in use.

Approximately 30 fourth-grade teachers indicated on the survey that an insufficient quantity of materials was one of the biggest obstacles to their mathematics teaching. About half of these teachers did not specify what *types* of materials were in short supply, mentioning only "lack of materials" or "inadequate supplies" in their answer to the open-ended question. Others specified books, manipulatives, or other supplementary materials. A few mentioned technology resources (such as computers or computer support).¹⁴ Some of the teachers who were interviewed also spoke of insufficient quantities of materials.

In some cases, the shortage of materials appears to be a function of large class size. "Proper materials—not enough for a class over 25," wrote one teacher in response to the obstacles question on the survey. (Class size is further discussed in Chapter 8.) For some, the problem was manipulatives¹⁵; for others, it was books. Shortage of books becomes a particular problem when teachers want to assign homework out of the books, because there are not enough books for each student to take one home, or there are not enough "consumables," as discussed earlier in the chapter.

Large class size notwithstanding, the problem of materials shortage cannot be completely separated from concerns regarding the curriculum programs themselves. In particular, the reason that some teachers experience a shortage may be that they are using materials other than those adopted by the district, and these other materials may be in shorter supply than the adopted ones. One teacher wrote:

The biggest obstacle in my classroom is not enough math books for each student. Normally I have 2 to 3 students to math book.

¹³ Across all ten districts with clearly identifiable adopted programs, there was virtually no difference in the mean years of total teaching experience (as reported on questionnaire #32a) of "pure" users of the adopted text as compared to combination users/non-users (as reported on #20b). In the three *MathLand* districts, "pure" *MathLand* users did have fewer years of experience, on average, than other teachers; the same was true with the three *Quest 2000* districts. However, the difference between the means in each set of three districts was not statistically significant even at a .10 level.

¹⁴ On a different set of survey items including questions about instructional use of computers, approximately 20% of fourth grade respondents and 33% of eighth-grade respondents indicated that they had "no access" to computers.

¹⁵ On the other hand, several teachers cited an *abundance* of manipulatives as something that had *helped* their mathematics teaching.

This teacher, however, indicated that her primary text was the Holt, Rinehart and Winston *Mathematics Unlimited*, even though her district's currently adopted text was *MathLand*. Thus, it is likely that the book she had a shortage of was not the newly adopted program, but rather the older one, for which she would have been unable to get new or replacement copies. Other teachers who noted a lack or a shortage of materials may also have been referring to supplementary materials rather than to the primary adoption.

In the Next Chapter

As discussed in this chapter, one of the concerns held by many teachers was that adopted materials are not aligned with standards. Especially given how many teachers use their textbook to guide instruction, it is crucial that curriculum materials be aligned with standards. Standards, however, may have their own set of problems. These are discussed in the following chapter.