

CHOOSING BLINDLY

Instructional Materials, Teacher Effectiveness, and the Common Core



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Matthew M. Chingos and Grover J. “Russ” Whitehurst*

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EXECUTIVE SUMMARY

Students learn principally through interactions with people (teachers and peers) and instructional materials (textbooks, workbooks, instructional software, web-based content, homework, projects, quizzes, and tests). But education policymakers focus primarily on factors removed from those interactions, such as academic standards, teacher evaluation systems, and school accountability policies. It's as if the medical profession worried about the administration of hospitals and patient insurance but paid no attention to the treatments that doctors give their patients.

There is strong evidence that the choice of instructional materials has large effects on student learning—effects that rival in size those that are associated with differences in teacher effectiveness. But whereas improving teacher quality through changes in the preparation and professional development of teachers and the human resources policies surrounding their employment is challenging, expensive, and time-consuming, making better choices among available instructional materials should be relatively easy, inexpensive, and quick.

Administrators are prevented from making better choices of instructional materials by the lack of evidence on the effectiveness of the materials currently in use. For example, the vast majority of elementary school mathematics curricula examined by the Institute of Education Sciences What Works Clearinghouse either have no studies of their effectiveness or have no studies that meet reasonable standards of evidence.

Not only is little information available on the effectiveness of most instructional materials, there is also very little systematic information on which materials are being used in which schools. In every state except one, it is impossible to find out what materials districts are currently using without contacting the districts one at a time to ask them. And the districts may not even know what materials they use if adoption decisions are made by individual schools. The National Center for Education Statistics (NCES), which has the mission of collecting and disseminating information related to education in the U.S., collects no information on the usage of particular instructional materials.

This scandalous lack of information will only become more troubling as two major policy initiatives—the Common Core standards and efforts to improve teacher effectiveness—are implemented. Publishers of instructional materials are lining up to declare the alignment of their materials with the Common Core standards using the most superficial of definitions. The Common Core standards will only have a chance of raising student achievement if they are implemented with high-quality materials, but there is currently no basis to measure the quality of materials. Efforts to improve teacher effectiveness will also fall short if they focus solely on the selection and retention of teachers and ignore the instructional tools that teachers are given to practice their craft.

Choosing Blindly: Instructional Materials, Teacher Effectiveness, and the Common Core



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We believe that this is a problem that can be fixed. Specifically, we recommend the following actions:

- **State education agencies should collect data from districts on the instructional materials in use in their schools.** The collection of comprehensive and accurate data will require states to survey districts, and in some cases districts may need to survey their schools. In the near term, many states can quickly glean useful information by requesting purchasing reports from their districts' finance offices. Building on these initial efforts, states should look to initiate future efforts to survey teachers, albeit on a more limited basis.
- **The National Center for Education Statistics should develop data collection templates for states to use through its Common Education Data Standards (CEDs), and provide guidance on how states can use and share data on instructional materials.** The most recent version of CEDs contains 679 data elements for K–12 education, none of which relate to instructional materials in use.
- **The National Governors Association (NGA) and Council of Chief State School Officers (CCSSO) have put their reputations on the line by sponsoring the Common Core State Standards Initiative. Research based on current and past state standards indicates that this initiative is unlikely to have much of an effect on student achievement in and of itself. The NGA and CCSSO should put their considerable weight behind the effort to improve the collection of information on instructional materials in order to create an environment in which states, districts, and schools will be able to choose the materials most likely to help students master the content laid out in the Common Core standards.**
- **The Data Quality Campaign (DQC) has had tremendous success in encouraging states to collect high-quality education data with the goal of improving student achievement. The DQC should use its influence in this area to encourage states to collect information on the use of instructional materials and support them in their efforts to gather these data. The DQC should also help states use the data once they have been collected.**
- **Major philanthropic organizations such as the Bill and Melinda Gates Foundation and the Lumina Foundation for Education have invested heavily in education reform efforts. Given the current strain on state budgets, most states are unlikely to undertake new data collection efforts. Foundations could have a major impact by providing the start-up funding needed to collect data on instructional materials and supporting the research that would put those data to use.**

“The sheer absence of trustworthy fact regarding the text-in-use is amazing.”

Lee J. Cronbach (1955)¹

Instructional Materials are Important

Student learning occurs primarily through interactions with people (teachers and peers) and instructional materials (textbooks, workbooks, instructional software, web-based content, homework, projects, quizzes, and tests). The contexts within which these interactions occur are surely important. The effectiveness of teachers, the behavior of peers, and the instructional materials with which students have the opportunity to interact are affected by layers of influences that range from circumstances in the home, to leadership in the school, to the international macro-economy and everything in between. But students do not engage in instructional interactions with the governance mechanism for their school or with state standards or with a school district’s evaluation system for teachers or with collective bargaining agreements or with the leadership qualities of their school principal—they learn by engaging in cognitive processes that are triggered and shaped by interactions with people and instructional materials.

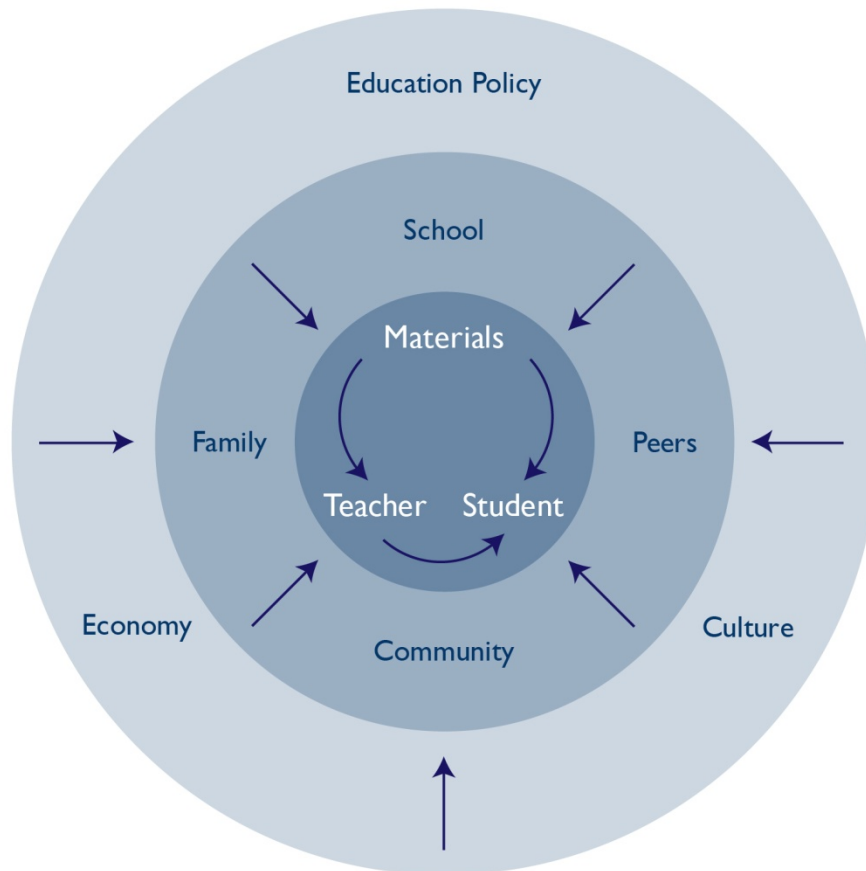
The balance between attention to context and attention to instruction has come to be substantially out-of-kilter among education policymakers.² It is as if the managers of a professional sports team spent most of their time and resources on the layout of the stadium, the advertising of the games, the logistics of travel, and the equipment in the weight room while giving little attention to playing the game itself. Instructional interactions are the core of student learning but policymakers attend mostly to context. We must give priority to the education policies that are most likely to improve instructional interactions if we are going to achieve substantial progress in student achievement.

This report focuses on instruction materials, which have a direct influence on student learning as students interact with them. For example, over 50 percent of fourth graders do math problems from their textbooks daily.³ But instructional materials also have a strong indirect path of influence on student learning via their effects on teachers. Commercially produced instructional materials dominate teaching practice in the United States—available estimates indicate that 70 to 98 percent of teachers use textbooks at least weekly.⁴ Teachers vary considerably in the way they use textbooks, teacher’s guides, and assessment materials, with some teaching strictly to-the-book and others exercising considerable flexibility.⁵ Despite such individual variability, in general, teachers are much more likely to cover topics presented in the materials selected by their school or district than to cover topics not included; they are likely to follow the sequence of topics in the selected materials; and their pedagogical approach is influenced by the instructional design of the materials.⁶ The evidence is clear that

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Influences on Student Learning

Students learn primarily through interactions with teachers and instructional materials.



instructional interactions between students and teachers are framed by the instructional materials that teachers are provided by their schools and districts. That instructional materials exercise their influence on learning directly as well as by influencing teachers' instructional choices and behavior makes instructional materials all the more important.

There is strong evidence that the choice of instructional materials has large effects on student learning—effects that rival in size those that are associated with differences in teacher effectiveness. For example, in a large-scale randomized comparative trial of the effectiveness of four leading elementary school mathematics curricula (consisting of a textbook, ancillary materials, and teacher professional development), second-grade students taught using Saxon Math scored on average 0.17 standard deviations higher in mathematics than students taught using Scott Foresman-Addison Wesley Mathematics.⁷ By way of

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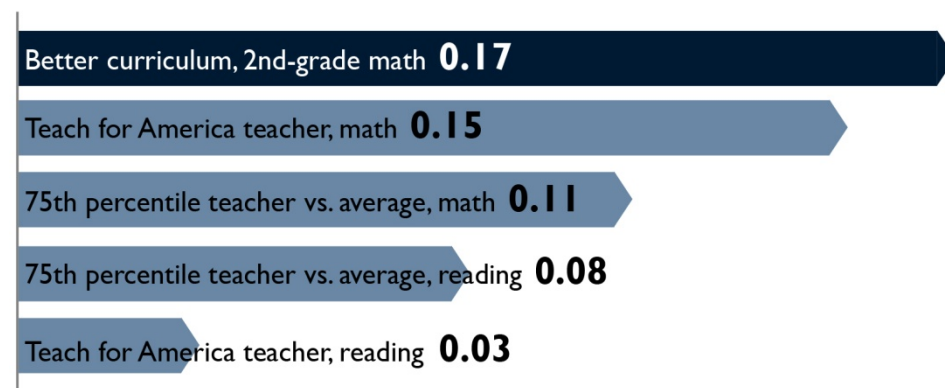
comparison, a review of 10 studies of teacher effectiveness found that a student taught by an above-average teacher—one at the 75th percentile—will learn more than the student of an average teacher by 0.08-0.11 standard deviations.⁸ A study of the impact of Teach for America (TFA) teachers on elementary school students' achievement found that students randomly assigned to TFA teachers experienced 0.15 of a standard deviation improvement in math compared to non-TFA teachers. The TFA effect on reading scores of 0.03 standard deviations was not statistically significant from zero.⁹

The evidence suggests that choice of instructional materials can have an impact as large as or larger than the impact of teacher quality. But whereas improving teacher quality through changes in the preparation and professional development of teachers and the human resources policies surrounding their employment is challenging, expensive, and time-consuming, making better choices among available instructional materials should be relatively easy, inexpensive, and quick.¹⁰

Curriculum Matters

The choice of instructional materials can have an impact as large as or larger than the impact of teacher quality on student test scores.

Effect size, in standard deviations, of selected interventions on student test scores



For data sources, see text

Existing Empirical Evidence has Limitations

Determining the effectiveness of instructional materials through large-scale randomized experiments is rare because it is expensive and time-consuming. For example, the federally-sponsored comparative study of elementary math curricula described previously was budgeted at \$21 million and spanned several years. There is a much larger body of smaller studies examining the effectiveness

of the introduction of a new package of instructional materials compared to what are typically ill-defined existing instructional materials. Such studies are a staple of the Institute of Education Sciences What Works Clearinghouse (WWC) and provide useful information, but they have several limitations.

The first limitation is that many instructional materials have not been evaluated at all, much less with studies that produce information of use to policymakers and practitioners. Of 73 elementary school mathematics curricula examined by the WWC, 66 either have no studies of their effectiveness or have no studies that meet reasonable standards of evidence. This problem will only worsen with the explosion of open-source web-based instructional materials. The second issue is that commercial instructional materials are frequently updated whereas many studies of the effectiveness of those materials are of out-of-date versions. For example, one of the studies of Saxon Math that contributes to the current WWC rating of that curriculum was conducted in 1992, when Saxon Math had a different author and publisher than the current edition. It is extraordinarily difficult to even determine the revision history of instructional materials that are marketed under the same name over many years, much less to determine whether the evaluated version of the materials is different enough from the currently marketed version to invalidate the evaluation results.

The final limitation is that most existing studies of the effectiveness of instructional materials are carried out with small samples of convenience and ill-defined comparison conditions that compromise the usefulness of the results for individuals charged with choosing instructional materials. For example, a study demonstrating that curriculum A is more effective than an unspecified home grown curriculum in the classrooms of middle schools in the suburbs of Minneapolis provides less than certain guidance for the curriculum selection committee for the Atlanta public schools that is trying decide whether curriculum A would be better than curriculum B for grades K–8. This is because curriculum B was not part of the study in Minnesota, the demographics of the student population in Atlanta are different, the grade span is different, and the teachers in Atlanta may well have a different skill set than those in Minnesota.

These limitations of the existing research on the effectiveness of instructional materials call for a parallel in education to epidemiological research in health care. In health care, epidemiologists use existing administrative records and survey data to study the distribution and patterns of health events (such as breast cancer), health characteristics (such as diet), and their causes or influences in well-defined populations (such as the relationship between diet and breast cancer in middle-aged Caucasian women). In education, we could be collecting information at the school and classroom levels on the instructional materials in use and examining the associations between those materials and student achievement by type of student, teacher, and school. With such data we could

begin to look for patterns that are associated with higher levels of student achievement, and we could fill some of the gaps and lessen some of the uncertainties that are associated with the existing body of studies of instructional materials.

Epidemiological methods have their own limitations, as we see with some frequency in the field of health when the results from a gold-standard randomized trial differ from those that were suggested in epidemiological research using the naturally occurring associations between variables in populations. For example, the impact of hormone replacement therapy on menopausal symptoms was thought to be entirely positive based on epidemiological studies from the 1990s, but randomized trials subsequently demonstrated that combination hormone replacement therapy increases the chance of breast cancer by 75 percent. Knowing that studies that are based on examining associations among natural occurring variables can sometimes send false signals about causation, advocates of rigorous research in education frequently take the position that research has to be substantially free of causal ambiguities if it is to be used to support high-stakes decision-making. But this is a classic case of the perfect being the enemy of the good. Epidemiological approaches generally have greater uncertainty associated with their findings than do randomized trials. But they provide a far better basis for choices than intuition, professional wisdom, whim and fancy, convenience, and vendor advertisement—all of which now dominate the selection of instructional materials for classroom use. Further, there are continuing methodological advances that can increase the confidence with which causal conclusions can be drawn from non-experimental data.¹¹

An educational epidemiology of instructional materials and student achievement requires having information on teachers, schools, students, and instructional materials at the level of individual students, teachers, and schools. Before we have a hope of knowing whether one curriculum is a better choice than another, we must know which students are being exposed to which instructional materials. Most states already have the requisite information on teachers, schools, and students and the rest will soon have this information. However, we know almost nothing about the instructional materials being used. At best, in terms of public data, we have the list of approved materials in statewide adoption states, but this does not tell us what is being used in individual school districts much less individual schools and classrooms. Publishers know what they sold to whom but this is closely guarded proprietary information and does not in any case include open-source materials or track materials to individual classrooms. The National Center for Education Statistics (NCES), which has the mission of collecting and disseminating information related to education in the U.S., collects no information on the usage of particular

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instructional materials. The Institute of Education Sciences, which houses NCES, has published one study on instructional materials in use in the mid-Atlantic region.¹² It drills down to the district level for major categories of core texts, supplemental materials, and assessments using survey data and demonstrates the feasibility of a widespread data collection effort in this area. It was initiated in response to requests from state education agencies that wanted to know what materials districts had adopted. Despite this interest from states, only one state in the country, Florida, currently collects information on instructional materials from its districts.

The opening quote from Lee J. Cronbach indicates that we didn't know what instructional materials were in use in the 1950s. It is more than a half-century later and we still don't know. How can we tolerate ignorance on something that is as critical to student learning as instructional materials?

Instructional Materials are Tied to Major Policy Initiatives

The two areas of educational reform that are presently receiving the most attention from policymakers are Common Core state standards and teacher effectiveness. Forty-six states and the District of Columbia have signed on to the Common Core State Standards Initiative, a project sponsored by the Council of Chief State School Officers (CCSSO) and the National Governors Association (NGA). The Common Core spells out what students should learn in mathematics and English language arts from kindergarten to the end of high school. Proponents argue that the Common Core will raise expectations for student achievement in most states, unleash a new era of development of instructional materials based on the scale afforded by 46 states having the same standards, and allow for more coherent and practically focused training and professional development of teachers. Yet work done by the Brown Center on Education Policy at Brookings has found little to no association between the quality of learning standards across the 50 states and either student achievement at a single point in time or gains in student achievement over time.¹³

The most likely explanation for the lack of a relationship between standards and student achievement is that standards are a very leaky bucket, with the effect on instructional interactions in the classroom being little more than drips and drabs of the content standards adopted at the state level. Instructional materials are likely to mediate the degree to which content standards influence classroom instruction. But we already see major publishers of K–12 instructional materials touting their products as aligned with the Common Core. Historically a demonstration of alignment with state standards has required little more than making sure that everything listed in the standards can be found under the same name in the table of contents or index in the publisher's materials.¹⁴ Materials that are identically aligned at this superficial level are likely to differ

substantially in their functional alignment and effectiveness. For example, each of the four early math curricula examined in the IES study we previously described is characterized as aligned with the Common Core on the publisher's website. However, as we have documented, the curricula differ dramatically in their effectiveness in raising student achievement. If the investment in the Common Core is going to pay off, an empirical link between standards and instructional materials must be provided. If we do not even know what instructional materials students are using, we will be completely in the dark and unable to discern that the Common Core standards are working in some places and not others in interaction with the materials that are deployed and characteristics of teachers.

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Reforms in the area of teacher effectiveness have to date focused on identifying persistently effective and ineffective teachers based on classroom performance and instituting human resource policies that are designed to reward persistently effective teachers, deselect persistently ineffective teachers, and target professional development to teachers most in need of improvement. These policy initiatives are based on the implicit assumption that the overall bell-shaped distribution of teacher effectiveness is more or less a fact of nature and that the characteristics of individual teacher performance that contribute to student learning mostly endure over time.

Policy initiatives focused on selecting and retaining more effective teachers based on on-the-job performance are likely to yield benefits, but the goal of human resource policies in most fields in which human performance is mission critical is to reduce the distribution of performance across individuals through training and technology. Thus every commercial airline pilot is good enough for passengers to have a high expectation that they will safely reach their destination. This is because pilot training is specific, extensive, and ongoing; and pilots fly aircraft and are subject to flight control systems that have been designed to reduce errors related to human factors.

The analogous supporting tools for teachers are instructional materials. We can expect both theoretically and based on existing research that effective instructional materials either reduce the variability in performance across teachers, raise the overall performance level of the entire distribution of teachers, or both.¹⁵ To focus education reform policy on selecting and retaining effective teachers while ignoring the role of instructional materials is to pay too much attention to the aspects of teacher quality that are set in stone and too little attention to ways that the effectiveness of all teachers might be improved and the variability among teachers reduced.

In summary, instructional materials matter in their own right as students interact with them, as a shaper of the interpersonal instructional interactions between teachers and students, and as conduits and levers by which reform

policies focused on standards and teacher effectiveness play out. Despite the obvious importance of instructional materials to learning and instruction, our knowledge of what materials are being used much less their relative effectiveness is severely limited. This can be fixed. We turn to how in the next section.

What Information to Collect

The systematic collection of information on the instructional materials currently in use is not as straightforward as measuring the number of female Hispanic students in the fourth grade in a given school or the number of art teachers employed by a given district. Instructional materials encompass a variety of forms, including textbooks, workbooks, educational software, and other ancillary materials. Different materials are used for each grade and subject. And the adoption of these materials occurs at different levels in different places. Some states adopt a list of approved materials from which districts and schools must choose. Other states do not have a mandated list, and of course the adoption of materials by a district or school does not guarantee their use in every classroom.

The most comprehensive information gathering effort would identify the instructional materials used in every classroom. The only way to assemble such information would be to survey teachers about every class they teach, and in most states it is impractical to undertake such a costly data collection effort every school year. But given that most states currently have little or no information on what instructional materials are in use, there are concrete steps they can take immediately, with relatively little difficulty, to make the transition from knowing nothing to knowing something. At the same time, they can start to put into place plans that will enable the collection of more detailed information in the future.

We propose three strategies for the collection of information on instructional materials. Different combinations of these approaches will be appropriate in different states. First, states can collect from the purchasing departments of school districts information on the instructional materials ordered in each school year. Second, districts can be surveyed about the materials used in their schools, as was done in the Institute of Education Sciences study of instructional materials used in the mid-Atlantic region.¹⁶ Third, states can periodically survey teachers on the instructional materials they actually use, which may differ from the ones officially adopted by the school or district.

There are concrete steps states can take immediately, with relatively little difficulty, to make the transition from knowing nothing to knowing something.

Data Collection from Purchase Reports

Every year, school districts across the country purchase instructional materials and keep some record of what they are buying and at what price. In fact, they must use those records to produce financial accounting data that are routinely collected by NCES.¹⁷ But only one state, Florida, currently gathers this information on a statewide basis and makes it publicly available. Data on the purchase of instructional materials can be used to learn simple facts about what instructional materials are used in specific districts and in the state as a whole. For example, in Florida one could learn that in 2010 Broward County purchased 20,200 copies of the Houghton Mifflin Harcourt Publishing Company's "Go Math! Florida Student Bundle" for their fourth-grade students, along with 918 copies of the teacher edition.¹⁸

Every year, districts collect and report information such as student enrollment, the number of teachers employed, and per-pupil expenditures. Districts could also be required to report the instructional materials purchased during the course of the year for each grade in at least the three core subject areas of math, language arts, and science. Data elements should include:

- The type of instructional material: primary (e.g., textbooks), supplementary (e.g., workbooks), software, assessments, etc.
- The name, publisher, and ISBN number of the product.
- How many copies were purchased and, if available, the price (which may present complications due to the bundling of materials by publishers).

The great advantage of this type of information is that most school districts should already have it, and it should be available for both current and previous school years. But an important disadvantage of purchase data is that they only capture instructional materials at the moment of purchase. Historical information can help identify materials purchased in previous school years, but is unlikely to give a complete snapshot of the materials in use in a district in a given year. And in some districts, individual schools decide what materials to use. As a result, the district purchasing reports will indicate the purchase of multiple products for the same grade and subject. For example, four different middle school math curricula were purchased by the Miami-Dade schools in 2004.¹⁹

Gathering district purchase reports would bring most states from knowing nothing about instructional materials in use in their schools to having information for every district in the state. But given the limitations of information gathered from purchase reports, this method of data collection is only a starting point that states might consider. In order to obtain data on the instructional materials actually in use in a given school, grade, and year, states will need to gather this information from districts through a survey instrument.

And in some cases, districts will need to gather data from individual schools in order to report it to the state.

Surveys of Districts and Schools

A survey of districts on the instructional materials they actually use is most straightforward in states where districts adopt instructional materials from a state-approved list. This was the procedure in place in Indiana until 2007-08. In order to ensure compliance with state law, districts were required to submit adoption reports to the state, which were then compiled and published. One could use these data to learn, for example, that during the 1998–2004 adoption cycle three instructional products accounted for 86 percent of all adoptions for elementary school math instruction.²⁰

Indiana ended its collection of such information once it stopped requiring districts to choose instructional materials from a state-approved list. But states that remain “adoption states,” and where districts choose materials for all their schools, could require districts to report which materials they chose for each grade and subject. These states are often on adoption cycles, so the information would only need to be reported as often as adoptions change.

But in practice districts in adoption states may deviate from the approved list, and some may allow schools to choose materials. And of course many states do not have an approved list, with full responsibility for choosing instructional materials residing at the district or school level. Consequently, we suspect that most states will need to survey districts on the materials they use. This is the method that was used by the Institute of Education Sciences Mid-Atlantic Regional Educational Laboratory (REL) in their 2010 study of instructional materials adoption in Delaware, the District of Columbia, Maryland, New Jersey, and Pennsylvania.²¹ The Mid-Atlantic REL surveyed every district in these five jurisdictions and asked them to report, for select subjects and grades:

- The name of the core text and its publisher, date of adoption, and date due for re-adoption.
- The name and publisher of the supplemental text or materials.
- The name and publisher of the benchmark assessment.

This survey asked districts to identify the most commonly used materials across all schools in the district. As a result, a district that used one core text for 60 percent of its students and another for the other 40 percent would only report the first text. However, many districts still reported using multiple materials despite the instruction to refrain from doing so. Additionally, incomplete or inaccurate information provided by districts sometimes made it difficult to identify which product a district meant to report. We recommend the inclusion of ISBN numbers in future surveys as a way to mitigate this problem.

The survey should be flexible enough to accommodate both districts where adoption decisions are made centrally as well as those where schools make these decisions. Specifically, the survey should include at least the following information for every grade in general education core subjects:

- The type of instructional material: primary (e.g., textbooks), supplementary (e.g., workbooks), software, assessments, etc.
- The name, publisher, and ISBN number of the product.
- A list of the schools using each product when more than one product of the same type is in use for general education within the same grade and subject in the district.

Instructional Materials Adoption Survey

District Name: Broward County	Name of person completing form: _____
District ID Number: 06	Title of person completing form: _____
Date: March 15, 2010	Email/contact: _____

I. CORE MATERIALS

Grade/subject:	Core text publisher:	Core text title:	ISBN:
1st, math	Houghton Mifflin Harcourt	GO MATH! FLORDIA STUDENT BUNDLE	9780547279695
2nd, math	Houghton Mifflin Harcourt	GO MATH! FLORDIA STUDENT BUNDLE	9780547279787

II. SUPPLEMENTAL MATERIALS

Grade/subject:	Supplemental materials publisher:	Supplemental materials title:	ISBN:
1st, math	Houghton Mifflin Harcourt	FLORIDA EXAMVIEW CD-ROM	9780547294650
1st, math	Houghton Mifflin Harcourt	FLORIDA GRAB-AND-GO MANIPULATIVE KIT	9780547259345
2nd, math	Houghton Mifflin Harcourt	FLORIDA EXAMVIEW CD-ROM	9780547294667
2nd, math	Houghton Mifflin Harcourt	FLORIDA GRAB-AND-GO MANIPULATIVE KIT	9780547264448

The Mid-Atlantic REL survey of districts did not achieve a very high response rate, as might be expected in any voluntary survey. Although 90 percent of districts responded to the survey over the course of the seven-month survey period, many responding districts left survey items blank. For example, for Algebra 1, only 53 percent of districts provided the title of the core textbook. Even fewer provided the titles of benchmark assessments and supplemental materials: 13 and 7 percent, respectively. The survey likely posed a greater challenge in states with many small districts, such as New Jersey and Pennsylvania, than in states with a few larger districts, such as Delaware and Maryland.

A state-mandated survey effort with consequences for non-response could generate information from all districts, both overall and for specific survey items.

But the REL survey reveals a potential problem: districts may wish to provide the information but be unable to do so because they simply do not know what materials are being used in their schools. Surely this was the case for some of the districts that responded to the REL survey but left many items blank. If these districts were compelled to send this information to the state government, some might try harder to obtain the information but others might simply report inaccurate information.

Obtaining accurate information from districts will be particularly difficult if adoption decisions are made at the school level. As the fiscal agents, districts in theory should at least know the materials they are buying and for which schools they are buying them. But many districts, particular small ones, may not track this information in a useful way. And even in districts where districts select materials, some schools may not use the materials that were officially adopted by the district—for example, they may continue using materials that were adopted previously. Consequently, at least some states will need to collaborate with their districts to gather school-level information. Every year, public schools already report data items such as student enrollments and pupil-teacher ratios. Collecting school-level information on instructional materials could occur by augmenting this annual data collection effort. With support from the state, districts could gather from their schools the same data items that districts would be required to report to the state.

In order to make it easier for schools to report the needed information, the surveys might include pre-populated lists based on data available at the district level. For example, five different elementary math curricula were purchased by the Miami-Dade schools in 2004.²² If the Miami-Dade school district did not know from its own records which curricula were purchased for which schools, it could send schools a survey listing these five curricula as well as an “other, please specify” option. The list could also include materials purchased in previous years in order to increase the likelihood of identifying schools that are using older materials.

The collection of data from schools is more likely to be necessary in states with a small number of geographically large districts, such as Florida. In states where districts are small, the district is more likely to know—or be able to easily find out—which materials are in use in its small number of schools. For example, Vermont and New Hampshire have an average of 1.3 and 2.8 schools per district, respectively. There are also populous states with many small districts, such as New Jersey with 4.2 schools per district.²³ The important point is that district- and school-level surveys should be thought of as a coordinated effort to obtain accurate and complete information on the instructional materials in use in each school. In some states a district-level survey will suffice to gather

information down to the school level, but in others districts will need to survey schools in order to provide reliable information to the state.

In addition to providing a more accurate and complete picture of the instructional materials that students are exposed to than data from purchase reports, surveys of districts can also elicit information about how instructional materials are selected. This is a subject on which little systematic information is available. In some places, core materials are selected by the district, but in others they are selected by the school or even by the teacher. At the school or district level, materials may be selected by an individual charged with this responsibility or by an official committee formed for this purpose. Researchers could use this information to examine whether some selection methods are associated with the selection of better materials.

Drilling Down to the Classroom Level

With good data from districts and schools in hand, states will have a rich set of information on the instructional materials used in their public schools, both statewide and down to the school level. Efforts to gather this sort of basic information should be undertaken by every state. Looking further down the road, some states may wish to build on this important foundation by initiating efforts to collect more fine-grained information at the classroom level.

States, districts, and schools set standards, measure outcomes, and select instructional materials, but once the classroom door is closed teachers are largely free to teach as they see fit. Some strictly follow the instructional materials that they have been provided whereas others go so far as to substitute their own materials or to continue to use books that have been “retired” by the district. Teachers may use this freedom to use different instructional materials, for better or for worse, than those chosen by the school or district. Teachers also supplement materials purchased from publishers with materials from other sources, such as those brought from a previous school or found online.

A school administrator would in most cases not be aware of what materials are used by every teacher, and thus could not provide this information to the state. In theory, one could survey every teacher every year as to what materials the teacher uses in every one of her classes. But in practice, such an ambitious effort may not be worth the cost. Instead, states could periodically survey teachers, or a random sample of them, on what materials they are using. Specifically, states could ask them to identify:

- Name, publisher, and ISBN number of primary instructional materials used.
- Estimate of percent of time primary materials are used.
- Estimate of percent of time other materials are used.

With good data from districts and schools in hand, states will have a rich set of information on the instructional materials used in their public schools.

- Estimate of time spent on professional development related to curriculum.

States could allow teachers to choose from a list of materials adopted (or previously adopted) in their state, district, or school along with an “other, please specify” option. However, such a list of adopted materials should not be too long or duplicative, which would generate non-response and errors. For example, lists should not include several components of a package that are normally used together, such as the teacher and student editions of the same textbook.

Florida is an exemplary state in that it is currently piloting exactly this sort of survey. All high school teachers will be asked to complete a short survey where they will identify the instructional materials they use. The survey asks teachers to select a subject and course(s). The survey tool lists state-approved materials for each course, and allows the teacher to choose from among those or manually enter materials that are not on the list (or both). Teachers are also asked to report the approximate percentage of time they use each item during instruction. Although the pilot is limited to high school teachers, the state plans to survey all teachers in the future.

The results of a teacher-level survey would enable states to measure the extent to which the instructional materials that districts and schools intend for teachers to use are actually used in the classroom. Researchers would also be able to examine whether the effectiveness of a curriculum was influenced by how much time the teacher devoted to implementing it.

The first time a state conducts such a survey it could compare the results to those obtained from district and school data. If the results are very similar, then it could decide that frequent surveys of teachers are unnecessary. But if the results differ markedly, it might decide to survey teachers more often.

Teachers may not respond accurately to such a survey unless they are guaranteed anonymity. For example, a teacher who prefers to use different materials than those selected by the school or district may not want to admit that to his employer. One solution is to keep the survey results completely anonymous, but that would make it impossible to link the teacher data to the statewide longitudinal database. Another solution is to guarantee that the data will only be used for statistical purposes, and will not be made available on an individual teacher level to the school or district. However, freedom of information laws in some states may complicate the goal of protecting teachers’ anonymity.

Developing Surveys and Collecting Data

Developing the specific survey instruments needed to gather this information from districts, schools, and teachers will take time, and every state should not reinvent the proverbial wheel. Instead, the federal government's National Center for Education Statistics (NCES) should develop templates for states to use through its Common Education Data Standards (CEDS). The most recent version of CEDS contains 679 data elements for K–12 education, none of which relate to instructional materials in use.²⁴ The district survey developed by the Mid-Atlantic REL and the classroom survey currently being developed by Florida provide useful starting points. In addition to developing a survey template, NCES could also develop an electronic tool that would increase the accuracy of information reporting. For example, the tool could pre-populate lists from which survey respondents choose and verify whether manually entered ISBN numbers are valid.

Throughout this report we have assumed that the responsibility to collect data on instructional materials in use will be a state responsibility and not a federal one. There are certainly reasons why a federal effort might be desirable. Districts and schools, through their state education agency, already report data to the U.S. Department of Education's Common Core of Data. One could imagine adding data elements on instructional materials adopted by districts or in use by schools. A federal effort would certainly ensure consistency across states. However, the most powerful use of data on instructional materials comes from analyses that link particular instructional materials to particular teachers, students, and schools. The federal government does not collect or hold such unit record data—only states do. Thus, the collection of information on instructional materials in use should be a state responsibility and this information should be incorporated in each state's statewide longitudinal education database. The role of the federal government should be limited to helping design templates and tools for state use and to linking federal funding to states for education databases to the collection of information on instructional materials.

States may be reluctant to engage in new data collection efforts because of costs. But the budget of the Mid-Atlantic REL suggests that the costs would be quite low. The REL study of four states and the District of Columbia estimated annual recurring costs of data collection and reporting of about \$250,000.²⁵ This works out to about \$220 per district.²⁶ With about 13,500 regular public school districts in the U.S., and assuming no economies of scale, the annual costs for surveying every district in the U.S. would be about \$3 million—a rounding error in the context of the \$600+ billion annual public investment in K–12 education.

These are the recurring costs. They do not include startup costs, which led to the first year of data collection by the Mid-Atlantic REL being roughly twice as expensive as the recurring costs. A single state engaging in an effort on its own

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The annual costs for surveying every district in the U.S. would be about \$3 million—a rounding error in the context of the \$600+ billion annual public investment in K–12 education.

would have to incur those start-up expenses. But we have recommended that the federal government through the NCES and Institute of Education Sciences invest in development of the survey and reporting instruments that would be available to states wishing to determine instructional materials in use. For states that adopt those instruments, start-up costs would be reduced. But assume that a state carrying out the data collection and reporting function entirely on its own would incur annual costs at three times the level estimated by the Mid-Atlantic REL for recurring data collection. That is still just \$750 per school district—less than 10 percent of median national expenditure on instruction for one student. Surely states and the nation can afford to invest in aggregate a few million dollars to determine what instructional materials are in use.

The data collection effort we propose will provide crucial support to the teachers and administrators in charge of selecting instructional materials.

Using the Data

States that collect data on instructional materials will benefit immediately from the knowledge gained from this effort, and will be able to better support teachers and administrators as a result. The availability of this information will allow for better informed adoption decisions, both immediately by enhancing opportunities for collaboration across districts and in the long run by enabling research on the effectiveness of instructional materials.

Support Teachers and Administrators

Administrators and teachers in charge of selecting instructional materials have little information, either formal or informal, about which materials are most likely to facilitate student learning. As a result, they choose the materials that are most similar to teachers' current practices, are the cheapest, appear to be the easiest to teach, or are sold by the publisher that provided a good snack during their sales pitch.²⁷

States that collect information on the instructional materials used in their schools will be well on their way toward remedying this situation. In the long run, this information will greatly increase the availability of evidence as to which instructional materials are most effective at increasing student achievement, as we discuss below. But effectiveness studies will not arrive overnight, and will not become available for all of the materials in use.

Given how little information is currently available about instructional materials, the data collection effort we propose will not have to wait for the results of effectiveness studies to provide crucial support to the teachers and administrators in charge of selecting textbooks, workbooks, instructional software, and assessments. A district official in charge of curriculum selection could identify districts using certain materials and ask them about their experiences using those materials. Or an individual teacher looking for

innovative supplementary materials could look up what other schools that serve similar student populations are using. This kind of informal collaboration around curriculum selection decisions will only be possible in states that collect the necessary information and make it available.

The availability of detailed data on instructional materials, coupled with the ongoing development of teacher evaluation systems, will allow states and districts to identify whether their most effective teachers are using different materials than their less effective counterparts. States and districts can use this information in their selection decisions and to provide professional development to help teachers improve their craft. Teacher preparation programs would also benefit from access to accurate information on the instructional materials their students are likely to use once they enter the classroom.

States that make centralized adoption decisions should want to know which of the approved materials are most popular among districts, and which are rarely selected. The individuals charged with making these statewide adoption decisions could easily identify which districts are using which materials and gather feedback from them which could then be incorporated in the next round of adoption decisions. States might even be able to use this information to negotiate better rates from publishers whose materials are widely used in the state.

The process of surveying districts has an additional potential advantage, especially if states make it clear that they expect the information reported to be accurate and take actions against non-compliers: it might force districts to think more strategically about the instructional materials they use in the course of finding out what their schools are using. For example, districts that let schools choose their own materials may decide that some level of collaboration across schools will help schools make better informed selections. And districts that make the adoption decisions may realize that deviation from the adopted materials is more widespread than they previously realized.

States are likely to need assistance in putting these new data to use. NCES, in addition to supporting data collection efforts, could also provide guidance to states as to how to make the newly collected information available. For example, NCES could develop a template for a web tool that states would use to publish data on instructional materials. The website developed by the Mid-Atlantic REL serves as a useful starting point for this work.²⁸ The Data Quality Campaign (DQC) also has a supporting role to play given its ongoing work in helping states build capacity to use data for effective decision-making.

Currently, actors at various levels of our education system decide which instructional materials to adopt largely in isolation from one another based on limited or unreliable information. The collection of reliable data on materials in use will improve the knowledge base on which those decisions are made. The

kinds of immediate benefits discussed above will be greatly enhanced by the eventual availability of objective evidence about the relative effectiveness of different materials.

Enable Effectiveness Studies

Most instructional materials in use have never been subjected to an impact evaluation, much less a rigorous one such as a randomized trial. As we noted previously, the Institute of Education Sciences What Works Clearinghouse has found credible studies of the effectiveness of only a small fraction of instructional materials in use.

The primary reason so little is known about the relative effectiveness of different educational products is that data are not widely available on the materials that schools use. This is despite the fact that states have laboriously constructed longitudinal data systems that include detailed administrative data on students, teachers, schools, and districts. For example, in 2011 36 states had adopted all 10 of the Data Quality Campaign's essential elements of statewide longitudinal data systems, up from zero in 2005.²⁹ This dramatic progress at the state level was made possible in large part by over \$500 million in grants from the federal government. These grants helped finance the development of the data systems, and the \$250 million in grants included in the 2009 stimulus package required states to adopt 12 elements very similar to those suggested by the DQC.³⁰

The investment of the federal and state governments in building data systems has had immediate payoffs. Questions that could not be answered 10 years ago now can be. For example, states and districts can now estimate measures of teacher effectiveness based on student test-score growth. States can now track the movement of students and teachers across schools, and many can also track students from K–12 to postsecondary education. Some states even follow students into the workforce by linking education records to earnings records.

Despite the existence of these incredibly detailed data, only one state, Florida, currently collects basic information about the instructional materials used in classrooms—a factor which may matter just as much as teacher quality. Were the data available, researchers would be able to apply correlational and quasi-experimental approaches to exploring the differential effectiveness of competing instructional materials. For example, researchers would be able to compare student achievement in districts that serve similar student populations but adopted different core textbooks. Or they could examine whether changes in adoption from curriculum A to curriculum B coincides with a change in student achievement. With classroom-level data, researchers could examine whether

teachers who are most successful at boosting student achievement tend to use different materials than teachers who are less effective in the classroom.

The only existing study that links student achievement data to instructional materials used across an entire state is Rachana Bhatt and Cory Koedel's analysis of data from Indiana.³¹ They were able to link information on the elementary mathematics curricula adopted by districts to data on schools' test scores and student demographics. They then compared the test scores of schools that served similar populations of students but adopted different materials, and found large differences in the effectiveness of the two products that had the largest market shares in the state. Bhatt and Koedel's study was limited by the fact that Indiana curriculum adoption decisions were made at the district level once every six years, and districts usually selected materials from a state-approved list. In a state where districts can select any instructional materials they wish to, the greater variation in materials in use would present researchers with opportunities to measure the effectiveness of a wider variety of materials.

With data on instructional materials linked to student-level longitudinal data, these kinds of studies will be able to examine the effectiveness of materials as they are used by particular types of students and teachers. Just as we can ask whether various dietary supplements have differential effects on quality of life and health outcomes for people of various ages and health statuses, so too we can ask whether various math workbooks have differential effects on student achievement for students in various demographic categories and in classrooms of teachers with various levels of experience. The results of such studies might lead a district to use different materials in different schools in order to best serve the needs of different student populations. Schools that use digital materials could even target individual students with the software they are likely to learn the most from.

This kind of research will not occur entirely on its own. Given the current dearth of information on instructional materials in use, new data is likely to encourage new research in this area. But states do not need a smattering of studies; they need ongoing evaluations of the materials used in their schools. Consequently, in the long run states will need to take some responsibility for encouraging this sort of research, either through funding it or conducting it internally. Many states do not yet have the capacity to do this sort of research, but the growing use of data in education is changing that fact.³² The Institute of Education Sciences and the Data Quality Campaign are among the actors that could support states in this important effort.

Data on instructional materials linked to student-level longitudinal data will enable researchers to measure the effectiveness of materials as they are used by particular types of students and teachers.

Recommended Actions

The dearth of information on instructional materials in use can be fixed by states with support from the federal government, non-profit organizations, and private philanthropy. Specifically, we recommend the following actions:

- State education agencies should collect data from districts on the instructional materials in use in their schools. The collection of comprehensive and accurate data will require states to survey districts, and in some cases districts may need to survey their schools. In the near term, many states can quickly glean useful information by requesting purchasing reports from their districts' finance offices. Building on these initial efforts, states should look to initiate future efforts to survey teachers, albeit on a more limited basis.
- The National Center for Education Statistics should develop data collection templates for states to use through its Common Education Data Standards (CEDS), and provide guidance on how states can use and share data on instructional materials. The most recent version of CEDS contains 679 data elements for K–12 education, none of which relate to instructional materials in use. The district survey and web tool developed by the Mid-Atlantic REL and the classroom survey currently being developed by Florida provide useful starting points for this work.
- The National Governors Association (NGA) and Council of Chief State School Officers (CCSSO) have put their reputations on the line by sponsoring the Common Core State Standards Initiative. Research based on current and past state standards indicates that this initiative is unlikely to have much of an effect on student achievement in and of itself. The NGA and CCSSO should put their considerable weight behind the effort to improve the collection of information on instructional materials. It is not enough to determine whether a set of materials superficially covers every topic listed in the new standards—information must be made available that will allow the materials to be evaluated. Only then will states, districts, and schools be able to choose the materials most likely to help students master the content laid out in the Common Core standards.
- The Data Quality Campaign (DQC) has had tremendous success in encouraging states to collect high-quality education data with the goal of improving student achievement. For example, the 2009 federal stimulus package required states to adopt certain elements for their longitudinal data systems in order to be eligible for federal grants for the development of those systems. The required elements were very similar to the DQC's recommended essential elements of statewide longitudinal data systems.

The dearth of information on instructional materials in use can be fixed by states with support from the federal government, non-profit organizations, and private philanthropy.

The DQC should use its influence in this area to encourage states to collect information on the use of instructional materials and support them in their efforts to gather these data. The DQC should also help states use the data once they have been collected.

- Major philanthropic organizations such as the Bill and Melinda Gates Foundation and the Lumina Foundation for Education have invested heavily in education reform efforts. Given the current strain on state budgets, most states are unlikely to undertake new data collection efforts. Foundations could have a major impact by providing the start-up funding needed to collect data on instructional materials and support the research that would put those data to use. Such an effort would dovetail nicely with foundations' existing efforts in areas ranging from teacher effectiveness to college and career readiness—all part of the educational context that influences the instructional interactions between teachers, students, and instructional materials.

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²⁶ These costs do not include the costs incurred by districts in providing information to the state. We have not attempted to estimate the cost of this reporting burden.

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