

**Influences on Mathematics Textbook Selection:
What Really Matters?**

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Researchers have long been in agreement that instructional materials matter (Begle, 1973; Begle, 1979; Driscoll, 1980; Glidden, 1991; McKnight et al., 1987; Porter, 1989; Robitaille & Travers, 1992; Schmidt, McKnight, & Raizen, 1997; Tyson, 1997; Usiskin, 1985). Four decades ago, the School Mathematics Study Group provided this summation of the National Longitudinal Study of Mathematical Abilities: “If a mathematical topic is in the text, then students do learn it. If the topic is not in the text, then, on average, students do not learn it” (Begle, 1973, p. 209). The Third International Mathematics and Science Study (TIMSS) showed that this pattern endures; the performance of U.S. eighth graders was notably different on different topic areas, and those differences could be linked to differences in emphasis in instructional materials. The correlation between topics that were covered in the textbook and what teachers actually taught was a stunning .95. One of the important findings of TIMSS is “...that *the curriculum itself—what is taught—makes a huge difference*” (Schmidt, Houang, & Cogan, 2002, p. 12, authors’ italics).

Instructional materials can play a defining role in mathematics classrooms, affecting both what and how teachers teach (National Research Council, 2002; Reys, Reys, Lapan, & Holliday, 2003; Van Zoest & Bohl, 2002). Ball and Cohen (1996) explain this influence: “Unlike frameworks, objectives, assessments, and other mechanisms that seek to guide curriculum, instructional materials are concrete and daily. They are the stuff of lessons and units, of what teachers and students do... Not only are curriculum materials well positioned to influence individual teachers’ work but, unlike many other innovations, textbooks are already ‘scaled up’ and part of the routine of schools. They have ‘reach’ in the system” (p. 6). When ignored, instructional materials can become a stumbling block. Schmidt (2002) cautions against efforts to improve instruction that are isolated from efforts to improve instructional materials: “If we pretend that the textbook doesn’t exist—and conduct professional development in ways that assume teachers will implement an entirely different approach to content than the texts take—believe me, the textbook will win” (p. 18). To successfully strengthen mathematics instruction, school districts *must* consider how materials will play a part.

Reys, Reys, and Chavez (2004) also describe the powerful influence of textbooks in the classroom and the impact of materials on instruction. However, they also note that textbook authors and publishers are developing materials in a country where local control, both at the district and state level, make it difficult to standardize content. In addition, financial considerations can greatly affect the decisions of publishers, as well as the content of the materials. Given the influence of instructional materials and the variation in content and presentation of this content, the authors recommend giving careful thought to their selection.

The selection of instructional materials is not only critical because of the influence of these materials on the teaching and learning of mathematics but also because instructional materials can become a critical piece in a district’s plan to advance the quality of students’ mathematics learning. The selection of new mathematics instructional materials occurs in school districts every six to eight years (Finn, Ravitch, & Whitman, 2004; Reys & Reys, 2006) and provides an occasion for a conversation about the mathematics program and its improvement. In all but the most superficial selection processes, administrators and teachers have a conversation about the intentions of the mathematics program, ways in which they would like it to improve, and how various materials would support the achievement of those goals (Spencer, Mark, Zeringue, & Schwinden, in press). The selection process is an opportunity to direct some financial resources toward program improvement in mathematics, one that few districts intend to squander. And, in fact, over the past decade many school districts across the country have centered their program

improvement efforts on the adoption and use of instructional materials well aligned to state standards (Mark, Spencer, Zeringue, & Schwinden, 2010). These district-level improvement efforts are, in many cases, a response to increased accountability for student outcomes in mathematics and are intended to ensure that all students are exposed to high-quality mathematics content and instruction.

Selection processes are complicated, though, because in reality, program improvement is only one of the outcomes considered. The selection process is not just a process of curriculum decision-making; it is also a purchasing process, a human resources process, and a political process. Administrators and teachers choosing new mathematics materials also consider:

- The *information available* about the effectiveness of new materials under consideration and the supports necessary for using them well. It is not easy to discriminate among programs in terms of quality, given the limited research on effectiveness, the potential bias in the information provided by publishers, and the vast amount of material in each program (making them difficult to review comprehensively in limited committee time).
- The *resources available* to the district. The resources needed are financial (to support the purchase of books, ancillary materials, and professional development), time (classroom time for mathematics instruction; time available for professional development), and expertise (of the teachers; also, expertise available on the new materials themselves).
- The *support for change* among the various stakeholders. Because the adoption of new mathematics instructional materials (particularly the adoption of materials that are substantively different from those used prior) may require some changes in classroom practice, teachers, principals, and district-level administrators must commit to supporting those changes. Parents are also important stakeholders in this process.

Although bodies of research exist looking at the effects of mathematics instructional materials on student achievement, the role of materials in the classroom, and the mediating effects of teachers in using mathematics textbooks, substantially less is known about how districts choose mathematics textbooks and what factors affect these choices. Given the influence of textbooks and the increased attention to the adoption of materials as an improvement strategy, how districts negotiate the process of selecting instructional materials and what considerations matter most when making choices about these materials is of growing concern. In this paper, we report on a study conducted by Education Development Center (EDC)¹ investigating curricular decision-making, with particular attention to the factors that mattered most to districts when selecting mathematics instructional materials. The research questions that guided this work include:

- What processes do school districts use in selecting mathematics textbooks?
- **What factors shape curriculum decisions in K-12 mathematics?**
- How does textbook selection differ in state-adoption and open-territory states?
- What research do curriculum leaders find most useful in textbook selection?
- What questions about mathematics textbooks do decision-makers need answered?

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This paper reports primarily on the second of these research questions, paying specific attention to the most significant factors affecting curriculum leaders' and selection committees' decisions when deciding which mathematics instructional materials would be the best fit for their districts. However, we also touch on other aspects of our research questions. Before delving into these influences, and illustrating how these factors are intertwined and play out in districts, we review our data collection efforts, with a particular focus on the deliberate choices we made in selecting states and the potential effects of state context on materials selection.

Data Collection

In order to understand the complexities and realities of how districts select mathematics instructional materials, we began investigating these questions by conducting in-depth interviews with over 150 K–12 mathematics curriculum decision-makers representing districts in eight states. These states – Colorado, Louisiana, Maine, New York, Ohio, Texas, Washington, and West Virginia – were carefully chosen to investigate curriculum decision-making in a variety of state-adoption and open-territory states across the country. Districts selected for interviews within each state reflected a range of characteristics in terms of performance level, geographic region, percent of students in poverty, size, and instructional materials used.

Our interviewees were, in most cases, the person in each district directly responsible for overseeing the selection of new mathematics textbooks.² Interviewers sought to understand curriculum decision-making processes in various settings, to identify the decisions curriculum leaders make, and to identify the role various sources of information play in those decisions. We were particularly interested in curriculum leaders' use of research, in light of national calls for a broader perspective on the research needed to properly evaluate instructional materials in mathematics (National Research Council, 2004).

The qualitative data gathered in these interviews was then supplemented by other sources, including a survey of the members of the Association of State Supervisors of Mathematics, a series of surveys of curriculum leaders nationally, conducted by our partners at Inverness Research Associates, an investigation of state-level documents and websites, and a review of the relevant literature. This data was analyzed first for each state individually to identify themes and hypotheses. We then looked across states to identify a set of claims in six key areas, including factors that influence mathematics textbook decisions and curriculum leaders' use of research and resources. We then coded each interview, as well as the survey results, organizing the data available to confirm or disconfirm each possible claim. However for the purposes of this paper, we will only be reporting data from our interviews.

In designing our study, both in our construction of our sample and in the design utilized for conducting an analysis of the data, we paid very careful attention to state context. Given the clear differences in textbook selection procedures and policies in state-adoption and open-territory states, we felt it was essential to better understand how state context affected the decisions made by curriculum leaders and selection committees. In the section below, we describe what it means to be an open-territory or state-adoption state and offer a brief overview of how state context

² Our interviewees were typically mathematics supervisors, curriculum coordinators, department chairs, and assistant superintendents. For simplicity's sake, throughout this article we refer to these interviewees collectively as "curriculum leaders" though none held this title officially.

affects textbook selection. (For further discussion of this issue see Zeringue, Spencer, Schwinden, & Mark, 2008.)

The state context for textbook selection

Statewide adoption of textbooks dates back to the late nineteenth century when some states – many in the south – wanted to influence textbook content, make access to textbooks more uniform to address the challenges for transient populations, and standardize costs for districts (Farr & Tulley, 1985).³ States typically characterized as state-adoption states are those states that control textbook selection by providing state funding for purchase of materials on an approved state list, by establishing the timing of the adoption cycle and by providing regulations that local districts must follow. Even though these are shared features of state-adoption states, there is a wide range of how these influences play out in each state. (See Zeringue, et al., 2008 for examples of the range of contexts within state-adoption states.)

Although the widely used and accepted term is adoption state (Farr & Tulley, 1985; Watts-Taffe, 2006), Stern (2006) makes the distinction between adoption states and states that refer to themselves as recommendation states (e.g., Idaho, Utah, Virginia), in which districts select from a recommended list provided by the state. While there is no penalty for selecting materials not on these lists, funding is still connected to purchasing from the recommended list. For the purposes of this article, states that link funding to lists provided from the state, influence timing of the adoption cycle, and offer some guidelines about the process will all be referred to as state-adoption states.

Using the above definition, twenty-one states in the United States are state-adoption states. While there is general agreement in the literature about what constitutes an adoption state (Farr & Tulley, 1985; Finn, Ravitch & Whitman, 2004; Watts-Taffe, 2006; Zinth, 2005), there is slight variation in the number, ranging from 20 to 22, of states deemed state-adoption states. The lack of consensus focuses mainly on the designation for the states of Illinois and Nevada. Illinois does provide textbooks to districts free of charge through the *Textbook Loan Program*, however, it does not determine a list of approved materials;⁴ districts or schools are free to select programs without restriction from the state. In Nevada, district committees recommend textbooks to the State Board of Education for adoption and the state funds the purchases.⁵ Because Nevada retains some control over which materials are approved for selection, and Illinois does not, for the purpose of this study, we list Illinois as open territory, and Nevada as state adoption. This results in a list of twenty-one state adoption states.

The remaining twenty-nine states are considered open-territory⁶ states, which means that the choice of instructional materials is unrestricted by the state, and decisions about funding and timing of adoptions are made locally, at the district or school level. In open-territory states, states

³ Many critics argue the merits of statewide adoption, believing the process marred by censorship and the textbook market controlled by the largest adoption states. A discussion of these issues can be found in Ansary (2004), Finn, Ravitch, & Whitman (2004), and Tyson-Bernstein (1988).

⁴ In 2009, budget cuts resulted in an elimination of funding for the Textbook Loan Program (TLP) in fiscal year 2010. However, the TLP continues to operate.

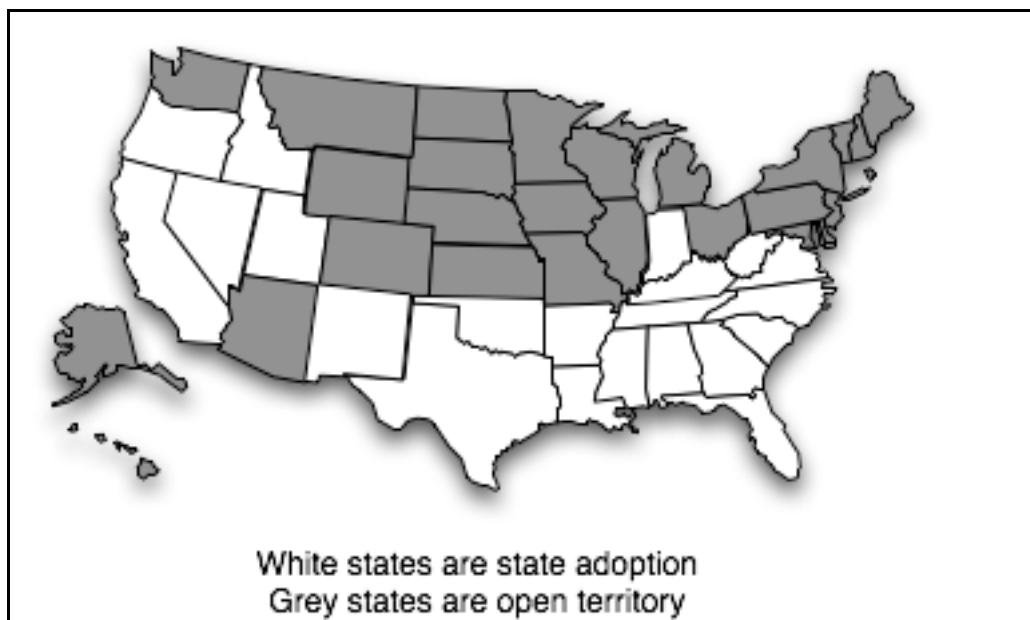
(<http://webprod1.isbe.net/illinoistextbookloanprogram/aspapps/Default.asp>)

⁵ (http://nde.doe.nv.gov/Resources_TextbookAdoption.htm)

⁶ Open-territory state is the term used by Finn, Ravitch, & Whitman (2004) and the one we have chosen to use, but it is also common to see the term open state (Watts-Taffe, 2006) to refer to this group of states.

neither dictate what materials districts must select nor do they fund the purchase of mathematics instructional materials. Although the state does not provide funding for textbooks, they may provide other resources that affect textbook selection. In fact, there is a wide variation in the role of the state in open-territory states, with some states having characteristics resembling that of state-adoption states and other states still highly reliant on local decision-making with little or no involvement from the state. (See Zeringue et al., 2008 for examples of the range of contexts within open-territory states.) See Figure 1 for a map of state-adoption and open-territory states.

Figure 1

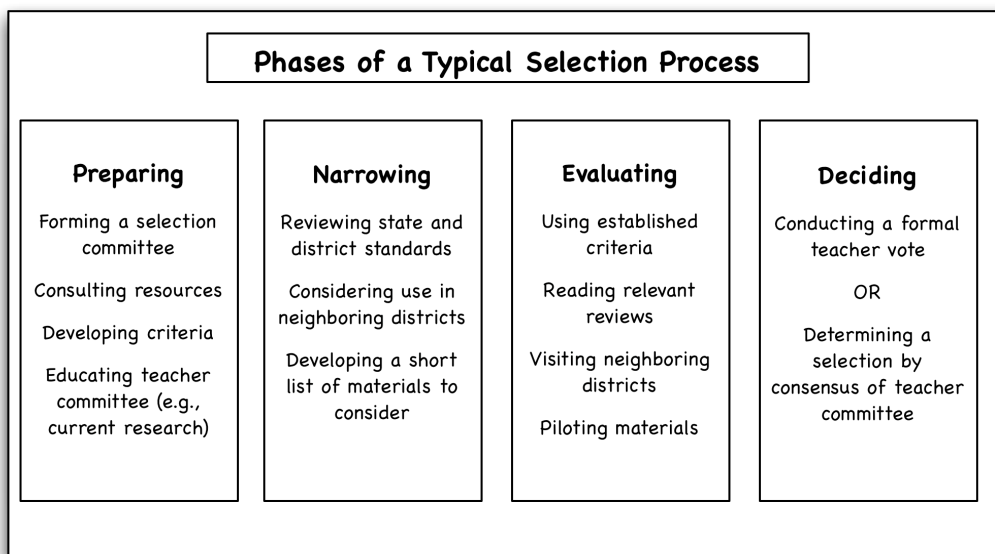


Although the literature on textbook adoption is limited, a common thread is the discussion of the policies in state-adoption and open-territory states and how influences from the state have the potential to have an impact on the choices made at the district and classroom level. In these times of increased accountability, where districts are looking to materials selection as a way to improve their mathematics program and ultimately increase student achievement, understanding this role of state context as an influence on the mathematics selection process is critical. State context factors into many of the design decisions made by curriculum leaders, but what factors matter most for districts when selecting instructional materials? In the section below, we share the influences that ultimately led to why districts selected particular materials. Additionally, we illustrate how these factors may play out differently depending on state context.

Findings: What Really Matters in Selecting Mathematics Instructional Materials

Across states and districts, we found many commonalities in districts' processes for choosing new instructional materials in mathematics. The process most commonly used involved assembling a selection committee with a representative group of teachers that acted as the primary decision-makers.

Figure 2: Phases of a typical selection process



In a typical district, committee members prepare for the selection process by reviewing such information as state or district data and relevant articles. They then narrow the program options by creating a “short list” of programs for analysis, evaluating those options in detail using established criteria and then deciding on a recommendation, by consensus or by official vote. (See Figure 2.) We did also find, however, key variations on the process, most notably in relation to the role of the curriculum leader, and in the extent to which the process was formalized.

In the analyses of these processes, we found five key factors that matter most when districts are selecting mathematics instructional materials. These include:

- The degree of alignment of the candidate materials with state standards and tests;
- The anticipated level of teacher acceptance of the materials under consideration;
- The advocacy of a curriculum leader(s) for a particular approach or set of materials;
- A committee’s evaluation of the quality of the materials being reviewed (usually based on an established set of criteria); and
- Additional information about the materials such as, data about student performance, reviews from trusted sources, and advice from neighboring districts.

In the section below we discuss each of these factors. This section is followed by a collection of district stories, drawn from our interviews, that illustrate how these factors interact within the context of a district’s process for choosing new instructional materials.

Alignment with state standards and tests

Curriculum leaders—in both state-adoption and open-territory states—emphasized the importance of choosing instructional materials that aligned with their state standards and were consistent with their state tests. An overwhelming majority of curriculum leaders (97%) mentioned or described attention to state standards and tests in their selection process. More than half (60%) of our interviewees designed their selection processes to include an “alignment check” to ensure that the materials being considered were well aligned to state standards. This

ranged from a cursory look—Does this textbook align with the general direction of our state standards?—to a much more detailed analysis. Some districts did their own analysis to look at depth of coverage of a particular topic (e.g., functions) or to examine a concept that was particularly weak for their students (e.g., division of fractions), whereas some districts in state adoption states relied solely on the state’s approval of materials as evidence of alignment.

This attention to state standards and tests largely resulted from increased accountability for student learning at the state level and districts’ needs to meet the requirement of the No Child Left Behind (NCLB) legislation. NCLB demanded greater accountability for students’ learning and called for research-based evidence to support the choice of mathematics textbooks. Revised state standards included grade-level expectations (Reys, 2006) and measured outcomes for students in grades 3–10 along with consequences for under-performance (consistent with NCLB) thereby increasing the importance of aligning mathematics programs with state standards.

Another way in which accountability pressures influenced the selection process was in districts in our study moving toward greater centralized decision-making about mathematics materials. More than three-quarters of districts in our study provided evidence of this shift. This move was most evident in districts that historically allowed schools (or even teachers) to choose mathematics textbooks independently; most such districts in our sample now require common materials be used across all schools. Districts that have always made a centralized decision but have, in the past, allowed teachers to make individual choices about the extent to which they use the selected textbooks, reported introducing mechanisms such as pacing guides, curriculum maps, and common unit and yearly assessments that hold teachers accountable for using the adopted materials.

Teacher acceptance of the materials

When districts choose new instructional materials, teacher input into the selection, as well as the anticipated level of acceptance for the materials when implemented, matters. Curriculum leaders we interviewed cited various reasons for including teachers, both in the design of the process and in planning for implementation. Ninety-four percent of our interviews were coded as including some teacher input in the process, and 82% of our interviewees reported teacher committees as an element of the selection process.

Teacher input and acceptance played a significant role in the selection for three central reasons:

- A belief that teachers, as the educational experts, should decide on the materials used in classroom. This belief stems from the view that since teachers are the instructional experts, they should have final say in the materials they use in their classrooms.
- Teacher input is mandated by district or board policies. This requirement took a few different forms: the design of the process to include teachers through a committee, piloting of materials, or a teacher vote on choice of materials.
- Teacher input in the selection of materials is viewed as important in preparing for the successful implementation of materials. Concerns about fidelity of use and teacher buy-in prompted leaders to involve teachers in the process.

Attention to teachers’ experience using the materials was also reflected through the inclusion of “ease of use” elements among the criteria for evaluation, such as whether the materials were teacher-friendly or had additional assessment resources and other desirable ancillaries.

Teachers' comfort with the choices being considered was particularly an issue if any of the options represented a significant change in practice. For example, materials developed with support from the National Science Foundation, such as *Everyday Mathematics*, *Connected Mathematics*, and *Core-Plus*, were seen by interviewees as requiring a shift in approach to content and pedagogy for many teachers. While many districts in our study had adopted such materials, some curriculum leaders we interviewed expressed reluctance to choose textbooks that required significant change in instructional practices, fearing that implementation would suffer from lack of teacher interest, commitment, or knowledge. This consideration sometimes meant that curriculum leaders ultimately accepted materials that were less satisfying for their identified programmatic needs, in exchange for an expected higher degree of teachers' commitment and use. As one curriculum leader described the phenomenon, "There are times where our needs, and the programs that support them, are just too radical and it's just too much change. And so, when folks have a voice [in the process], they can resist the radical change through that voice. And sometimes, that's probably saved us. And other times, it's actually hindered."

In fact, according to the literature, when selecting mathematics instructional materials, districts must give careful thought to how the materials will be used and adapted by teachers. In an analysis of how middle school teachers used the district-adopted textbook, Tarr, Chávez, Reys, and Reys (2006) found that the textbook influenced what was taught in the classroom, but teachers took liberty in moving and omitting content and certain content, such as number operation, received greater emphasis than was proportional to what was included in the text. In a related set of studies (Chávez, Grouws, Tarr, Ross, & McNaught, 2009; Chval, Chávez, Reys, & Tarr, 2009; McNaught, Tarr, & Grouws, 2008) that looked at curriculum implementation, the authors again found that teachers omit lessons and/or units from the textbooks and also make use of supplemental materials. However, the results also suggested that teachers tended to be more faithful to the content of the textbooks than to the instructional approach suggested in the materials.

According to our findings, when selecting materials, curriculum leaders and selection committees do consider teacher readiness to use the materials, the content teachers are likely to teach, how teachers will teach the content and what district and school supports need to be in place to ensure the strongest implementation possible. If these factors are not considered in the selection process the implementation of the materials is likely to be even more difficult.

Advocacy for a particular approach or set of materials

In our study, we found that a substantial minority of the curriculum leaders we interviewed played a role in advocating for specific materials or a particular instructional approach, and ultimately their advocacy greatly influenced textbook selections. It was a key factor in at least 30% of the selection decisions in our study. In most of these instances (93%), it was the curriculum leader—a mathematics director, curriculum coordinator, or assistant superintendent—who advocated for specific materials or a type of materials.

Curriculum leaders who chose to champion a particular program or perspective did so in different phases of the selection process, from preparation to the final decision. Many leaders used the preparation phase to showcase a specific instructional approach, or develop criteria targeting a certain program or type of program. Curriculum leaders also chose to only include materials that represented a particular instructional approach (e.g., only NSF-funded instructional materials) or handpicked the subset of textbooks to be included on the "short list." Advocacy for

a specific program was also evident in the final decisions, where 12% of curriculum leaders actually chose the instructional materials to be adopted by the district.

Not all curriculum leaders felt that advocating for a particular perspective, materials or instructional approach was an option. Some curriculum leaders described local or state policies that specifically prohibited such advocacy. Other leaders believed it was critical to avoid any perceptions of bias and chose to remain neutral in an attempt to maximize teacher input into the decision.

We also found evidence that some states played a targeted advocacy role in district selection decisions (beyond the role of that played by textbook lists in state adoption state) either by encouraging the use of particular programs in their state standards (11% of interviewees), or through state Department of Education advocacy for certain programs (8%). Other ways in which states exerted an influence on selection decisions were by providing professional development programs, by providing an influential alignment document or recommended list of materials, or by issuing new state tests, standards, or graduation requirements (thus necessitating a change in instructional materials).

Evaluation of the quality of the materials

In many districts, the selection committee's evaluation of the quality of the materials under consideration influenced what they ultimately selected. Committee evaluations of the quality of the materials were usually guided by a set of criteria and in at least two-thirds of the districts were codified into an evaluation form, checklist, or rubric. The use of a formal, established rubric was somewhat more common in the state-adoption (80%) than in the open-territory states.

The intention of the rubric was to make the evaluation process more objective, consistent and rational, and to convey district beliefs about mathematics teaching and learning. Curriculum leaders in our study described the established criteria as a mechanism they used to keep the committee focused, and to ensure that committee members were not distracted by supplementary materials or physical features of the materials. The use of a rubric also provided selection committees with numeric, seemingly more "objective" data to support their ultimate decision.

In developing their criteria, districts often collected rubrics from other sources and revised them to reflect their specific needs. What specific criteria were included on rubrics? Our data suggest that the primary criteria used by selection committees to evaluate the materials were:

- the alignment to state and national mathematics standards,
- the quality of important mathematical content,
- the materials' pedagogical or instructional approaches, and
- the organization of the materials including supplementary materials.

Among the criteria used, the most frequently mentioned were the evaluation of the materials' alignment with standards (consistent with our earlier description of the importance of state standards) and the quality of mathematics content. When describing the attention to pedagogical approach, curriculum leaders in our study emphasized the importance of ease of use for teachers and a balanced instructional approach. Other criteria mentioned included the professional development requirements for the program and the availability of materials for parents.

Data, reviews, and advice

Districts in our study also considered information that went beyond the committee’s review of the materials. Curriculum leaders and committee members turned to relevant literature, to knowledgeable and trusted sources of information, to results from piloting, and to advice from similar districts in making their selections. Nearly 80% of curriculum leaders indicated using such resources or research at some juncture of the process to gather data about the use, effectiveness, and acceptance of the materials under consideration, and the data gathered from these sources was a significant influence on the choice of textbooks in more than half of our interviews.

Districts used many of the aforementioned resources to collect data about potential mathematics programs in framing the short list of materials for consideration or in preparation for making a final decision. We also found that curriculum leaders gathered a substantial amount of information to set the stage for the selection process. It was in this preparation phase that curriculum leaders discussed the research literature, including articles on student learning of mathematics and curriculum selection. Curriculum leaders viewed this phase as an opportunity to orient the committee regarding high quality teaching and learning in mathematics and best practices, and as a chance to lay the groundwork for the other phases.

As curriculum leaders discussed the research and resources used to gather data to inform the selection process and eventual decision, it became evident that much of the information they relied upon was not just from peer-reviewed scientific research published in journals. What we found was that curriculum leaders were seeking information from trusted sources, individuals or organizations that were considered knowledgeable to identify “top” mathematics materials. These sources included regional and national organizations, state departments of education, and professional networks. Expert reviews, such as the American Association for the Advancement of Science’s (2000) Project 2061 textbook evaluations or analyses of textbook alignment to state standards, were used to identify short lists of high-quality mathematics textbooks.

In open-territory states one of the most trusted resources was data from “districts like us” — neighboring or demographically similar districts. Almost half of our curriculum leaders contacted colleagues in other districts to discover which programs they should be seriously considering. Conducting site visits was another way for curriculum leaders to gain information about the alignment of a particular program with the state test, and to access others’ experiences using the programs to support student learning. Information gathered from these trusted sources offered curriculum leaders opportunities to identify instructional materials that might help districts improve their mathematics achievement, and to learn more directly about the use of these programs in preparation for implementation. These trusted sources were ultimately influential in districts’ decision-making.

District Stories: Illustrations of the Selection Factors in Context

The stories below illustrate the influences, or factors, that were most critical in districts’ processes for selecting mathematics instructional materials in our study. As you read through these examples, you will notice not only differences in the processes themselves, but also see which factors mattered most in the districts’ selections and how these factors interacted.

*Alder Brook School District*⁷

Alder Brook is a suburban district in an open-territory state. As director of curriculum, Robert Evanston facilitates a selection process that reflects the main characteristics of a typical process. In this district, materials are reviewed and selected according to a predetermined adoption schedule. A committee composed of teachers makes the final decision, although they work closely with the curriculum leader. In our interview with him, Robert described this process.

**Robert Evanston, Director of Curriculum
Alder Brook School District**

We were on a five-year cycle. When it's math's year, around October, I would call the textbook companies. We get a vendor list, vendors that are approved through the state. I would tell them to send their samples to my schools, and I asked them not to send them until around the end of January, so we'd get through Christmas.

I would meet with the staff of each building and say, "You'll be getting these samples. Be looking at them. Have some dialogue." Most of our schools had common planning time at grade levels, and they would meet, really, without my guidance, as a grade level, just getting some input. Then we had a math textbook committee, with a representative from each grade. When I had a district meeting, the math representative would come with their colleagues' opinions.

Usually, when we got together as a math committee, we would have three or four choices to look at. The teachers had already weeded out some that were not comprehensive, when they looked at them on their own. Then each grade level will have a little form and look at, say, Numeration. How would you score that according to that standard? Numeration. Was it completely covered? Or was it just barely there? Each company got a score for each standard. Then you'd see which textbook had the most complete coverage.

Then, our district has what we call power standards. Even though the state gave us indicators, the district chose power indicators, and these were ones that the teachers felt the kids had to have before they go to the next grade. We wanted to make sure that those power indicators were not just covered, but covered in depth in the text. Our power standards might be different than the district next to us, because we had to look at our data, our student data. Their strengths and weaknesses. So you have those, and then they look at the text to see, "Are the power standards covered in depth? What kind of instruction do they suggest?"

Because, as much as I dislike it, there are some teachers who look at the textbook as their bible. It's just a guide, not your bible. But we wanted to make sure that they had good instructional strategies there, and that they were explained well. Then we would also have to look at the assessment. What assessment pieces came with it? You know, was it just basic factual things? Was there some real world connection? Higher level thinking? All that stuff: Was it teacher friendly? Was it student friendly? Were the graphics pretty, because you know, kids like colorful things. Did it have a lot of student engagement? And we also had to look at, was there integration with writing? What professional development is going to be needed, to get teachers to be able to implement this series? There were a lot of factors that they had to look at.

Then, the textbook representatives would come in, and they would meet with the committee.

I usually let the teachers decide, as long they could show me on the little forms that they would fill out, it does cover their indicators, and it does have, you know, multiple kinds of assessment, student engagement, integration of the writing, you know... I respect their opinion. Because I always felt like, if they had a buy-in with it, they're going to do a better job than if I just said, "No, you're not getting that. You're getting this." Now if they picked a book just because it had a lot of pictures, and if it didn't meet the criteria that we had set, I didn't hesitate to say no.

⁷ (The names of all individuals and school districts have been changed.)

This story offers an example of a process influenced by several major factors, including teacher acceptance, the use of criteria, and the use of data. Teacher acceptance is a consistent theme throughout the process, from the earliest stage, when all teachers are encouraged to “have some dialogue,” through the work with the math committee, and ending with the selection of the materials. The importance of the role of teacher acceptance is also evident in Robert’s remark, “I always felt that if they had buy-in with it, they’re going to do a better job than if I just said, “No, you’re not getting that. . .” This remark also reveals Robert’s attitude about his role in the process, in which he assumes a more neutral stance, while reserving the right to veto unacceptable materials. His advocacy, therefore, is not a strong influence in the choice of materials. The use of criteria and the use of research and resources as factors are also in evidence, both in the use of the alignment check against state standards and in the reliance of district test data to check alignment with the district power standards.

Slippery Creek School District

Hope Lange is the curriculum coordinator in Slippery Creek, a small rural district. Hope’s account of the selection process in her district offers an example of a process in which the administrator plays a more prominent role. In fact, in this example, Hope is highly involved and influential in the process. Her approach emphasizes the selection of materials that will support improvements to the mathematics program. Although a committee of teachers does play a substantial role in this process, Hope’s decision to review only NSF-funded materials limited their choices. Hope described her approach to this selection process.

**Hope Lange, Curriculum Coordinator
Slippery Creek County School District**

Last year was my first as curriculum coordinator, and I practically stroked out at what they were using for math. I thought, “Oh, my goodness. How am I going to fix this?” Primarily, the teachers “do math.” They don’t understand math; they do math. It’s all standard algorithm. They assess kids using photocopied, multiple choice, bubble tests. There’s very little hands-on. Kids don’t conceptually understand. They have no fluidity of thinking about math. I had been involved in setting up a selection process for a new math program a few years ago in my former district. I had done a lot of research and knew what to look for.

I had a math curriculum committee, with grade level representatives. So we had a K rep, a one rep, etc. And basically we talked about what we’re doing and why we’re doing it, and I was very blunt. I used state test scores to show that we were in trouble mathematically. We went to the data, and I said, “Woo, folks. We’re walking this thin edge of barely meeting.” For me, there was the real concern about math instruction. But my entry point was the state test scores.

Then I went to the state department of education and talked to the mathematics curriculum specialist. I was trying to figure out, maybe I should get some [replacement] units out to the people to get them in to looking at math differently. The specialist said, “I wouldn’t start with [those] if you’ve got people who don’t understand math.” Then I got to thinking. And I was talking to some people from a local math and science collaborative, and I just said, “Why don’t we just pilot the best of the best out there?” And they suggested that I look at NSF-supported series. And then we piloted this year. We [piloted two of the programs]; we were unable to pilot [a third], because they were in the middle of a rewrite.

And I was trying to think of how to structure this so that I didn’t have to get into, “This is my agenda.” So I basically told people that I went to the math collaborative and the Department of Education, and they suggested I look at standards-based programs that had been reviewed by National Science Foundation. I know the work’s not real new anymore, but it gave me something to hold onto. And I really had no agenda, once we put that parameter around what they were looking at.

The teachers piloted the materials. Then we had a math curriculum committee meeting. I was so prepared. I had this wonderful process for evaluating stuff. And people just said, “[The first program] is just too hard to implement. It’s too language-heavy.” But the people who tried [the second program] loved it. It’s got all the bells and whistles for ease of implementation. They said, “We’re ready to make a decision.” So next year we’re going to be instituting [the second program].

I’m trying to lay some groundwork for major change, and we’re getting there. I don’t hammer it to death. I just say it like it’s a fact: “We’re troubled mathematically.” So people know that. They may not believe it, but they’ve heard it enough to know that it’s a belief system here. What I’m seeing—and my perceptions may not be accurate, because staff know I’m a proponent of the change—but what I’m seeing is acceptance.

This story offers a strong example of a process influenced both by the advocacy of the leader and other major factors. Hope’s willingness to narrow the committee’s choices stands in contrast to those of other leaders (like Robert) who assume a more neutral stance. The factors of use of research and resources are evident throughout the story, both in the reliance on state test data as an “entry point” into the discussion, and Hope’s decision to seek the opinions of “trusted sources” in the department of education and local math collaborative.

Garden City School District

Garden City is a mid-sized district in a state that has a state-adoption process for instructional materials. Susan Hall is the K-12 mathematics coordinator for the district, and organizes a process for selecting new instructional materials for mathematics that is similar to many others in the state. In talking about her selection process, Susan shared the following story.

Susan Hall, K–12 Mathematics Coordinator Garden City Public Schools

We have teacher committees for different levels. We had a grades 6–8 committee. We had an Algebra 1, Geometry, and Algebra 2 committee. We had a pre-calc, and calculus, and stats committee. We use the criteria form developed by one of the university-based state resource centers as a reference. We study the texts in detail. And then we looked at textbooks only to see how they correlated with the state standards. We documented all of that. After that was done, then we looked somewhat at ancillaries and supplemental materials that came with the books. After that we narrowed it down to the top three choices. Then the publishers were called. We have a closed adoption, which means that the publishers are not allowed to go out and visit the teachers or talk to them. So the publishers are then called to present on the top three choices. And then we narrowed it down to our first choice.

At central office we were not members of the committee nor did we vote. Because I just think it needs to be a teacher’s decision. They are teaching from the book and they are using the materials. It gives them more ownership. That it wasn’t somebody else that’s not teaching everyday in a classroom making the decision for them. The math specialists at central office pretty much ran those meetings and did the work. Their role was to facilitate, to organize, to make sure to keep everyone on task. But in no way to influence their decisions.

From experience I’ve gone through many different situations and it’s just very important to remain neutral from my end. And to let the teachers decide, but to give them the tools that they need so they’ll make sure they’ve done a good evaluation. I think the ultimate choice is the teacher’s. They are going to use those materials. And they’re in the rooms every day with the kids and so they’ve got a lot of knowledge. And it’s interesting to see so many different opinions. And you know it’s interesting to see the politics of what plays out.

I didn't have any expectations of what they would choose, because the instructional materials that I looked at this time were all pretty similar. There was some debate, I think they discussed some of the pedagogy that was in the books. I can't give you a lot of detail on that because I wasn't in those meetings.

In this story, clearly one of the key factors was teacher acceptance of the materials. The curriculum leader shared her perspective about how important it is for teachers to have ownership of the decision, and for the process to respect their classroom knowledge and expertise. In this district, not only was it important for teachers to provide input on the decision, the curriculum leader and central office staff remained neutral in the decision-making process.

Another critical factor in this district's story was the alignment of the materials to state standards and tests. In fact, the first step in the district's review process was to determine how well instructional materials programs under consideration correlated with their state standards. Also evident in this district's process was the use of an established set of criteria to evaluate the quality of the materials. This district reached out to their local university resource center to obtain these criteria and access resources to support their selection process.

Springfield High School

Springfield, a very rural school district with a small mathematics department, has an informal approach to choosing mathematics materials. High school teacher Tanya Moeller reviews textbook choices with her colleague in the mathematics department, Sue Marsh, and together they decide on the books they will use in each course they teach. Describing what happened in her high school, Tanya recounted the following process.

Tanya Moeller, High School Teacher Springfield Public Schools

We kind of made our own criteria, what we liked about the books. We then came to each other with three books that we really liked. And then we'd explain why. In the end, we both sort of, nodded our heads, and we thought this one book was the way to go. We won't buy the books for a few months, so I may, over the summer, take a second look at some, just to make sure that we are getting the top dog, the best fit.

This is a very rural district, with a forty-five percent Hispanic population. And a few years ago, the district had some difficulty, particularly with the state exam. I think we were ranking towards the bottom. And last year, we're seeing some genuine progress. At least in math. Around February is when we started working on the actual adoption for the main high school math courses: Algebra I, Geometry, and Algebra II, in particular. I teach currently Algebra II, Geometry and Calculus. Those three courses. And Sue, our other math teacher, is teaching both sections of Algebra I. She has predominantly the Algebra I course, and she's taking care of the College Trig or College Algebra. Both of us were involved.

The principal got the ball rolling by just calling several companies, and bringing in as many samples as he possibly could. I think, in all, I reviewed maybe about eight or nine Algebra II books, maybe the same number of Geometry books. And he gave us some time to just isolate ourselves a little bit, and just take a good look. He didn't give us real criteria, but we kind of made our own criteria. What we liked about the books. Just came up with a really crude rating system of what we liked about the books.

For me, it was readability. I'm not too much of a fan of very busy web-page like flashy books. Of course, spiraling. And just all-around, readability. What types of problems? Maybe, the format. Like, for instance, what we really liked about one publisher's text was the idea that they had worked out examples in the back of the book. That we could possibly include as homework. And academic rigor, which was one of the recommendations the state department of education gave us this year. You know, across the board, in all subjects. So, we kept that in mind.

We then each came to each other with three books that we really liked. We narrowed it down. There's a few of them that I just simply found unbearable to look through. I didn't spend too much time looking through those, and we narrowed it down to three, then we narrowed it down to two. In the end, we both thought this one book was the way to go.

Although Springfield High School has a very informal process for selecting the textbooks for their high school mathematics courses, this story still reflects a number of the key decision-making factors that are described earlier in this paper. The two mathematics teachers, Tanya and Sue, have a tremendous amount of input into the choice of texts, and ultimately the two of them are the decision makers. In addition, while not working from a rubric or a written set of criteria, these teachers do indeed develop criteria such as readability, academic rigor, and the presence of worked-out examples to guide their close examination of their choices. While not prominent in the story, the district's disappointing results on a previous state exam and the desire for improvement also influenced the selection process.

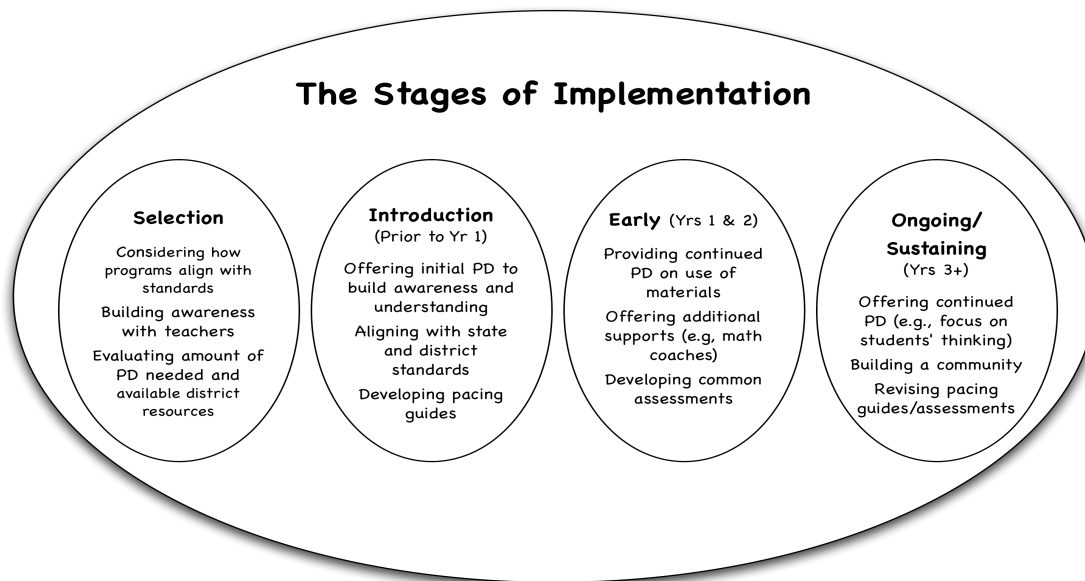
Across this set of district vignettes, we can see that the selection process looks somewhat different in these varied district contexts. Yet the set of selection factors that influence the choice of instructional materials that we identified in our research (e.g., alignment to state standards and tests, use of established criteria) are evident in many districts' selection processes. Within any individual district, there may be a factor that plays a more prominent role — for example, in one district a curriculum leader may advocate strongly for a particular approach or set of materials — but more often, a combination of critical factors appears across the stories. In each district, usually there are a number of influences at play and they interact in different ways, depending on the context of the district and often, the state context.

Discussion of Findings

Instructional materials do not stand alone: they must be carefully aligned with other elements of practice and policy at the district and school level to provide teachers with the coherent instructional guidance (Spillane, 1998) needed to enact the materials' vision for classroom practice (Boyd et al., 2003; Briars & Resnick, 2000; Char, 2004; Lord et al., 2000; Schoenfeld, 2002; Stein & Coburn, 2008; Swafford & Langrall, 2008). Ensuring the adopted materials are used and used well is a significant challenge.

The selection of materials is often seen as separate from the implementation of the materials; implementation is thought of as what happens once the materials have been chosen, purchased, and put in place in the classroom. But, based on our findings, we would argue that selection and implementation are more connected; what happens in the selection process affects and prepares for the implementation. Selection is the first step, and a critical one, toward successful implementation of new materials that support program improvement. The elements of a successful implementation – teacher and administrator commitment to use, professional learning opportunities, the alignment of materials with the district scope and sequence and related assessments, classroom support for the use and adaptation of materials – all begin in selection. (See Figure 3.)

Figure 3: The Stages of Implementation



In our own study, we found that school districts vary in the degree to which they provide and align all the supports necessary for coherent implementation (Mark, et al., 2010). But we also found the factors that matter most in selection do reflect consideration of the important elements of implementation. When discussing the selection process, the factors curriculum leaders revealed as important did suggest they were thinking ahead to implementation. We found that in the selection process, as individuals or committees consider each set of materials, they engage in a series of activities connected to future use of the materials, and these activities reflect the key factors we have described in this paper.

- They consider the strengths and weaknesses of the materials according to a particular set of criteria that include indicators of instructional quality.
- They evaluate the alignment of those materials to important benchmarks expressed in their state or district standards or state tests.
- They consider the degree to which teachers will be required to adapt their classroom practices to use the new materials well, and the (often expensive) supports that will be necessary for teachers to do so effectively.
- They consider the vision for mathematics education in the district (usually, as represented by the vision of a mathematics coordinator, assistant superintendent, or other mathematics leadership group) and whether the materials align with that vision.
- They collect and consider the information available about each program, including research on materials effectiveness, evaluations of programs done by other entities, use of materials by nearby districts, as well as the related effects on their state tests and what trusted sources outside the district (e.g., regional resource centers) have to say about the quality of the materials.

The data curriculum leaders and teacher committees gather, and the conversations they have about the quality of the materials, their degree of alignment to important benchmarks, and the supports needed for successful implementation serve not only to help them choose the most

appropriate program to purchase, but also provide the initial information that helps to form a plan for implementation.

Conclusion

As curriculum leaders and selection committees engage in the process of choosing mathematics instructional materials, it is evident that even when the design of the process varies, there is a common set of factors that matter most. In this era of accountability, the role of state standards and tests in affecting selection decisions cannot be overlooked. Yet, in our study consideration of alignment to state standards and tests was just one of the primary factors garnering the attention of curriculum leaders and selection committees. As the district stories illustrate, there were other key factors in play (e.g., teacher acceptance, criteria) that ultimately affected which textbook districts choose. In almost all of our interviews, these influences were intertwined and reflected the complexity of the selection process. Furthermore, we found that the careful attention given to these factors exemplified how the selection process affects and helps prepare for the implementation of the new mathematics materials. Thinking about the selection process separately from implementation undervalues the work that occurs as districts make selection decisions. Instead, the selection process should be thought of as the first step in implementation, and as part of an overall strategy to improve a district's mathematics program.

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