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Teachers' Perceptions of What Makes Instructional Materials Engaging, Appropriately Challenging, and Usable

A Survey and Interview Study of Teachers

With the establishment of Common Core and similar standards, state education agencies, school districts, and schools have shown renewed interest in using instructional materials as levers in aligning instruction with those standards. By *instructional materials*, we mean any materials that are intended to provide learning opportunities for students,

KEY FINDINGS

- In general, teachers in our study did not regard themselves as implementers of curricula but as curators, modifiers, or creators of instructional materials.
- Their reasons for supplementing and modifying materials suggest that engagement, appropriateness of challenge level, and usability are key dimensions that they pay attention to when deciding how to use materials.
- Teachers using at least one standards-aligned material had less-favorable perceptions of their materials; because of this, teachers, particularly of struggling students, might find such materials to provide an inappropriate level of challenge.
- Teachers perceived engagement, challenge, and usability as distinct but intertwined dimensions of instructional materials and consider the materials in context-based ways.
- English language arts (ELA) teachers were more likely than mathematics teachers to find their main materials engaging, but otherwise ELA and mathematics, middle school, and high school teachers converged in their perceptions of materials.
- Teachers serving higher proportions of Hispanic students and English learners (ELs) had some different perceptions of materials compared with teachers serving lower proportions of these subgroups.
- Teachers adapted how they used materials during coronavirus disease 2019 (COVID-19)-related school closures.

including curricula and supplemental materials. Recent national- and state-level investments and initiatives related to instructional materials have focused on assessing and reporting the extent of these materials' alignment with college- and career-readiness standards. For example, reviews of commonly used curricula for English Language Arts (ELA) and mathematics completed by EdReports.org are being widely used by states and districts in the curriculum recommendation and selection and adoption processes.¹ Moreover, the Council of Chief State School Officers (CCSSO) is leading the High-Quality Instructional Materials and Professional Development Network, which supports nine states in helping their districts select high-quality, standards-aligned instructional materials (CCSSO, 2020) and provides professional development in the use of those materials. In addition, some states have developed their own processes for rating the quality of curricula to guide district decisions.

Abbreviations

AIRS	American Instructional Resources Survey
CCD	Common Core of Data
COVID-19	coronavirus disease 2019
EL	English learner
ELA	English Language Arts
FRPL	free or reduced-price lunch
IEP	individualized education program
HB	Hispanic/Black students
M	mean
NCES	National Center for Education Statistics
SA	standards-aligned curriculum
SD	standard deviation
SWD	students with disabilities

¹ EdReports is an independent organization that has undertaken the most-comprehensive review of existing ELA and mathematics curriculum materials as of this writing. At the time of these report analyses, the EdReports website included reviews for 41 ELA and 84 mathematics curriculum materials. EdReports reviews focus on the alignment of materials to standards. Only those materials assessed as aligned to standards are subsequently assessed for usability. For more details, see EdReports.org, undated.

Despite these extensive efforts to provide teachers with high-quality instructional materials, evidence is mixed on how much teachers actually use the materials that districts or schools adopt (Blazar et al., 2019; Kaufman et al., 2020). Recent studies have shown that, in practice, teachers use a wide variety of instructional materials even when a specific curriculum is required or recommended and provided for use (Kaufman and Berglund, 2018; Kaufman et al., 2020). Past research suggests that teachers fit different profiles of curriculum use. Using survey responses from a nationally representative sample of K–12 ELA, mathematics, and science teachers, research from Kaufman et al. (2020) shows that teachers differ in terms of how much they use their curricula as designed and the extent to which they supplement or modify curricula.

There is a well-documented reason for the mixed results on how much teachers use district- or school-adopted materials: Teachers actively make decisions about what materials to use and how to use and adapt them. Their decisions reflect a multitude of beliefs and experiences, including teachers' perceptions of what constitute quality instructional materials (Ball and Cohen, 1996; Ben-Peretz, 1990; Collopy, 2003; Sosniak and Stodolsky, 1993). Past research suggests that teachers are inclined to supplement or modify the materials that the district or school has required or recommended, particularly if teachers view those materials as misaligned with their students' needs and/or their own perceptions of quality materials (Marple et al., 2017; Remillard, 2005). Teachers may even use or create different materials altogether if they perceive that the district- or school-provided materials are lacking in characteristics that they believe will engage students and lead to learning. However, supplementing or modifying materials affects teachers' time usage and could result in discrepant learning opportunities for students (TNTP, 2018). Moreover, although teachers in some schools and districts are free to supplement or modify district-provided or -recommended materials, other districts and schools hold teachers accountable for using required materials as intended; if the teachers view the materials unfavorably, this could lead to frustration and surface-level implementation (Chávez-López, 2003; Manouchehri and Goodman,

Definitions of Key Terms Used in This Report

- *Instructional materials* are any materials that are intended to provide learning opportunities for students. Instructional materials include curricula and supplemental materials. They include materials required, recommended, or provided by districts or schools and materials that teachers locate or create themselves.
- *Curricula* are instructional materials (e.g., specific textbooks or instructional programs) that are on record as formally adopted for use by teachers, their school or district, or both. Curricula are intended to constitute a full, comprehensive course of study for a particular subject and grade level.
- *Supplemental materials* are instructional materials that teachers use in addition to curricula. These materials could be developed and/or provided by various entities, including curriculum developers, districts, schools, or teachers themselves.
- *Main materials* refer to the instructional materials that, in our survey, teachers indicated using to the greatest extent (usually the curricula).
- *Self-created materials* are instructional materials that teachers develop themselves.
- *Standards-aligned materials* are instructional materials that have been reviewed and judged by EdReports as meeting the expectations of college- and career-ready standards.
- *Modifying* refers to teachers editing or making adjustments to their main materials.
- *Supplementing* entails the use of additional resources that complement or fill gaps in teachers' main materials.
- *Curating* refers to teachers compiling a collection of instructional materials to serve as their main materials (i.e., the materials they use to the greatest extent). Although *supplementing* implies that there is a main material (often a curriculum) that the teachers add to, curating involves compiling a set of instructional materials that together constitute the curriculum for a teacher's class.

1998; Remillard, 2005). It is clearly important to understand teachers' perceptions of instructional materials to better support their use of such materials.

Importance of Teachers' Perceptions of Instructional Materials

To date, we know little about what characteristics teachers pay attention to in their curriculum materials and what they believe makes for effective materials to anchor their instruction. A prior study of English teachers' decisions about what reading texts to use found that text accessibility and its appeal to students are key factors (Watkins and Ostenson, 2015). Data from Kaufman et al. (2020) and Kaufman and Berglund (2018) suggest that teachers' use of materials might be related to their perceptions of the extent to which the material is engaging and appropriately challenging for students and usable for teachers.

In this report, we build on past studies by using survey data from a nationally representative sample

to examine how middle and high school ELA and mathematics teachers use and perceive their instructional materials in terms of engagement, challenge, and usability. In addition, we use interview data to understand teachers' perceptions about what makes instructional materials engaging, appropriately challenging, and usable. By *engaging*, we mean the extent to which the instructional materials pique and sustain student interest and attention. By *appropriately challenging*, we mean that the materials address the academic and learning needs of students. By *usable*, we mean that the materials feature components that teachers desire and that are easy to enact or adapt to meet the needs of their students.

We focus on the engagement, challenge, and usability of instructional materials as key dimensions of effective materials because literature suggests that these dimensions—or the interaction of these dimensions with student characteristics or class make-up—could influence teachers' *enactment*, or interpretation and implementation, of the intended curriculum (Datnow and Castellano, 2000; Remillard, 2005; Sosniak and Stodolsky, 1993; Stein,

Remillard, and Smith, 2007). For example, if teachers perceive that the curriculum is not engaging, they might bring in additional materials or resources outside their required or recommended curriculum. If teachers perceive that the curriculum is too challenging, they might be inclined to downgrade the cognitive demand of the tasks. Moreover, teachers are likely to use materials if such materials feature desirable components (e.g., teacher's guide, extra practice exercises) and are easy to navigate and implement.

We recognized the possibility of overlaps among the three dimensions. For example, research suggests that students are motivated and engaged by authentic, intellectually challenging work (Marks, 2000). The well-known concept of productive struggle in mathematics (Hiebert and Grouws, 2007; Warshauer, 2015) draws on the idea that students learn when they work on engaging, worthwhile problems that are at the right level of challenge for them. This is also true in reading, where offering students texts and activities at a level just above their skills can motivate them, but providing texts and tasks that are too complex can risk disengaging them (Pressley and Allington, 2014). We also examined potential overlap between teachers' conceptualizations of what makes instructional materials usable and what makes them appropriately challenging or engaging, under the assumption that materials that are appropriately challenging and engaging could be easier to use and/or might require fewer modifications.

Gaining insight into teachers' perceptions of their instructional materials and the characteristics they associate with effective materials is important for at least three reasons. First, developers of instructional materials could work to ensure that their products reflect the key characteristics that teachers pay attention to and identify as effective. To do this, we require evidence about what within the materials drives teachers' perceptions. Second, states, school districts, and schools could consider these characteristics in their materials adoption processes along with standards alignment. Specifically, making materials that reflect teachers' views of what is engaging, appropriately challenging, and easy to implement available to teachers could increase their use of the materials, thereby reducing variation in implementation within a district or school and increasing

instructional coherence for students. At the same time, making such materials available to teachers could unburden teachers from the task of searching for supplemental materials or modifying provided materials. Third, although teachers' modifications of required or recommended materials can enrich learning experiences for students, modifications can also weaken the design of the materials in ways that undermine students' opportunities to achieve academic standards and potentially can increase inequity in learning opportunities (Remillard, 2005; Sosniak and Stodolsky, 1993; Stein, Remillard, and Smith, 2007). TNTP's (2018) report underscores the importance of understanding teachers' perceptions of appropriate levels of challenge. The authors found that students spent a large amount of time on tasks that were below grade-level, meaning that students, particularly traditionally underserved students (e.g., students of color, with disabilities, from low-income families, and those who were English learners [ELs]) had few opportunities to demonstrate grade-level mastery. Materials selected or created by teachers were "generally less likely than those provided by the district to meet academic standards" (TNTP, 2018).

Districts and schools could provide professional learning that highlights the aspects of district-selected materials that correspond to the characteristics that teachers value or that support teachers in modifying materials to satisfy these characteristics. Efforts of this kind simultaneously recognize the importance of teacher perspectives and the need to develop teachers' understanding and use of the adopted materials while ensuring that modifications do not undermine quality and rigor.

Understanding how teachers use instructional materials and teachers' perceptions about what makes such materials engaging, appropriately challenging, and usable has been particularly important as educators moved their instruction online during the coronavirus disease 2019 (COVID-19) crisis. Because there are countless digital learning resources—from online learning games to educational websites—educators and school districts have needed to make decisions about what new materials to use to meet their students' needs and whether and how to adapt their existing instructional materials for virtual instruction. Given the timing of our inter-

views, we were able to ask teachers about how they used instructional materials during the spring 2020 COVID-19–related school closures and whether and how the new learning context shaped their perceptions of the materials.

Research Questions

Our research questions were as follows:

1. How do middle and high school ELA and mathematics teachers use instructional materials? Why do they supplement and modify their materials?
2. To what extent do middle and high school ELA and mathematics teachers perceive that their main materials are *engaging* and *appropriately challenging* for students and *usable* for teachers? What characteristics of instructional materials do teachers associate with these three dimensions? How do they modify materials to improve engagement, appropriateness of challenge level, and usability?
3. How do the *school closures and online learning requirements* related to the COVID-19 pandemic affect middle and high school ELA and mathematics teachers' perceptions and use of instructional materials?

Our study focused on middle and high school teachers because of the importance of these grade levels in preparing students to meet college and career readiness standards. We focused on ELA and mathematics because these are core academic subjects for which a variety of standards-aligned instructional materials have been developed and widely adopted across states and districts (Kaufman et al., 2020). Also, most of the materials that EdReports has rated have been in these two subject areas. These two subjects might also offer interesting contrasts because mathematics instruction has been associated with the use of textbooks and curricula for a long time, whereas ELA teachers had, until recently, been encouraged to draw on literature and various other resources to shape their instruction (Remillard, 2005). This contrast might translate into different perceptions of materials among teachers.

Methods

For this study, we used a mixed-methods approach. First, we examined survey responses from a nationally representative sample of middle and high school ELA and mathematics teachers based on the American Instructional Resources Survey (AIRS). Then, we conducted interviews with 61 teachers to understand the characteristics that they associate with engaging, appropriately challenging, and usable instructional materials. Throughout this report, we use icons to signal when we are presenting topics or findings based, respectively, on the AIRS (clipboard icon) or interviews (conversation icon).

The American Instructional Resources Survey



The AIRS focuses on what instructional materials are used in schools, how and why materials are used, and what factors support their use. The AIRS was fielded through the RAND Corporation American Teacher and School Leader Panels in spring 2019 and spring 2020; the survey will be fielded again in spring 2021.

Survey Sample

In total, roughly 6,000 elementary, middle, and high school teachers across three subjects (ELA, mathematics, and science) completed the 2020 AIRS. The 2020 AIRS is sampled to be representative of the country with respect to teacher demographics (e.g., experience, education level, gender) and school demographics (e.g., percentage of students receiving free or reduced-price lunch [FRPL], percentage minority, school size). For details about this sample, see the AIRS 2020 Technical Appendix (Doan et al., 2020). For this study, we examined the survey responses of a subset of 1,748 middle and high school ELA and mathematics teachers who completed the 2020 AIRS and indicated that they did not exclusively

use self-created materials as their main materials.² See Appendix A for details on how teachers identified their main materials and descriptive comparisons between the sample of survey respondents we include in this analysis and the full 2020 AIRS sample.

Survey Data Analysis

We used a combination of the survey weighted data from the 2020 AIRS (Doan et al., 2020) and school demographic information from the 2018–2019 National Center for Education Statistics (NCES) Common Core of Data (CCD) to examine teachers’ perceptions of their materials, teachers’ purposes for modifying the materials, and the relationship between perceptions and the purposes for modification.

Teachers were asked 16 survey items about how they perceived their main materials. For this report, we focused on three of the survey items. One asked teachers to indicate, using a four-point Likert scale, the extent to which they agreed (1 = strongly disagree, 2 = somewhat disagree, 3 = somewhat agree, and 4 = strongly agree) that their main materials were *engaging* (“My main [ELA/Math] materials are engaging”). A similar item asked teachers to indicate the extent to which their main materials were *usable* (“My main [ELA/Math] materials are easy for me to implement”). For this report, we specifically examined the percentage of teachers who agreed (i.e., responding somewhat agree or strongly agree) to each of these items. A third survey item asked teachers to indicate whether their main ELA or mathematics materials were “too challenging,” “at the right level,” or “not challenging enough” for the majority of their students. We report on the percentage of teachers indicating that their main materials were “at the right level” as our measure of *appropriateness of challenge level*. Although we focus on teacher responses to these three items, when appropriate, we reference survey responses to other items that address teachers’ perceptions of their instructional materials to complement findings from the interview data, described

² Our analytical sample excluded teachers who (1) did not select any materials as their main materials and (2) selected only self-created materials as their main materials. See Appendix A for additional details.

later in this report. Appendix B lists the descriptive statistics for all perception items used in this report.

We also examined the purposes the teachers identified for modifying their main materials and whether these purposes related to their perceptions of their main materials (prior to modification). The survey asked teachers to indicate the extent (e.g., “less than half of a typical lesson”) to which they modified their typical lessons for one of ten purposes (e.g., “make materials more culturally relevant,” “better address state standards”). This was done by estimating ordinary least squares linear probability models. These models estimate the probability that teachers indicated that their main materials were engaging, appropriately challenging, or usable as a function of whether they reported modifying their materials for a given purpose. These models included fixed effects for a teacher’s grade and subject assignment and are described in detail in Table 4, where the results from these models are presented.

To compare how teachers’ perceptions and modifications of their materials differed across school contexts, we used teacher-reported data collected from the AIRS on the proportion of their students who were ELs or eligible for an individualized education program (IEP) (hereafter referred to as students with disabilities, or SWD)³ and school-level student demographic data (i.e., percentages of Black students, Hispanic students, and students eligible for FRPL) collected from the 2018–2019 NCES CCD.

Additionally, we compared how teachers’ perceptions and modifications of their materials differed according to grade level (middle compared with high school), subject taught (ELA compared with mathematics), and whether one of their main materials was rated as standards-aligned by EdReports. Among middle and high school ELA and mathematics teachers—the sample we focus on in this report—25 percent of mathematics teachers used at least one

³ Teachers were asked to separately estimate the percentage of students in their classes who were: (1) ELs and (2) eligible for an IEP or 504 plan using the following bands: 10 percent or less, 11–24 percent, 25–49 percent, 50–74 percent, and 75–100 percent. A *504 plan* is a plan developed to ensure that a child who has a disability identified under the law receives accommodations that will ensure their academic success and access to the learning environment.

standards-aligned material compared with 15 percent of ELA teachers. Finally, we examined differences in teachers’ perceptions based on whether they reported using main materials that were required or recommended by their school or district. Specifically, we compared teachers who exclusively used school- or district-required or -recommended materials as their main materials (62 percent of teachers; see Appendix A) with those who did not. Throughout the report, unless otherwise noted, the subgroup differences we reference in the text are statistically significant at the $p < 0.05$ level.

Qualitative Phone Interviews



The phone interviews were designed to complement the survey. Whereas the survey addressed teachers’ ratings of various dimensions of the main materials that they used in the 2019–2020 school year, the interviews allowed us to delve deeper into teachers’ perceptions of the characteristics that make instructional materials engaging, challenging, and usable.

Sample

We set out to interview middle and high school ELA and mathematics teachers who worked in various school contexts, particularly in schools serving greater or lesser proportions of Black and Hispanic students (combined) and in those using one or more materials defined by EdReports as standards-aligned. To ensure variation on these characteristics, we

purposefully selected a subsample of teachers who completed the AIRS spring 2019 survey to invite them to participate in phone interviews. In May and June 2020, we invited a total of 156 teachers in two rounds. In the first round, we invited 64 teachers; 28 completed interviews. In the second round, we invited 92 more teachers; 33 completed interviews. We offered a \$75 Amazon electronic gift card to each participant on completion of the interview. We conducted a total of 61 interviews and had an overall response rate of 39 percent. Table 1 shows the sample of teachers we interviewed and the strata to which they belonged based on the contextual conditions they reported. See Appendix C for details of the sampling.

In interviews, teachers also reported on their years of experience and provided a separate estimate of the proportion of students they taught who were (1) ELs, (2) SWD, and (3) performing below grade level. Teachers averaged between 16 and 20 years of experience, with the range being three to 38 years. About 46 percent of teachers served more than 10 percent ELs; 57 percent served more than 10 percent SWD; and 59 percent served 25 percent or more students performing below grade level. See Appendix C for a comparison to the analytic (national) sample.

Interview Data Collection

Five data collectors scheduled and conducted the phone interviews. The interview protocol consisted of brief background questions followed by four sub-

TABLE 1
Teacher Interview Sample

Subject	Context/ Material	Middle Schools		High Schools		Total
		Teacher Taught High % of Black and Hispanic Students	Teacher Taught Low % of Black and Hispanic Students	Teacher Taught High % of Black and Hispanic Students	Teacher Taught Low % of Black and Hispanic Students	
ELA	Aligned	1	2	4	1	8
	Not aligned	5	5	3	5	18
Mathematics	Aligned	5	3	5	4	17
	Not aligned	6	5	4	3	18
Total		17	15	16	13	61

stantive question sections about (1) how teachers use instructional materials; (2) characteristics of *engaging* instructional materials; (3) characteristics of *appropriately challenging* instructional materials; and (4) characteristics of *usable* instructional materials. Interview questions were not premised on the main materials that teachers were using. Because of the disruption of schooling in the 2019–2020 school year attributed to the COVID-19 health emergency, a final section asked teachers about their teaching situation since the beginning of the COVID-19–related restrictions (i.e., early March 2020) and how that might have affected their use of instructional materials. We audio-recorded the interviews for transcription to facilitate coding and analysis.

We engaged in two procedures to help ensure quality data collection. First, prior to data collection, interviewers were trained on the aims of the research and the interview protocol. Second, to ensure consistent data collection across interviewers and over time, the team of data collectors met at regular intervals throughout data collection to debrief. This helped calibrate the use of key terms, identify particularly useful probes, and troubleshoot any concerns.

Interview Data Analysis

We analyzed the interview data in Dedoose 8.3.17 (Dedoose, 2020), a cross-platform internet application that helps analyze qualitative data. Coding followed an iterative approach and established qualitative research procedures for ensuring reliability (Denzin and Lincoln, 2003; Lincoln and Guba, 1985; Miles and Huberman, 1994; Strauss and Corbin, 1993). We developed an initial coding scheme that was guided by our research questions (discussed previously) and that reflected emergent themes. These emergent themes were gleaned from a spreadsheet where, during or immediately after interviews, interviewers logged interviewee responses to each key interview question.

After developing and revising the coding scheme with the input of two expert qualitative researchers, the qualitative lead coded one interview to test the use of the coding scheme and to provide coders with examples for each code. Three coders were trained on the coding scheme and each independently coded

about 30 percent of the interviews. The qualitative lead also coded six additional interviews. To ensure that the three analysts were consistently and reliably applying the codes, as the analysts coded transcripts, the team met to debrief, discuss, and resolve ambiguities and consult on adding new codes and themes. We revised the coding scheme and documented decision rules as necessary.

Our analysis of interview data involved a systematic review of coded excerpts. We drew on established techniques (Bernard, Wutich, and Ryan, 2016; Ryan and Bernard, 2003) to identify themes, including looking for repetition, similarities, and differences between sets of data (e.g., similar responses across respondents who taught the same grade and subject). We took multiple steps to ensure the integrity of our findings, such as searching for and examining both confirming and disconfirming evidence (Denzin, 2006). In our analysis, we explored differences between several subgroups: subject area (i.e., ELA or mathematics); school level (i.e., middle school or high school); proportion of Black and Hispanic students served (75 percent or more, or fewer than 75 percent); alignment of materials as defined by EdReports (standards-aligned or not standards-aligned); and the proportion of ELs (10 percent or more, or less than 10 percent), SWD (10 percent or more, or less than 10 percent), and students performing below grade level (25 percent or more, or less than 25 percent) that teachers reported serving in their classrooms. Our purposeful sample maximized variation on key variables that could influence how teachers think about their instructional materials, such as grade level and subject taught and student characteristics.

Limitations

AIRS Limitations



There are several caveats to consider when interpreting our reports of AIRS responses. First, teachers reported on their perceptions (and modifications) only for the one to three materials that they identified as their main materials—the materials they use to the greatest extent (see Appendix A for details). Because of this,

we expected that teachers' perceptions of their main materials were likely to be favorable. This is because, even with states, school districts, and schools playing roles in selecting instructional materials, we expected that teachers used the materials that they viewed most favorably more often.

Second, although the majority of teachers selected only one curriculum among their main materials, they often identified other noncurriculum materials among their main materials. Only 30 percent of teachers in our survey sample identified a single main material. Therefore, for the 70 percent of teachers selecting more than one main material, responses on the perception and modification items likely represented a composite of their experiences across multiple main materials. It is possible that rather than providing an average perception across all materials, teachers' responses were guided by particularly positive or negative experiences with one main material.

Because the AIRS asks teachers to report on perceptions or purposes for modifications on the basis of all their main materials, this ambiguity regarding teachers' use of multiple main materials affects all survey analyses conducted in this report. The cautions that were previously mentioned posed particular analytical challenges in two cases. First, when teachers identified both standards-aligned and non-standards-aligned materials as their main materials, we cannot know what teachers used as a referent in responding to survey questions. Throughout this report, we refer to these comparisons as the differences in perceptions or modifications between "teachers using at least one aligned material" and "teachers not using any aligned material" to account for the possibility of the use of multiple materials with different alignment ratings. Second, although the analysis did not include teachers who identified only a self-created material as a main material, the analysis did include teachers who selected a self-created material alongside a non-self-created material. We found that these teachers were more likely to indicate that their main materials were engaging and appropriately challenging compared with teachers who did not report that one of their main materials was self-created. There was no statistical difference for usability.

Lastly, although we recognize that single items are potentially not as valid or reliable as multi-item scales, we use single survey items of teachers' perceptions of their materials to broadly represent each of the dimensions of interest in this study—engagement, appropriateness of challenge, and usability. We did this to allow the survey analyses to speak to teachers' broad sentiments about each dimension while letting the interview process surface the characteristics and aspects teachers associate with each of these dimensions. We assessed the robustness of our results by using factor analysis to combine perception items (listed in Table A.1) to form multi-item scales and found similar results.

Interview Limitations



The interview portion of the study also has several limitations. First, our interview sample was not randomly selected or nationally representative; teachers self-selected into our sample by agreeing to the interview. Therefore, the generalizability of our findings may be limited. We did, however, ensure that there was representation of teachers across subgroups relevant to our research questions (e.g., ELA and mathematics teachers, middle and high school teachers). Moreover, the purpose of conducting these qualitative interviews was not to identify statistically generalizable findings but to obtain rich data to gain greater understanding about how different types of teachers use and perceive their instructional materials to complement the broad national perspective provided by the AIRS.

Interview responses are also subject to self-report bias. Furthermore, we acknowledge that our investigation was limited to teachers' *perceptions* of materials, which we hypothesize to influence their use of materials; we are not able to draw links to teachers' actual practices, nor do we know how the characteristics of materials our teachers identified might relate to students' achievement. We note too that we conducted interviews several months after the COVID-19 pandemic disrupted schooling and forced instruction to move online; yet, for much of the interview, we asked teachers about their use of instructional materials prior to the pandemic. Teachers'

recollections of how they used instructional materials when they were in the classroom might be inaccurate or their responses might have been influenced by their experiences with remote learning during the COVID-19 pandemic.

Findings

In this section, we present findings derived from both survey data from 1,748 teachers and interviews with 61 teachers. We first present findings on why teachers use instructional materials the way they do: whether with fidelity to the material as designed, by creating their own, supplementing existing material, or modifying it extensively (research question 1). Then, we report on the extent to which they perceive their materials to be engaging, appropriately challenging, and usable; what characteristics of the materials are most indicative of these three dimensions; and how teachers modify their materials to improve these aspects (research question 2). Lastly, we share themes drawn from interviews about how teachers' use and perceptions of their instructional materials changed as a result of the COVID-19 pandemic (research question 3). Note that in this findings section, we largely refrain from drawing conclusions based on individual findings. In the final section of this report, we look across our survey and interview findings to offer some broad interpretations across research questions. In general, we present survey and interview findings separately because they provide complementary—not overlapping—information.

For the sake of brevity, we present survey findings that use the subgroup analyses specified earlier (e.g., by grade and subject taught, student composition) that are statistically significant and substantively compelling. Subgroup differences in survey results that are not reported either are not statistically significant or—in the case of subgroups with three or more categories, such as quartiles of school FRPL enrollment—did not present a meaningful pattern across subgroup categories. For the interview data, we report the proportion of interviewees who mentioned a particular idea represented by a qualitative code. In tables, we present interview subgroup differences when there is a difference of 15 percentage

points or more in the number of respondents identifying with that idea.

Teachers' Use of Instructional Materials (Research Question 1)

As noted earlier, even when a specific curriculum is required or recommended, in practice, teachers tend to draw on a variety of instructional materials (Kaufman et al., 2020). Among our interview sample, we found teachers who used one main material with fidelity, teachers who primarily created their own materials, teachers who drew on multiple materials, and teachers who substantively modified provided materials. Our analysis captured in the teachers' own words how they used materials and why they did so in that way.

Majorities of Interviewed Teachers Reported Curating and Using a Collection of Materials for Their Instruction



Among the teachers we interviewed, more than half confirmed that they curated and used a variety of materials for their day-to-day teaching, roughly paralleling Kaufman et al.'s (2020) survey finding that between 30 and 40 percent of teachers draw on multiple curricula. Our interviews revealed that teachers bring together many materials beyond curricula (i.e., items besides textbooks and other materials intended to constitute a full and comprehensive course of study). For example, rather than using a district- or school-provided curriculum with fidelity (e.g., largely as designed), about one-quarter of the teachers who we interviewed reported drawing on a curriculum or district or state guidance on standards to identify the concepts that they needed to address and then curating a collection of supplemental materials to help cover those concepts.

Although some teachers described using various materials to supplement or complement the curriculum that was required or recommended by their district or school, a little less than one-quarter of teachers described curating and using a collection of materials from multiple sources as their primary method of teaching. As one teacher noted,

My instructional resources are extremely varied. I don't really have a curriculum or a set of resources. I have a lot of strategies and skills that I try to teach, and I'm doing that with many resources. I bounce around to try to keep things varied. I'll use some supplementary resources, like Scholastic Action or NewsELA, and we have a comprehension toolkit with some stories that I will use.

Middle school ELA teacher

By drawing on many different materials, this teacher could choose the lessons and texts that students would find most engaging and appropriately challenging.

When asked to describe how they find additional instructional materials, a majority (more than half) of teachers reported using the internet to do so. They reported either using a search engine or visiting their go-to websites, such as Teachers Pay Teachers, Pinterest, and College Board (for Advanced Placement materials). More than a quarter of the interviewed teachers reported drawing from a collection of supplemental materials that they have accumulated over their years of experience. In addition, almost half of teachers relied on the recommendations and opinions of trusted colleagues; they found materials through word-of-mouth, as recommended by instructional coaches, as recommended by other district personnel, or through social media sites of teacher-influencers.

The Few Interviewed Teachers Who Used Their Main Materials with Fidelity Deemed Them Comprehensive; the Few Who Relied Only on Self-Created Materials Reportedly Did So to Meet Student Needs

Although about half of the interviewed teachers indicated that their district required them to use a specific curriculum, fewer than a quarter of all teachers reported relying solely on one instructional material without making modifications or using supplemental materials. The few teachers who reported using mainly one instructional material were mathematics teachers who described using comprehensive material that integrated different resources. As one teacher explained,

The main [material] that I used was i-Ready 10, I had a student workbook, teacher books. It had videos. It was a pretty good resource, I liked it. I had access to different information . . . [Students] took an assessment at the beginning of the year which would gauge where they were individually. It would individualize their learning and then they could do skill lessons.

Middle school mathematics teacher

Unlike teachers who reported using a curriculum with fidelity or drawing on a variety of sources, a few teachers indicated creating most of their instructional materials from scratch. For instance, one middle school ELA teacher developed an instructional material with 24 units centered on different texts; each unit included vocabulary, questions, and assessments related to each of the texts. He explained that, in the past, he had tried to use the district's recommended curriculum but found that students "weren't getting it." The teacher observed students doing the work but not "learning the lessons," leading him to conclude that the material did not meet students' needs. Creating his own instructional materials allowed him to teach in the way he felt was most effective and engaging for students at different achievement levels.

Interviewed Teachers Used Supplemental Materials Primarily to Differentiate Instruction, Fill Gaps in Existing Materials, and Engage Students

Interviewed teachers described seeking supplemental materials for a variety of purposes. They recognized that it was difficult for a given curriculum to be sufficient in all ways (i.e., to be engaging, appropriately challenging, and easy to use) and to meet all students' learning needs. School district leaders also seemed to recognize this; about half of the teachers who reported using a district-required curriculum also mentioned that their district encouraged them to use supplemental materials to differentiate instruction. Relatedly, even when teachers considered their required or recommended curriculum to be strong, they talked about drawing on supplemental materials to enrich students' learning experiences.

TABLE 2

Purposes Interviewed Teachers Described for Using Supplemental Materials

Reason (related dimension)	Percentage	Subgroup with More Respondents by More Than 15 Percent
Meet the needs of lower-achieving students, ELs, SWD (challenge)	52	High percentage of HB, SA, and ELs
Provide better explanation of a particular concept (usability)	48	Low percentage of ELs and SWD
Provide additional practice or exercises (challenge)	39	—
Include games and other fun activities (engagement)	33	Mathematics
Provide content that is relevant to students or up-to-date (engagement)	30	High school
Provide variety (engagement)	28	—
Meet the needs of advanced students (challenge)	18	High percentage of SWD
Offer concepts not covered in curriculum (usability)	10	Low percentage of SWD
Other purposes	36	

NOTES: HB = Hispanic/Black students; SA = standards-aligned curriculum; — indicates no subgroup difference. Total sums to more than 100 percent because interviewees might have provided multiple responses. Subgroup differences are based on a 15-percent differential between paired subgroups. *High/low percentage of HB* refers to the proportion of Hispanic and Black students in the class as reported by the teacher. SA corresponds to whether the material teachers reported using is standards-aligned, as rated by EdReports. $n = 61$.

Teachers we interviewed described roughly eight purposes for supplementing their curriculum with other materials (Table 2). These purposes fell into three categories corresponding to our three dimensions of interest: Teachers used supplemental materials to engage students, provide an appropriate level of challenge for different students, and fill gaps in existing materials that made the materials less usable (e.g., the materials did not provide clear explanations of key concepts or did not cover certain concepts).

The most common reason given for using supplemental materials was to differentiate instruction to better meet the needs of lower-achieving students, ELs, SWD, or some combination thereof. In essence, teachers looked to make materials more *appropriately challenging*. Some of these teachers considered their given curriculum to be too difficult or confusing for students performing below grade level and turned to supplemental materials that provided support with foundational skills to help students get on grade level. As one teacher explained,

A lot of times when I'm teaching students that are two and three grade levels or more below, they don't have the foundation for me to just walk in as an 8th grade teacher and say, "here it is" and start teaching from there. So I have to go in and build that foundation for them.

Middle school mathematics teacher

Other teachers perceived that the given curriculum inadequately differentiated for struggling learners, ELs, and SWD, or insufficiently targeted certain skills for these learners. One teacher described her situation as follows:

If we had to read an article, I will always have a graphic organizer. I would always have to supplement and then recreate my teaching because . . . even though my students were EL students, [the district] still wanted us to do grade-level material, which I don't really agree on because [the students are] new, they barely speak English.

Middle school ELA teacher

A considerable, though smaller, percentage of interviewed teachers stated that they used supplemental materials to meet the needs of advanced students. In sum, the teachers who mentioned differentiating reported that one material could not be expected to fully meet the diverse needs of all types of students; supplemental materials allowed for additional flexibility in their instruction.

The second-most-common group of purposes that interviewees gave for using supplemental materials was to fill gaps in existing materials that made the materials less *usable* to the teacher. For example, one teacher described seeking supplemental materials to

provide clearer explanations than those in the school-recommended textbook:

Sometimes I look for [supplemental materials] that would explain something in a better way [than in the textbook], for example, what is surface area. . . . Maybe it's a better presentation, it's just easier to comprehend.

Middle school mathematics teacher

Relatedly, teachers drew on supplemental materials to cover concepts or standards not addressed in the curriculum. By looking for supplemental materials that cover additional concepts or provide clearer explanations, teachers addressed the deficiencies that they perceived in their main instructional materials.

A final group of purposes for teachers using supplemental materials was to further *engage students* in learning. One-third of teachers we interviewed specifically sought games and other fun activities to include in their lessons to motivate students to learn the content or skill. Teachers said that hands-on or gamelike activities allow teachers to “offer practice in a different way” and thus “reach kids differently.” Interviewed teachers also said they looked to supplemental materials to improve the relevance of the curriculum for students. They incorporated materials that allowed students to practice and apply skills and strategies in varied real-life contexts. A small number of teachers reported seeking materials that were culturally relevant to students. For example,

A lot of times, the district curriculum will be good to teach [the students] skills and strategies, but for issues like equity or issues like social justice, diverse authors, I need other resources. So, I have to supplement and seek out authors of various backgrounds. I have to look for books that reflect my students. Sometimes that is absent in curriculum.

Middle school ELA teacher

Teachers also used supplemental materials to provide variety for and cater to students' varied interests and thus increase student engagement. Several teachers mentioned using supplemental materials to keep themselves engaged by allowing them to try new strategies.

Surveyed Teachers Reported Modifying Their Main Materials Primarily to Meet the Needs of Struggling Learners and Students with IEPs and to Reduce the Time Needed to Implement Lessons



Past survey-based studies (e.g., Kaufman et al., 2020) found that, in addition to supplementing their curricula, teachers often modified them. Whereas *modifying* refers to teachers editing or making adjustments to their main materials, *supplementing* entails bringing in additional resources that complement or fill gaps in teachers' main materials.

For the present study, we rely on items from the 2020 AIRS, which provided teachers with a list of ten potential purposes for modifying their materials and asked them to use a four-point scale to indicate the proportion of a typical lesson that they modified for that purpose (1 = “I do not make this type of modification or N/A [it is not applicable] for my students”; 2 = “I make this modification for less than half of a typical lesson”; 3 = “I make this modification for about half of a typical lesson”; 4 = “I make this modification for half or more of a typical lesson”). Table 3 shows the percentage of teachers indicating that they modified their main materials for at least half of a typical lesson (hereafter labeled as “substantial modifications”) for a given reason.

Eighty-seven percent of teachers reported substantially modifying their main materials for at least one of the purposes in Table 3. On average, teachers reported making modifications for four of the purposes in the table. Among the specific purposes for modification, teachers most commonly reported modifying materials to provide remediation activities, make materials more appropriate for SWD, and reduce the amount of time to implement a particular lesson or unit.

Surveyed Teachers Making Substantial Modifications to Their Materials Were Less Likely to Indicate That These Materials Were Engaging, Appropriately Challenging, and Usable

Using survey data, we explored the relationship between the purposes teachers gave for modifying their materials and whether they reported that these materials were engaging, appropriately challenging, and usable. Table 4 shows the difference in the probability that a teacher agreed that their materials were engaging, appropriately challenging, or usable for teachers who did and did not report making substantial modifications for each of these purposes, controlling for the subject and grade taught.

Generally, teachers who reported making modifications for a particular reason rated their materials (prior to modifications) lower than their peers who did not report making such modifications, although the size and statistical significance of this difference varied across purposes and perceptions. For example, one reason for modification, *provide more remediation activities*, was significantly negatively related to the probability that a teacher agreed to any of the perception items. Relative to teachers who did

not report making substantial modifications for the purpose of providing remediation, teachers who did make this modification were 8, 19, and 7 percentage points less likely to agree that their materials (prior to any modifications) were engaging, appropriately challenging, and usable, respectively. Only one type of modification was significantly positively associated with teacher perception of materials: Teachers who provided more enrichment activities for their students were 11 percentage points more likely to indicate that their materials were appropriately challenging, with no significant relationships to the other perception measures.

Overall, the five most common purposes for modifying were significantly associated with a lower probability of teachers agreeing that their materials were engaging, appropriately challenging, usable, or some combination thereof. This suggests that teachers likely make deliberate decisions about modifications based on perceived shortcomings in these dimensions of their materials and that teachers perhaps are most inclined to modify when they perceive weaknesses on multiple dimensions.

Lastly, the total number of purposes that teachers indicated for modifying their materials was signifi-

TABLE 3
Percentage of Surveyed Teachers Modifying Their Main Materials for Half or More of a Typical Lesson

For each purpose below, I modify a typical lesson within my [ELA/math] materials to the following extent:	Percentage of Teachers
Provide more remediation activities for students who have not yet mastered the material	64
Make the materials more appropriate for my students with IEPs or 504 plans	60
Reduce the time the materials will take (e.g., fit them into the lesson or into a unit)	54
Better address the content in my subject area	46
Make the materials more appropriate for ELs	38
Better address state standards	37
Make the materials more culturally relevant for my students	32
Scale the materials for a larger class size	32
Provide more enrichment activities for students who have already mastered the material	30
Integrate with other subject matter, such as science or social studies	20

NOTES: This table shows the proportion of teachers who indicated modifying half or more of a typical lesson for each of the given purposes. For each modification item, teachers were presented with the following response items: 1 = "I do not make this type of modification or N/A for my students"; 2 = "I make this modification for less than half of a typical lesson"; 3 = "I make this modification for about half of a typical lesson"; 4 = "I make this modification for half or more of a typical lesson." $n = 1,583$.

TABLE 4

Relationship Between Teachers' Purposes for Modification and Perceptions of Main Materials

Purpose for Modification	Teachers' Perceptions of Main Materials		
	Engagement (0–1)	Challenge (0–1)	Usability (0–1)
Provide more remediation activities for students who have not yet mastered the material	–0.08*	–0.19***	–0.07***
Make the materials more appropriate for my students with IEPs or 504 plans	–0.08**	–0.14**	–0.06**
Reduce the time the materials will take (e.g., fit them into the lesson or into a unit)	–0.07*	–0.18***	–0.04
Better address the content in my subject area	–0.08*	–0.05	–0.08**
Make the materials more appropriate for ELs	–0.07*	–0.19***	–0.05
Better address state standards	–0.03	–0.00	–0.03
Make the materials more culturally relevant for my students	–0.05	–0.06	–0.04
Scale the materials for a larger class size	0.02	0.02	–0.00
Provide more enrichment activities for students who have already mastered the material	0.01	0.11*	0.03
Integrate with other subject matter, such as science or social studies	0.05	–0.03	–0.07
Total number of purposes for modifications	–0.01*	–0.02***	–0.01*

NOTES: * = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$. This table shows the difference in the probability that a teacher “somewhat” or “strongly” agreed with each teacher perception item (engagement, challenge, and usability) between teachers reporting that they made modifications to half or more of their typical lessons for the purposes indicated in each row. For each modification item, teachers were presented with the following response options: 1 = “I do not make this type of modification or N/A for my students”; 2 = “I make this modification for less than half of a typical lesson”; 3 = “I make this modification for about half of a typical lesson”; 4 = “I make this modification for half or more of a typical lesson.” For each perception item, teachers were presented with the following response options: 1 = strongly disagree, 2 = somewhat disagree, 3 = somewhat agree, 4 = strongly agree. The final row shows the relationship between the total number of purposes given for modifications and the probability that a teacher agreed with each perception item. Each cell represents a separate perception-modification regression, which also includes fixed effects for teachers' subject (ELA, mathematics) and grade level (middle, high) taught.

cantly negatively correlated to their probability of indicating that their materials were engaging, appropriately challenging, or usable, although the size of this association was modest, as shown in the last row of Table 4.

Surveyed Teachers Using at Least One Standards-Aligned Material Were More Likely to Report Modifying Materials to Fit Activities into a Lesson or Unit

Teachers using at least one standards-aligned material were significantly more likely to report modifying these materials for one particular reason related to usability: to reduce the amount of instructional time spent on certain ideas or concepts to fit activities into a lesson or unit. Sixty-three percent of teachers who reported using at least one standards-aligned

material also reported substantially modifying their materials for this reason, compared with 49 percent of teachers who did not use any standards-aligned material. In prior work using AIRS data, Kaufman et al. (2020) found limited evidence of connections between the adoption of standards-aligned materials and teacher reports of student engagement in standards-aligned practices.

Surveyed Teachers' Purposes for Modifying Their Materials Also Related to the Student Population That They Serve

Teachers appeared to modify their materials according to the types of students they serve, with the proportion of teachers who reported modifying their materials to “make them more culturally relevant,” “make them more appropriate for ELs,” and “make

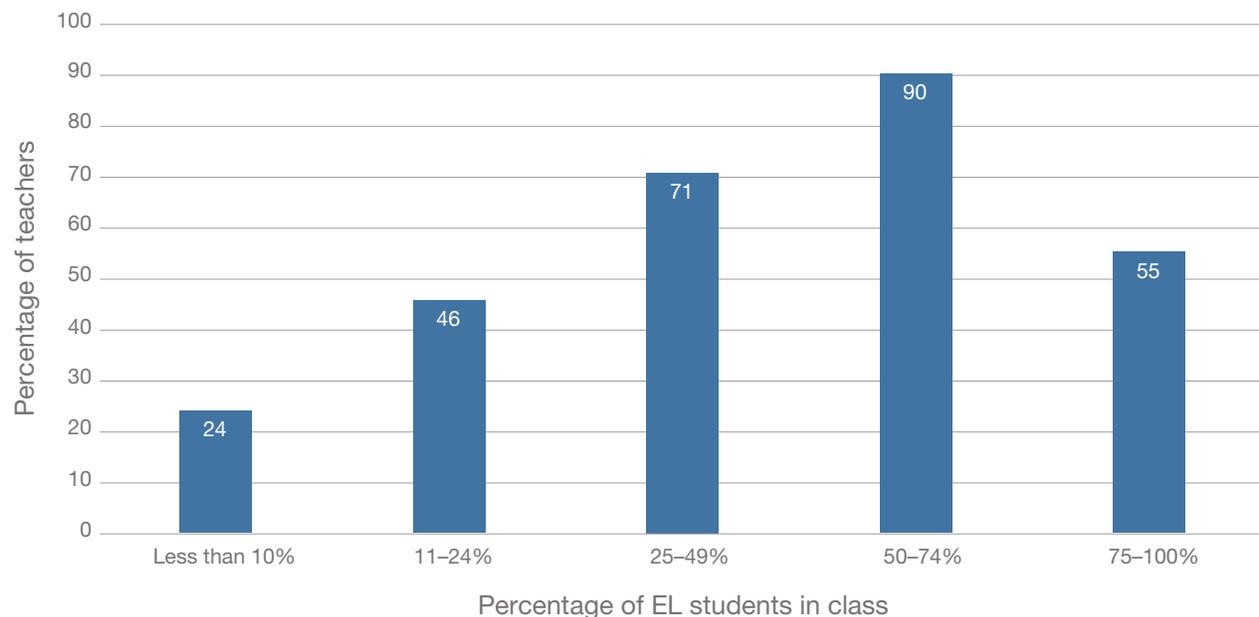
them more appropriate for students with IEPs or 504 plans” linked to the classroom- or school-level demographics of students. Teachers in schools serving the largest proportions of Black students were 10 percentage points more likely to report modifying their materials to increase cultural relevance than teachers in schools with the lowest quartile of Black student enrollment. Teachers in top-quartile schools by Hispanic student enrollment were more than twice as likely to make modifications for this reason than teachers in bottom-quartile schools (40 percent versus 17 percent).

Modifications accommodating the needs of ELs and SWD were far more prevalent among teachers serving higher proportions of those students in their classrooms. More than 80 percent of teachers with 75–100 percent of their classrooms comprising SWD reported substantially modifying their materials to better serve these students, compared with 54 percent

of teachers with just 10 percent or fewer SWD in their classrooms. We found a similar relationship between the prevalence of substantial modification for ELs and the reported percentage of ELs in that teacher’s classroom, although there was a noticeably lower rate of modification among teachers in classrooms comprising 75–100 percent ELs (Figure 1). One hypothesis for this is that teachers with predominantly ELs are able to explicitly select or create instructional materials designed to serve these students, limiting the need for subsequent modifications.

With regard to modifying materials for students needing remediation, we have no direct or teacher-reported measures of student academic performance to enable the like-for-like comparison we make for ELs and SWD modifications. However, we did find that the prevalence of remediation-based modifications was higher among teachers in schools with higher proportions of FRPL-eligible students, Black students,

FIGURE 1
Percentage of Teachers Reporting Modifying Main Materials for Half or More of a Typical Lesson to Make Them “More Appropriate for ELs,” by Percentage of ELs in Class



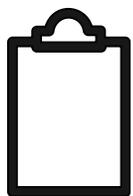
NOTES: This figure shows the percentage of teachers modifying their ELA/mathematics materials for half or more of a typical lesson to make them “more appropriate for ELs,” separated by the teacher-reported percentage of EL students in the classroom. For each modification item, teachers were presented with the following response options: 1 = “I do not make this type of modification or N/A for my students”; 2 = “I make this modification for less than half of a typical lesson”; 3 = “I make this modification for about half of a typical lesson”; 4 = “I make this modification for half or more of a typical lesson.” The percentage of EL students in a classroom is self-reported by teachers; the available response categories are presented along the x-axis. All pairwise comparisons are statistically significant at the $p < 0.05$ level except 11–24 percent versus 75–100 percent and 25–49 percent versus 75–100 percent. $n = 1,383$.

and Hispanic students, suggesting that teachers might perceive these groups of students as more likely to need or benefit from remediation-type strategies.

Teachers' Perceptions of Engaging Instructional Materials (Research Question 2)

This and the following two sections focus respectively on the engagement, challenge, and usability of materials. In each section, we report survey data from the 2020 AIRS to provide a national perspective on teachers' perceptions of their main materials. Then, we use interview data to identify what teachers consider to be characteristics of materials that engage and appropriately challenge students and are usable for teachers. We also provide insights into *how* teachers modified their materials to make them more engaging, appropriately challenging, and usable.

A Large Majority of Surveyed Teachers Agreed Their Main Materials Were Engaging for Students



Survey data from the 2020 AIRS showed that, overall, 87 percent of teachers generally agreed that their main materials were engaging for their students. (Appendix B). ELA teachers, however, were significantly more likely than mathematics teachers to agree (91 percent compared with 82 percent).

Surveyed Teachers Using at Least One Standards-Aligned Material, High School Mathematics Teachers, and Mathematics Teachers in Schools with the Most Hispanic Students Perceived Their Main Materials as Less Engaging

The vast majority of ELA and mathematics teachers indicated that their materials were engaging, although teachers using at least one standards-aligned material as a main material were slightly—but significantly—less likely (81 percent) to indicate that their materials were engaging than teachers who did not use any standards-aligned

materials (89 percent).⁴ Among mathematics teachers, the percentage of teachers indicating their main materials were engaging appeared to differ by grade level and the percentage of Hispanic students enrolled at their school. High school mathematics teachers (78 percent) were less likely to indicate that their materials were engaging than middle school mathematics teachers (87 percent). Teachers in schools serving above-average percentages of Hispanic students reported significantly lower ratings of engagement of their main materials compared with teachers in schools serving low proportions of Hispanic students (Figure 2). There were no clear patterns between engagement and school-level percentage of Black students and classroom-level percentage of ELs.

In Interviews, Teachers Suggested That Engaging Materials Are Characterized by Appropriate Level of Challenge, Interactivity, and Opportunities for Student Choice



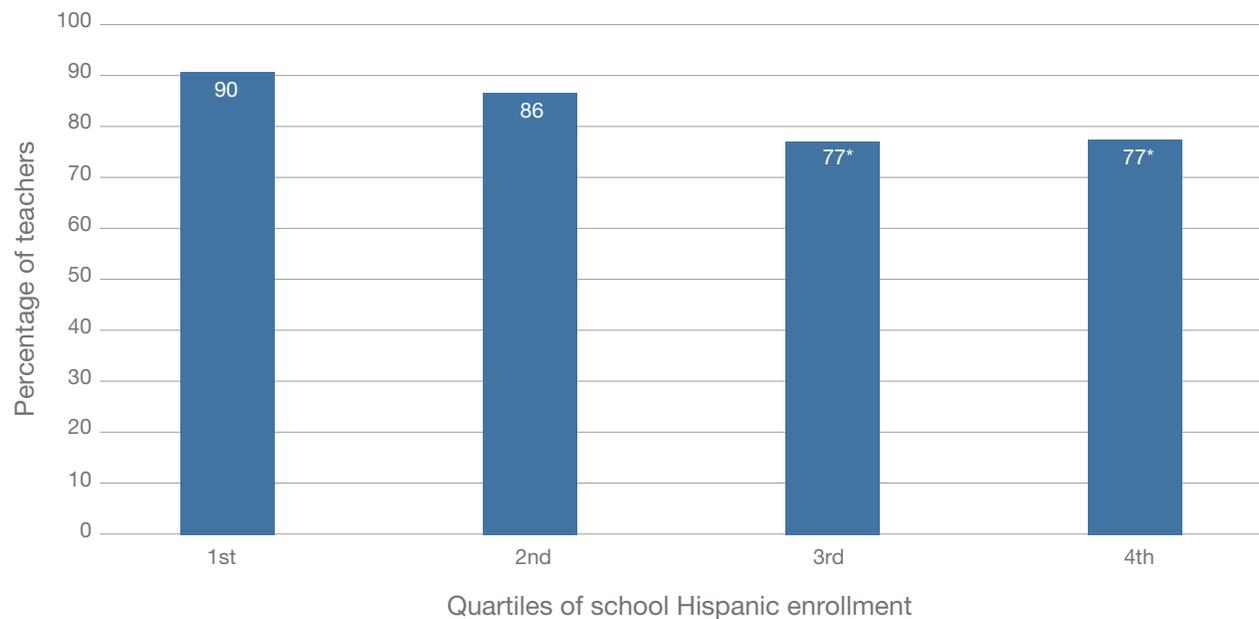
Survey results indicated how teachers rated the level of engagement of their main materials. We now turn to the interview findings to understand what teachers might have had in mind as they assessed this dimension. Table 5 summarizes the responses that interviewees provided on characteristics they associate with engaging materials.

Majorities of teachers in all subgroups stated that it was important for materials to be *appropriately challenging* to be engaging for students, thus associating two of the dimensions of interest. Some teachers specifically stated that materials needed to be modified to engage students performing below grade level, ELs, SWD, or advanced learners. Teachers reported that students get frustrated when the materials are too challenging and subsequently become less motivated to participate in the learning activities. When materials are not challenging enough, students also disengage and become disinterested. Teachers therefore often provided different options of materials or activities for students based on their

⁴ This pattern is also present when examining each subject (ELA and mathematics) separately, although it is not statistically significant at the $p < 0.05$ level because of smaller sample sizes.

FIGURE 2

Percentage of Mathematics Teachers Agreeing That Their Main Materials Were Engaging, by Quartiles of School Hispanic Enrollment



NOTES: This figure shows the percentage of mathematics teachers indicating that they somewhat or strongly agreed that their main materials were engaging for students, separated by quartiles of school Hispanic enrollment. For each perception item, teachers were presented with the following response options: 1 = strongly disagree, 2 = somewhat disagree, 3 = somewhat agree, 4 = strongly agree. Quartiles of school percentages of Hispanic enrollment were obtained using the 2017–2018 NCES CCD. Labels with asterisks indicate that differences relative to percentages in the first quartile are statistically significant at the $p < 0.05$ level. $n = 766$.

achievement level or EL status so that students can remain engaged. For ELs, teachers felt that it was important to provide translated materials to facilitate understanding.

Teachers reported that materials supporting *interactive or collaborative activities* were particularly engaging. Such materials invited teachers to facilitate class discussions about assignments or had students discuss materials among themselves or work on assignments as a team. Relatedly, teachers indicated that using only textbooks or worksheets bored students and thus most teachers sought to include more-interactive resources. Mathematics teachers specifically reported a need to use hands-on activities—activities that incorporate physical objects and manipulatives—to engage students. Interactive activities also include games or competition. Some teachers use quiz activities on smartboards and online platforms, such as Nearpod, Quizizz, and Kahoot!, to engage students in competitive question-and-answer activities. Teachers of both subjects, grade levels, and in schools with various proportions

of Black and Hispanic students regarded interactive or collaborative activities as essential to engaging students.

A majority of teachers reported that they dislike instructional materials that are repetitive and provide basic, one-dimensional activities for students, such as a worksheet with a long list of basic mathematics problems that do not increase in difficulty or a long passage to read unaccompanied by structured questions and activities. Teachers associated these activities with “busy work.” Teachers indicated that materials were more enjoyable if they included *different types of activities and questions* from which students could choose. For instance, ELA teachers preferred having multiple assignment options for lessons based on novels.

Similarly, teachers perceived that materials *connected to student interests* facilitate engagement. A large majority (more than three-quarters) of ELA teachers identified this as a characteristic of engaging materials compared with less than a quarter of mathematics teachers. Teachers believed it was

TABLE 5
Interview Responses on Characteristics of Engaging Materials

Characteristic	Percentage	Subgroup(s) with More Respondents by More Than 15 Percent
Appropriately challenging	79	Mathematics, high school, SA
Incorporates interactive and/or collaborative activities	71	Middle school, high percentage of ELs, high percentage below grade level
Provides variety and/or choice	61	High percentage of ELs, low percentage of SWD
Connected to student interests	57	ELA, low percentage of HB, low percentage of ELs, high percentage of SWD, low percentage below grade level
Appropriate length/amount of information	52	Mathematics
Real-life application	51	Mathematics
Visually appealing	41	Not SA
Culturally relevant	30	ELA, high school
Various other characteristics	44	—

NOTES: Total sums to more than 100 percent because interviewees might have provided multiple responses. Subgroup differences are based on 15-percent differential between paired subgroups. $n = 61$.

important to get to know students at the beginning of the year so that they could include topics that interested students—individually and collectively—in their instruction and seek materials that address such interests and “connect to students’ worldview.” These materials included texts amenable to an audience of young adults, such as science fiction novels, or stories about characters reflecting students’ demographic backgrounds.

The *amount of text that students are required to read* concerned both ELA and mathematics teachers, but the latter more so. A majority of mathematics teachers reported that materials requiring students to read a considerable amount of text risked disengaging students. Specifically, students were less engaged when given long word problems. For example,

I would honestly say the setup of a page alone can be intimidating for kids. As we looked for materials, we know straight off [that] reading alone causes a lot of our kids to disengage with the material. So, we had to be kind of careful how we built up problems on worksheets over time. If it started with word problems right at the beginning, that often caused kids to just step back and not even attempt it. They simply wouldn’t do it because reading is involved.
Middle school mathematics teacher

Teachers reported that students became overwhelmed with materials that looked too busy or dense; conversely, shorter texts (or the appearance of less text) facilitated engagement. Students disliked worksheets with a lot of content or presentations with too much text on one page.

Teachers reported that materials were more engaging when they *connected to the real world*. Notably, more mathematics than ELA teachers identified this characteristic, and responses showed that teachers thought about real-life applications differently. Mathematics teachers considered instructional materials to connect to the real world when they used such subjects as baseball or sports to describe mathematics concepts or referred to physical objects and shapes to teach geometry. Meanwhile, ELA teachers believed that it was important for the reading materials to reflect students’ lives or their community or for students to be able to relate text ideas, characters, and events to their experiences or current events.

Finally, more than a quarter of all interviewed teachers—ELA and high school teachers in particular—associated *culturally relevant* materials with engaging materials. These teachers reported that it was important to use multicultural content to make sure that students of all races, genders, and ethnicities were represented. ELA teachers reported that

students enjoyed material written by people who have the same cultural background as they do. Teachers felt that students of color were more engaged when reading material included characters who look like them or material written by African American or Hispanic authors. It was important for students to be able to relate to the material that they were reading and see themselves in the story.

To Elevate Student Engagement, Interviewed Teachers Modified Materials to Create Connections to Student Interests and the Real World, Provide Students with Choices, and Incorporate Technology

To modify materials to make them more engaging, teachers described creating connections to student interests and real-world examples, giving students choices about the materials or parts of materials to use, and incorporating technology. As one teacher explained,

I took the paper-based curriculum and made it more technology-enhanced through the use of Nearpod and different interactive games. I added Edpuzzle videos to build background knowledge. Pretty much every single lesson got modified.

High school ELA teacher

This excerpt illustrates how one teacher reformatted materials using technology to make instruction more interactive and, thereby, more engaging. The example also shows teachers both modifying and supplementing their curriculum to achieve their instructional goals. In this case, the teacher mentioned bringing in supplemental materials in the form of videos to engage students.



One item on the AIRS asked teachers to indicate on a four-point scale the extent to which they agreed that their main materials *are culturally relevant*. About 82 percent of respondents ($n = 1,689$) agreed or strongly agreed (mean $[M] = 3.16$, standard deviation $[SD] = 0.81$).

Teachers' Perceptions of Appropriately Challenging Instructional Materials (Question 2)

Interviewed teachers reported that, most of all, engaging materials needed to be appropriately challenging for students. In this section, we examine what teachers regard as “appropriately challenging.”

Seven of Ten Surveyed Teachers Agreed Their Main Materials Are Appropriately Challenging



About seven of ten teachers in our sample indicated that their main materials were “at the right level for the majority of [their] students,” with no significant differences by subject or grade level taught. Nearly all of the remaining

teachers who did not believe their materials were at the right level indicated that they were too challenging (26 percent overall); only 3 percent of teachers overall indicated that their materials were not challenging enough.

Surveyed Teachers Using at Least One Standards-Aligned Material and Teaching Higher Populations of Low-Income Students Were Less Likely to Indicate That Their Materials Are Appropriately Challenging

We observed differences based on whether teachers used a standards-aligned material and on the demographics of the students they served. Teachers using at least one standards-aligned material were less likely (54 percent) to indicate that their materials were appropriately challenging when compared with teachers who were not using any standards-aligned material (76 percent). Additionally, the percentage of teachers indicating that their main materials were appropriately challenging decreased as the level of school poverty increased: Seventy-nine percent of teachers in the schools with the lowest poverty rate (first quartile of school FRPL enrollment) indicated their materials were “at the right level,” compared with just 55 percent of teachers in the schools with the highest poverty rate (fourth quartile).

Surveyed Teachers Who Taught Classes in Which One-Quarter to One-Half of the Students Are ELs Were Less Likely to Indicate Their Materials Are Appropriately Challenging

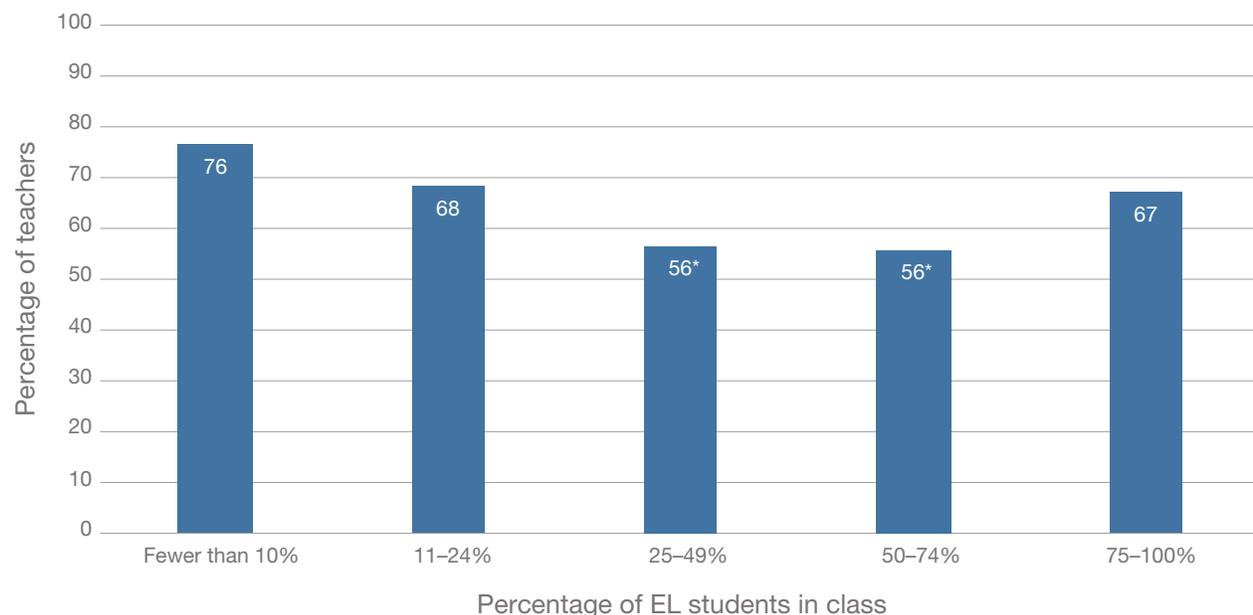
We found a U-shaped relationship between the proportion of ELs that teachers reported serving and whether they reported that their materials are appropriately challenging (Figure 3). Specifically, teachers serving the highest and lowest proportions of ELs were more likely to indicate that their materials were appropriately challenging than teachers in the middle (25–49 percent ELs or 50–74 percent ELs). One inference from this pattern could be that teachers serving less-uniform classrooms with respect to EL status might have the most difficulty finding well-suited materials for all of the students they serve. However, we note that this is a speculative interpretation, given that differences between teachers serving 25–49 percent ELs and 50–74 percent ELs are significantly different at the $p < 0.05$ level only from teachers serving

10 percent or less ELs. Additionally, it is possible that teachers serving mixed-EL classrooms use separate materials for ELs and non-EL students.

Appropriate Materials Are Characterized by Availability of Scaffolds, Vocabulary at Students’ Reading Level, and Not Too Much Text

Having learned that most surveyed teachers regard their main materials as appropriately challenging, we turn to interviews to learn what teachers attend to when considering the challenge levels of the materials. In Table 6, we summarize the interview responses about the characteristics most indicative of materials that are appropriately challenging. We then elaborate on the top three responses. As we expected, teachers identified characteristics that helped distinguish appropriately challenging materials from those that were too challenging (e.g., did not provide enough

FIGURE 3
Percentage of Teachers Indicating Their Main Materials Were Appropriately Challenging, by Percentage of ELs in Class



NOTES: This figure shows the percentage of teachers indicating that their main materials were at the right level for the majority of their students, separated by the self-reported percentage of ELs in their classrooms. Teachers were presented with the following response options for the challenge item: My main [ELA/mathematics] materials (excluding materials I create myself) are 1 = “. . . too challenging for the majority of my students,” 2 = “. . . at the right level for the majority of my students,” 3 = “. . . not challenging enough for the majority of my students.” The percentage of EL students in a classroom is self-reported by teachers; the available response categories are presented along the x-axis. Labels with asterisks indicate that differences relative to percentages in classrooms with 10 percent or fewer EL students are statistically significant at the $p < 0.05$ level. $n = 1,721$.

TABLE 6

Interview Responses for Characteristics of Appropriately Challenging Materials

Code	Percentage	Subgroup with More Respondents by More Than 15 Percent
Provides scaffolds	72	Mathematics
Matches students' reading comprehension or vocabulary level	65	ELA, middle school
Has appropriate length and amount of information or text	41	High percentage of ELs
Provides necessary background knowledge	34	Low percentage of HB, low percentage below grade level
Requires critical thinking	33	—
Has appropriate pacing	33	—
Uses clear language, syntax, or diction	21	ELA
Includes various other characteristics	64	—

NOTES: Total sums to more than 100 percent because interviewees might have provided multiple responses. Subgroup differences are based on a 15-percent differential between paired subgroups. — indicates no subgroup difference. $n = 61$.

scaffolds) and not challenging enough (e.g., did not push students' critical thinking).

A majority of teachers said that appropriately challenging materials *provide scaffolds to support student learning*. More mathematics teachers than ELA teachers identified this as a key characteristic. Mathematics teachers described materials that progress in difficulty and allow students to build confidence or that support students in practicing more-concrete or procedural steps before tackling a concept that is more abstract. Meanwhile, ELA teachers described materials that provided scaffolding as having entry points for students of different skill levels such that students could access the material and then build to a higher level of difficulty. For example, ELA teachers described using such strategies as sentence frames or sentence starters to support students, especially ELs, in analyzing text. Teachers also favored materials that promoted strate-

gies, such as gradual release (e.g., I do, we do, you do), "chunking" materials (i.e., breaking down difficult materials or concepts into more-manageable parts), or using materials that are appropriately targeted toward students' specific skill levels. Teachers believed that these types of scaffolding can make difficult material more accessible to students.

Teachers regarded appropriately challenging materials as those that *match students' reading comprehension and/or vocabulary level*. Matching students' reading comprehension level involves considering multiple factors besides students' actual reading ability because there are multiple facets to text complexity, including the level of vocabulary used, the maturity of the topics or themes addressed, and the style of writing (e.g., more "antiquated" language as opposed to contemporary vernacular). Teachers thought it was important that vocabulary be accessible to students. For ELA teachers, materials with too much new vocabulary can make it difficult for students to focus on the reading strategy at hand (e.g., finding the main idea, making an inference). Teachers appreciated materials with features that made reading less challenging for students, such as introducing vocabulary ahead of time or providing synonyms to help connect new words to familiar words. Teachers noted that informational texts and texts using more-antiquated language tended to be more difficult for students, but texts with thought-



One item on the AIRS asked teachers to indicate on a four-point scale the extent to which they agreed that their main material *provides differentiated (i.e., scaffolded) materials to meet the needs of different students*. About 81 percent of respondents ($n = 1,708$) agreed or strongly agreed ($M = 3.21$, $SD = 0.82$).

provoking themes could still challenge students even if other facets were not as complex.

Although more ELA teachers than mathematics teachers identified matching students' reading comprehension and/or vocabulary levels as a characteristic of appropriately challenging materials, this was still mentioned by more than half of mathematics teachers we interviewed. Mathematics teachers noted that the way that materials are worded could either act as a barrier or facilitator to students' mathematical understanding. Although leveled texts are typically associated with ELA, one teacher remarked that having leveled texts for mathematics would be helpful for students who might be proficient at mathematics but who struggle in reading. Mathematics teachers also emphasized the need for materials to support students in understanding mathematics vocabulary (e.g., *product*, *denominator*). Teachers thought that this was especially the case for ELs and students performing below grade level. These findings suggest that reading comprehension is not only a concern in ELA but that it is intertwined with an ability to understand mathematics.

Teachers identified presenting a *reasonable amount of information* to students as an important feature of engaging materials; this characteristic was also associated with appropriately challenging materials. Teachers believed that appropriately challenging materials should present information to students in amounts that they are able to digest and process without feeling overwhelmed. Mathematics teachers perceived a page or task with "too many problems" as intimidating to students, especially those who are struggling. Wordy explanations or long, multi-step questions can also be difficult for students because they shift the focus to reading comprehension. Similarly, in ELA, instead of "walls of text," teachers preferred text that was chunked into smaller, more manageable portions with more opportunity for students to interact with the text (e.g., through checks for understanding throughout). Teachers indicated that lengthy materials were particularly difficult for special student populations, such as SWD or ELs, because it can be difficult for students to focus and determine what they should attend to first.



One item on the AIRS asked teachers to indicate on a 4-point scale the extent to which they agreed that their main material *provides texts that are linguistically appropriate for English language learners*. About two-thirds (67 percent) of respondents ($n = 1,531$) agreed or strongly agreed ($M = 2.84$, $SD = 0.89$).

To Make Materials More Appropriately Challenging, Interviewed Teachers Clarified, Simplified, and Shortened Instructional Materials

Teachers reported modifying their instructional materials in three main ways to make them appropriately challenging: clarifying directions or instructions; simplifying the materials and presenting them in smaller, more digestible parts; and shortening or skipping parts of the material. Teachers described making these types of modifications more often for students performing below grade level, ELs, and SWD, but they also made these types of modifications for all students when their materials were too challenging or unclear. Mathematics teachers described these types of modifications in terms of using "easier" or more "accessible" numbers in problems and examples, providing word problems with simpler vocabulary, skipping certain mathematics problems or exercises, or delivering lessons in shorter chunks. As one teacher said,

I would chunk the work so instead of giving them all the practice problems at once, I would give [students] one section at a time. I would do things to make sure that I didn't give them too much at once.

High school mathematics teacher

Similarly, ELA teachers described modifications that involved simplifying text or breaking longer texts into smaller chunks, choosing texts that were less complex or had easier vocabulary, and skipping certain texts or questions. A teacher explained,

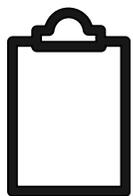
[One way I modify is] chunking the information or breaking it apart, or I might just not give them the second page of the article because if I give a student three pages [to read],

they would say, “I’m not doing this” or “This is too overwhelming.” . . . Meeting [students] where they are, I think, is important.
Middle school ELA teacher

Teachers’ Perceptions of Usable Instructional Materials (Question 2)

So far, we have addressed engagement and challenge—dimensions of materials that we conceptualize as student-facing. In this section, we consider what characteristics of materials make them more *usable*—or easier to implement—for teachers.

A Large Majority of Surveyed Teachers Agreed That Their Main Materials Were Usable, but Teachers Who Reported Using at Least One Standards-Aligned Material Had a Less Favorable Perception



In the AIRS data, we defined *usability* as the extent to which teachers perceived materials as easy to implement. Ninety-two percent of teachers either somewhat or strongly agreed that their materials were easy to implement.

Similar to the engagement and challenge dimensions, teachers’ perceptions of the usability of materials were lower among those who reported using at least one standards-aligned material (86 percent) compared with those who did not (93 percent). How teachers perceived the usability of their materials did not appear to significantly differ across the other subgroups we examined (e.g., grade and subject taught, school and classroom composition).

In Interviews, Teachers Suggested That Usable Materials Are Characterized by Easy Access, Options for Students of Different Levels, and Editability



Interview findings provided insights into what usability might mean to teachers. Table 7 summarizes the responses interviewees provided about what characterizes materials that are usable for teachers. We elaborate on the top three responses in the following paragraphs.

Majorities of teachers in all subgroups described a preference for materials that are *easily accessible*, especially digital materials that provide learning activities or quizzes for students’ independent use, such as i-Ready, Nearpod, IXL, and Google Classroom. Teachers also perceived online materials as usable because they allow teachers to provide students with feedback easily; online materials can even automatically score student responses, thereby reducing the burden on teachers. Despite their advantages, teachers recognized that digital materials can be less usable because they are susceptible to technical difficulties. The following excerpt illustrates the double-edged nature of easily accessible digital materials:

I think [that] what makes a resource engaging or inviting or attractive, “teacher-friendly” or “user-friendly” [is] just access . . . whether I need to access it to project it or print it or share it. To use Agile Mind [for an example], for the students, it [is] easy because they just have to log in, [though] sometimes [it] is a struggle. Inevitably there’s a student [whose] computer is not working.

High school ELA teacher

Teachers described *materials that differentiate content for students of various achievement levels* as more usable, thus associating usability with the dimension of challenge. Teachers serving a high proportion of Hispanic and Black students especially preferred materials that included different texts or questions for students at different levels. This included offering options for more-advanced students and guidance for struggling students, as one teacher described:

[My material] does have built-in things for the kids that are really good and fast finishers. There’s more challenging questions . . . that you can give. Then there’s stuff if [students are] at average pace. . . . And then there are suggestions for the kids that need extra help. I think it does a good job of getting everyone.

Middle school mathematics teacher

Teachers also regarded materials that provide translated content for ELs (e.g., a Spanish-language version of the mathematics curriculum) as more usable.

TABLE 7

Interview Responses for Characteristics of Usable Materials

Code	Percentage	Subgroup with More Respondents by More Than 15 Percent
Are easy to access	72	—
Provides options for students at different levels	58	High percentage of HB, SA
Are editable or easy to modify	49	ELA, high school, not SA, low percentage of ELs, high percentage SWD
Identifies associated skills or standards	36	Middle school
Provides supplements	28	—
Has logical sequence	26	—
Is aligned with district or state standards, benchmarks, and/or assessments	21	High percentage performing below grade level
Provides immediate feedback	10	Middle school, low percentage performing below grade level
Includes various other characteristics	64	

NOTES: The total sums to more than 100 percent because interviewees might have provided multiple responses. Subgroup differences are based on a 15-percent differential between paired subgroups. $n = 61$.

Teachers—especially ELA and high school teachers—appreciated the freedom to *edit and modify their materials* to support their instructional needs. Some teachers created physical versions of such materials as handouts, and others liked materials that could be easily edited on an online platform or converted into a Microsoft PowerPoint presentation. More generally, teachers wanted to be able to insert, exclude, or modify content. One teacher explained,

I like when resources are editable so that if there is one part that doesn't work for me, I can still use the resource and just modify it a little bit. I look for that a lot if I'm going to buy a resource.

High school mathematics teacher

Even as teachers desired easily modifiable materials, however, they conceded that they preferred materials that did not require too much editing and, as a result, too much preparation time.

To Improve the Usability of Their Instructional Materials, Interviewed Teachers Annotated the Materials, Modified the Format, and Incorporated Technology

First, teachers described annotating instructional materials to help them plan in the future. Annotations included details about how long it took

to implement a lesson; what aspects, questions, or texts were difficult to understand or particularly effective in helping students learn a skill or concept; and how a lesson connected to learning standards. Second, teachers described reformatting materials to make them easier to use. A few teachers preferred to print out online lesson plans, while others preferred to scan printed materials so that they could edit them on a computer. Third, teachers also discussed modifying materials so they could incorporate technology, such as a smart board or tablet, in their instruction.



Items on the AIRS asked teachers whether their main material supported learning for students of various ability levels. Specifically, teachers were asked to indicate on a four-point scale the extent to which they agreed that their main material *meets the needs of students with IEPs or 504 plans*, *meets the needs of English learners*, and *helps them accelerate the learning of students who are performing below grade level*. Respectively, 80 percent ($M = 3.19$, $SD = 0.86$, $n = 1,696$), 76 percent ($M = 3.01$, $SD = 0.83$, $n = 1,547$), and 73 percent ($M = 2.97$, $SD = 0.84$, $n = 1,697$) of respondents agreed or strongly agreed.

Teachers' Use of Instructional Materials During the COVID-19 Pandemic (Research Question 3)

We have seen that what teachers regard as characteristics of engaging, appropriately challenging, and usable instructional materials can depend on their teaching context. The COVID-19 pandemic has presented an unexpected and challenging context for teachers. In this final section, we examine whether interviewees have different opinions about what makes instructional materials engaging, appropriately challenging, and usable than they did before the COVID-19 pandemic-related school closures in spring 2020. We also discuss how our interviewees adapted their use of materials during spring 2020 school closures.

COVID-19 and Online Instruction Did Not Change What Interviewed Teachers Regarded as Characteristics of Engaging, Appropriately Challenging, and Usable Materials



When we interviewed teachers about their perceptions of instructional materials during COVID-19-related school closures, their responses suggested that characteristics of what they considered to be engaging, appropriately challenging, and usable materials did not change much relative to their perceptions pre-COVID-19. For example, materials and activities still needed to be interactive and relevant to engage students; furthermore, they needed to be matched to students' comprehension levels to be appropriately challenging. In fact, teachers expressed that some of these characteristics were perhaps more important during school closures because students would be largely responsible for using the materials independently. In many instances, especially with asynchronous delivery, teachers are less able to provide real-time support around the materials by paraphrasing complicated instructions or scaffolding multi-step assignments.

In terms of usability, during the COVID-19 pandemic-related closures, teachers realized even more the advantage of having instructional materials or components of such materials that students could easily access online; teachers who had easily

accessible digital materials did not need to scan and convert print materials, shift students to new materials, or curate a collection of digital materials. Such materials could provide continuity for instruction and learning should schools allow in-person learning but then need to close again. Then again, teachers also recognized that easy access alone is insufficient for online learning, particularly asynchronous and largely independent types of learning. Teachers referenced *EngageNY* as an example of a fully accessible online curriculum that is much too challenging for students to navigate without teacher instruction and guidance.

Interviewed Teachers Struggled to Modify Their Materials to Be Engaging and Appropriately Challenging for Online Learning

A large majority of teachers adapted their instructional materials for online learning. In their interview responses, teachers described struggling to adapt their materials in ways that attended to engagement and challenge. As one teacher explained,

Let's say I wanted to do a hands-on activity. I wouldn't know how to do that and get manipulatives to all of the students. . . . I don't think that way; I'm a mathematics person. Somebody help me.

Middle school mathematics teacher

In general, to accommodate teaching online in spring 2020—synchronously, or more often asynchronously—teachers modified their lessons to make them shorter, simplified lessons to cover basic skills and content, created or used videos as instructional materials, and held virtual meetings to maintain connections with students. However, even teachers who had previously felt confident in adapting their lessons and materials struggled to determine whether the changes they made were effective because they received little to no feedback from their students.

Interviewed Teachers Found It Necessary to Modify Materials for New Groups of Students

About two-thirds of teachers we interviewed reported that, during remote instruction, they focused modifications of materials not only on struggling students

or SWD, but also on other groups needing attention. One such group was students who had technology access issues. Teachers struggled to reach students who lacked access to the internet, devices, or both. Others found that students were unable to access videos that teachers had posted because streaming required too much bandwidth. Teachers tried to address these issues by relying less on videos or interactive, digital materials and instead finding ways of sending materials to students or families (e.g., taking photos of lessons or worksheets to send in a text message).

Teachers also reported modifying materials for students who lack support at home. As one teacher explained:

[COVID-19 has] introduced a new subgroup of challenges for kids . . . who don't have the time. Maybe their parents are working or they are first responders, I got kids that can't get on at 8:00 in the morning because they're giving their siblings breakfast.

Middle school ELA teacher

Most interviewed teachers felt that they needed to decrease the level of challenge in the work they assigned for students who lacked access or support at home. Teachers also described universally decreasing the challenge level for all students because of schools' and districts' failure to provide supports for all students to learn and access the materials. For example, teachers lamented receiving back untouched packets of work that the district had sent out for students to complete.

Some Interviewed Teachers Experimented with New Materials and Methods

About one-quarter of the teachers we interviewed indicated that the remote learning circumstance necessitated by the COVID-19 pandemic gave them the opportunity to experiment with new materials and teaching methods. Teachers mentioned using learning platforms, such as Google Classroom, Canvas, Blackboard, Schoology, and OneNote, as well as websites and programs that help deliver interactive activities, such as Edpuzzle, i-Ready, and wizer.me. Among the teaching methods that teachers tried were prerecording lessons, anchoring instruction in exist-

ing YouTube videos, and using a *flipped* classroom model, in which students are exposed to new content prior to class; class time is focused on helping students process the content and providing feedback. Teachers who tried some of these materials and approaches reported that they helped struggling students. One teacher said,

They tell me they enjoy learning like this because it's at their pace. And they can stop or re-watch something if they had to.

High school mathematics teacher

Other teachers agreed; some said that even after schools return to fully in-person instruction, they will continue to make videos to help students engage with and learn the materials.

Finally, a few teachers reported finding remote instruction freeing because they no longer had to use the curriculum required by their district. This is because some districts recognized that their curriculum did not have digital components to use for remote learning (e.g., online videos of lessons, online quizzes), so they encouraged teachers (or teams of teachers) to find or create their own online resources and materials. One teacher indicated that she enjoyed using materials that she had not previously been able to use; she expanded the materials that she used to increase engagement with students.

Discussion and Implications of Findings for Policy and Practice

In this section, we offer some interpretations of our findings, looking across our survey and interview data and across research questions. We follow our points with relevant implications for state and school district policymakers in positions to influence the development, selection, and/or adoption of instructional materials or teachers' use of such materials. We remind readers that our investigation is limited to teachers' perceptions of materials, which we hypothesize has influence on their use of materials; we are not able to draw links to teachers' actual practice, nor do we know how the characteristics of the materials described by teachers might relate to students' achievement.

In General, Teachers Do Not Regard Themselves as Implementers of Curricula but as Curators, Modifiers, or Creators of Instructional Materials

Our interview findings corroborate past scholarship that shows that teachers are rarely passive implementers of specific curricula but instead are active decisionmakers about what materials to use and how to use, supplement, or modify curricula (Coburn, 2001; Schmidt and Datnow, 2005). Teachers drew on supplemental materials even when they had positive opinions about their main materials. They looked to supplemental materials to enrich students' learning experiences and to better address students' diverse needs.

With respect to modifications, our survey findings suggested that teachers made substantial modifications based on their perceptions of the engagement, appropriateness of challenge, and usability of their materials. Our interview data further illustrated how teachers modified their materials to make them more engaging, appropriately challenging, and usable. Modifications included creating connections to student interests and real-world examples; providing students with choices; incorporating technology; clarifying directions or instructions; simplifying

the materials and presenting them in smaller, more digestible parts; shortening or skipping parts of the material; annotating materials; and modifying the format of the materials.

Understanding how teachers supplement and modify for different purposes can inform the design of instructional materials that minimize the need for substantial supplementation or modifications based on curriculum shortcomings. It can also motivate district and school leaders to (re)consider how teachers are positioned and supported as curriculum users.

Teachers Using at Least One Standards-Aligned Material Had Less Favorable Perceptions of Their Materials

Survey results showed that, compared with teachers who did not use any standards-aligned materials, teachers using at least one standards-aligned material rated their materials lower on all three dimensions: engagement, appropriateness of challenge, and usability. The challenge dimension is not surprising; materials rated as standards-aligned received that designation precisely because they present and treat standards and concepts with appropriate depth and quality (EdReports, undated); such materials are expected to be rigorous. Given this, teachers, particularly of struggling students, might find such materials to provide an inappropriate level of challenge. To the extent that the engagement rating reflects one aspect of the challenge, this can be accounted for by the prior explanation, too. Standards-aligned materials can also be less accessible and less differentiated for multiple student groups and levels, which might be why teachers perceived these materials to be less usable.

It is also possible that the ratings reflect the context in which teachers are using standards-aligned materials rather than differences in the materials themselves. In fact, districts and schools where teachers reported using standards-aligned materials tend to serve higher proportions of non-White and FRPL-eligible students. This pattern is driven by between-state differences (e.g., racially diverse states, such as California and Louisiana, have relatively high

Recommendations

- Support teachers in effectively supplementing and modifying standards-aligned materials by providing guidance or options.
- Recognize that materials are not one-size-fits-all; teachers make decisions about materials based on the students they serve.
- Pay attention to nuances as to what makes effective ELA and mathematics curriculum materials and apply similar criteria when selecting materials for middle and high schools.
- Reexamine materials and supplement as needed to address diverse students' interests and experiences.
- Reflect on teachers' challenges during the COVID-19 pandemic to better support selection and availability of materials.

Implication for Policy and Practice

Support teachers in effectively supplementing and modifying standards-aligned materials by providing guidance or options

Policymakers should recognize that simply adopting or requiring the use of standards-aligned materials might not necessarily lead to the use of such materials or to more-robust teaching and learning. Because a large majority of teachers using standards-aligned curricula are discouraged from supplementing or modifying materials and because teachers have some unfavorable perceptions of these materials, this can lead to great frustration for teachers and potentially to perfunctory implementation of required materials in a way that ignores students' needs. Knowing this and acknowledging teachers' roles in supplementing and modifying materials, states, school districts, and school leaders should support teachers by providing guidance on how they can supplement and modify standards-aligned material in ways that allow for differentiation without weakening intended design.

For example, school districts and schools can better communicate to teachers the beneficial and nonnegotiable aspects of the selected standards-aligned curriculum while conceding potential shortcomings of the materials and then providing professional learning sessions or collaborative work time to help teachers modify materials to address those shortcomings. In particular, teachers' top purposes for supplementing and modifying materials concerned meeting the needs of struggling students or students with distinct needs. Professional learning can make this a focus. Districts and schools can also proactively curate materials for teachers or provide guidelines for how to find high-quality supplemental materials or how to modify materials while still ensuring academic rigor. Unless exemplary materials that provide all desired characteristics become available, such compromise is likely essential to increase use of standards-aligned materials in ways that support student learning.

rates of standards-aligned material use). In addition, accountability pressures within states could drive schools and districts that serve a higher proportion of low-income students to adopt standards-aligned materials (Kaufman et al., 2020). In the end, we cannot know for certain what characteristics of materials or context surveyed teachers accounted for in their ratings because we did not ask them for their ratings rationale.

Teachers Perceived Engagement, Challenge, and Usability as Distinct but Intertwined Dimensions of Instructional Materials and Considered Materials in Context-Based Ways

Teachers provided similar, although not perfectly correlated, survey ratings for their main materials along the three dimensions of engagement, challenge, and usability. This suggests that these are interrelated dimensions. Evidence from interviews suggests a similar conclusion. From teachers' discussions of the

characteristics of engaging materials and appropriately challenging materials, it is apparent that these two are overlapping ideas. This echoes research that suggests that the two constructs are related (Marks, 2000). In interviews, teachers suggested that materials that were perceived as intimidating—possibly because of the density of information or problems or the level of text complexity—could cause students to disengage or “shut down,” especially if the students were struggling learners or had to complete the work more independently. The anxiety students feel and the difficulty they experience in accessing materials could be exacerbated during remote learning necessitated by the COVID-19 pandemic. In remote learning settings, teachers might be less able to determine which students need support and of what type; in asynchronous learning situations, students must often navigate difficult materials themselves, without timely support.

To this point, teachers referred to the concept of *productive struggle*—that appropriately challenging material should be somewhat above students' comfort level, but not so far beyond that comfort level that

students feel as though the challenge is insurmountable. Again, this reflects prior research (Hiebert and Grouws, 2007; Warshawer, 2015). Moreover, teachers mentioned the importance of *entry points*, such that students of different skill levels can access materials and make progress from their point of entry. Materials that are not challenging enough can also lead students to lose interest in the lesson or the subject matter. To a lesser extent, characteristics of engaging and challenging materials overlap with characteristics of usable materials. Specifically, teachers considered materials that provide differentiated text options or activity choices both engaging for students and easy to use for teachers.

Regardless of how distinctly teachers perceive the three dimensions, it is worth underlining that teachers do not appear to designate a material as “engaging” or “challenging” in a static, generalizable way; rather, in interview responses, teachers indicated that the interaction between materials and students in context matters. They often discussed making decisions about materials to use based on the individuals and groups of students in front of them each year. Multiple veteran teachers emphasized that, with each cohort of students, they reassessed the materials they had available; they did not simply reuse materials. For example, teachers’ present cohorts might be more or less advanced, in which case teachers might seek less- or more-challenging materials. If students had specific interests that could be leveraged, teachers could seek texts or lessons that address those topics. Or current events might naturally connect to a concept, skill, or content, leading teachers to adopt materials that reflect those events.

ELA Teachers Were More Likely Than Mathematics Teachers to Find Their Main Materials Engaging, but Otherwise, ELA and Mathematics, Middle School, and High School Teachers Converged in Their Perceptions of Materials

On the AIRS, ELA teachers had more-favorable perceptions of the level of engagement of their main materials than mathematics teachers did; however,

there were no statistically significant differences across subjects with respect to perceptions of the level of challenge or usability of the materials. Because the top characteristic of engaging materials named in interviews is that they provide an appropriate level of challenge, and because a larger number of mathematics teachers than ELA teachers identified this as a key characteristic, one could infer that mathematics teachers thought this aspect of their materials could be improved. More specifically, mathematics teachers (more than ELA teachers) associated materials that provide scaffolding with appropriately challenging materials. Together, the findings suggest that more scaffolding—or generally more support for struggling students—could enhance mathematics teachers’ perceptions of the extent to which their materials are appropriately challenging and engaging. Interview responses about the use of supplemental materials seem to support this hypothesis; mathematics teachers are more inclined than ELA teachers to use supplemental materials for the purposes of providing additional practice and meeting the needs of students performing below grade level.

Although several other characteristics of materials along all three dimensions of interest (engagement, challenge, and usability) might not account for significant differences, they appeared to be differentially important to ELA and mathematics teachers. According to their interviews, ELA teachers preferred materials that connected to students’ interests, were culturally relevant, matched students’ reading comprehension levels, featured clear language use, and were editable. Meanwhile, mathematics teachers cared about the amount of information that students were required to digest and the extent to which the materials connected to real life.

Meanwhile, according to survey results, middle and high school teachers had similar views of their materials on all three dimensions. Likewise, interview responses showed that although middle and high school teachers use different instructional materials and ostensibly have different objectives as they work with students of different ages, teachers’ perceptions of the characteristics of engaging and appropriately challenging materials were essentially the same. There were some minor differences between the two groups of teachers. In assessing materials’ levels

Implication for Policy and Practice

Recognize that materials are not one-size-fits-all; teachers make decisions about materials based on the students they serve

Because of teachers' inclinations to supplement and modify materials and the context-based nature of teachers' decisionmaking about which instructional materials to use, incorporating the various characteristics of effective materials that we have identified into instructional materials likely will not result in a materials equivalent of a panacea—materials that all teachers will use with fidelity or that a given teacher will use from class to class or year after year.

However, while talking about supplementing and modifying materials to meet student needs, teachers expressed appreciation for materials that “did the work for them;” for example, by providing appendixes with relevant background knowledge, vocabulary definitions, and suggestions for texts and activities or exercises for students that are below, at, or above grade level. Given this, developers of instructional materials could work to address more of the characteristics that we have identified in their products. Similarly, state, school district, and school leaders can apply the insights we have generated to select or recommend materials with more of the characteristics that teachers associated with engaging, challenging, and usable materials. Leaders can also prioritize materials that facilitate modifications, for example, with editable student handouts. Importantly, leaders should elicit teacher input in the materials selection and adoption process, including, if possible, a preview or pilot of the materials.

These actions can help reduce the time needed for teachers to supplement or modify materials for their students. Ultimately, however, it seems inevitable—and perhaps desirable—that teachers' assessments and uses of materials include a consideration of the materials' context and the student population that they serve.

of engagement and levels of challenge, high school teachers seemed to care more about the content of the materials (i.e., appropriateness of challenge and cultural relevance), whereas middle school teachers focused more on the delivery of the content (i.e., use of interactive and/or collaborative activities and match to students' reading level).

Teachers Serving Higher Proportions of Hispanic Students and ELs Had Some Different Perceptions of Materials Compared with Teachers Serving Lower Proportions of These Subgroups

Survey results point to some trends based on the student populations that teachers served. Specifically, perceptions of the level of engagement of materials was lower among mathematics teachers serving in schools with higher Hispanic enrollment. This could mean that the materials selected for use (whether by school districts, schools, or teachers) in locales with higher populations of Hispanic students tend to have fewer of the characteristics that teachers associate

with engaging materials. Or the materials might be no different than those used in other locales, but teachers might deem them less engaging for the given student population. Teachers' interview responses about engaging materials reflecting student interests, being connected with student life experiences, and being culturally relevant suggest that, ultimately, the dimension of engagement of materials is coupled with the students that teachers serve.

Two additional survey findings about subgroups concern ELs: Teachers with 25–49 percent and 50–74 percent of their roster composed of ELs were the least likely to indicate that their materials were appropriately challenging; there were higher rates of agreement among teachers with rosters composed of zero to 10 percent and 75–100 percent EL students. We hypothesize that teachers serving more-homogenous groups of students are better able to find materials that address students' collective (and similar) needs, although we caveat this finding by noting that only the differences relative to teachers with zero–10 percent EL students are statistically significant. Together, these findings suggest that teach-

Implication for Policy and Practice

Pay attention to nuances between what makes effective ELA and mathematics curriculum materials and apply similar criteria for selecting materials for middle and high schools

The differences in the survey and interview responses of ELA and mathematics teachers suggest that, in a curriculum search and selection process, states, school districts, or schools might need to pay attention to the nuances of teachers' perceptions of effective criteria for each subject area rather than apply the same set of characteristics to curricula in both subjects. Moreover, supports for teachers to use materials might need to be differentiated for ELA; supports for mathematics teachers might not need to be. For example, because ELA teachers regard as important connection to students' interests and cultural relevance, as well as a match to students' reading comprehension levels, and because ELA teachers are likely to supplement or modify materials to achieve these features, school districts and schools might want to ensure that teachers learn how to do so through professional learning, coaching, or other means, and provide opportunities for teachers to share their expertise and modified materials with others.

States and school districts should continue to identify distinct instructional materials that are appropriate for middle and high school students. However, decisionmakers can likely apply the same criteria in selecting materials at these two levels within subject areas because there are only minor differences in what teachers associate with engaging and challenging materials between the two groups.

ers serving a significant, but not majority, proportion of students in particular subgroups have difficulty finding or using materials that both support typical students' learning and differentiate for special learners. One possible consequence of this is that teachers might use materials that "teach to the middle" (i.e., support the average students in the class) or that focus on on-grade-level students, which might then be too challenging for ELs and struggling learners.

Teachers Adapted How They Used Materials During the COVID-19–Related School Closures

Finally, our exploration of how teachers use materials during the COVID-19 pandemic reveals that what teachers regarded as desirable characteristics of instructional materials remained largely the same. For example, whether in print or online, an engaging material is one that features interactive components or activities. To support students learning in a new mode (i.e., online), however, teachers indicated that they had to spend considerable time finding new materials or making modifications to ensure that the materials they use or post online for students meet those characteristics. For some teachers, the pandemic highlighted preexisting inequities

in access to technology and inadequate support at home that became magnified during remote learning. This aligns with findings from other research on the consequences of remote instruction and learning during the COVID-19 pandemic (Diliberti et al., 2020; Stelitano et al., 2020). As a result, teachers had to find different ways of reaching those students by, for example, modifying the format of their instructional materials so that they could send them via text instead of email, and by providing personalized support to students who struggled at home.

Conclusion

Teachers' perceptions, decisions around use, and actual use of instructional materials are complex and multifaceted. In particular, our findings suggest that teachers are constantly assessing the efficacy of their instructional materials in meeting the needs of their students. In doing so, they consider whether their instructional materials are engaging and appropriately challenging for their students, as well as whether the materials are easy to use. Most of our interviewees reported that it is difficult to find a single curriculum that meets all of their own and their students' needs. Hence, they often supplement or modify their main instructional materials.

Implication for Policy and Practice

Reexamine materials and supplement as needed to address diverse students' interests and experiences

Using our findings about teachers serving high proportions of Hispanic students, school districts, schools, and teachers should consider examining their materials through the lens of Hispanic learners. They should assess whether the materials that students interact with in daily lessons include content that relates to their culture and experiences. Leaders can seek to improve the engagement of the materials by adopting new curricula, developing a library or suggested list of supplemental materials that are connected to Hispanic students' interests and heritage, or supporting teachers in finding other ways to integrate content with which Hispanic students identify.

As for ELs, school districts and schools can pay particular attention to classrooms where the roster is composed of 25–49 percent ELs. Those teachers might require extra support in finding and using their materials in ways that meet ELs' needs. Leaders can support teachers by recommending materials that offer differentiated versions of lessons and activities or by making available quality supplemental materials to address any gaps in the main materials (e.g., lesson plans, guidebooks, digital materials). They can also ensure that teachers have access to coaches or other experts who can provide guidance on differentiation.

Implication for Policy and Practice

Districts and schools can reflect on teachers' challenges during the COVID-19 pandemic to better support selection and availability of materials

Even once schools resume their in-person operations, states, school districts, and schools can learn from the COVID-19–induced circumstances by reflecting on how to select and provide instructional materials in ways that minimize burdens on teachers (e.g., having to transpose print materials online or differentiate for multiple groups of students), provide continuity of learning to students (should a hybrid approach be necessary), and are equitable. On this last point, even outside the pandemic, teachers are increasingly integrating digital materials in their instruction, in part to address engagement (i.e., by using videos, online games, or information about current events). Accordingly, districts and schools should find ways to guarantee that all students have reliable access to these materials. This could be achieved, for example, by providing electronic devices (e.g., laptops, iPads) and internet access to all student households; this might take state-level collaboration and resources (Stelitano et al., 2020). Furthermore, although the COVID-19 pandemic might have illuminated the issue of students learning without available support at home for some of the teachers we interviewed, this is not a novel scenario. Districts, schools, and teachers would benefit from working together to develop a plan to support these students year-round and throughout their schooling to help ensure that all students learn and succeed.

Despite the multifaceted nature of instructional materials and teachers' needs, there is currently a focus on standards alignment as the key feature to pay attention to when selecting materials. Although well-intentioned, this could limit intended improvements to teaching and learning. State, district, and school selection of curricula based on standards alignment has only taken us so far. Adopting standards-aligned materials has not necessarily resulted in teachers' regular use of such materials

as designed (Kaufman et al., 2020; McDuffie et al., 2017), and so the theory of change—that high-quality instructional materials drive improvements in instruction and learning—is unlikely to play out. A narrow focus on standards alignment means that policymakers are at risk of overlooking other dimensions of instructional materials that teachers perceive to be essential and that influence them to use materials. Attending to these other dimensions of materials—for example, engagement, appropriate-

ness of the level of challenge, and usability—could be critical to the materials selection and adoption process.

Any further policies or actions related to curriculum choice, however, should acknowledge teachers as more than passive curriculum implementers; indeed, teachers make active, consequential decisions about what materials to bring forward to students. State, district, and school leaders should consider the balance between prescribing use of instructional materials with fidelity and supporting some extent of teacher autonomy. This means permitting or even encouraging teachers to use, supplement, modify, or create materials based on their assessment of students’ needs, interests, and backgrounds. Leaders can facilitate this by providing time for and guiding the process of supplementing and modifying materials by offering training.

Meanwhile, further research is needed to better understand how teachers can supplement and modify instructional materials in ways that meet students’ needs without compromising the rigor or other key features of the intended design of curricula—and to understand how leaders can best support teachers in this respect. Beyond the focus on teachers’ perceptions, future studies could consider students’ perceptions of materials that engage and appropriately challenge them. Finally, future research could investigate the relationship between characteristics—or combinations of characteristics—of materials and teachers’ actual use of those materials, and ultimately how both of those constructs relate to student achievement.

Technical Appendixes

Appendix A. Teachers’ Selection of Main Materials and How We Determined Our Analytic Sample

The 2020 AIRS asked teachers first to indicate the instructional materials that they *regularly use*—defined as using once per week or more, on average—as part of their classroom instruction. These materials included listed published curriculum titles; non-listed or “other” curriculum titles; school- or district-created curricula; self-created curricula; or

“additional” non-comprehensive curriculum instructional materials, such as Khan Academy or Quizlet. The list of instructional materials included in the 2020 AIRS was developed in consultation with state department of education leaders, content experts, and survey funders. From among the “regularly used” materials, teachers were then asked to indicate their *main materials*—the material(s) they use to the greatest extent. Teachers were encouraged to select a single material but allowed to select up to three.

Although the full 2020 AIRS sample consisted of 5,978 teachers, we made the following restrictions to form our analytic sample. First, we included only the responses of the 2,079 teachers who were middle or high school teachers of ELA or mathematics. This excludes responses from elementary school teachers and science teachers at all grade levels. Second, we further restricted our sample by excluding (1) teachers who did not select at least one instructional material as a main material ($n = 131$) and (2) teachers who solely selected a self-created material as their main material ($n = 200$). Teachers who met either of these conditions were not asked to complete the perception and modification items used for our analysis. These exclusions resulted in a final analytic sample of 1,748 teachers. Table A.1 shows the unweighted statistics of main materials use among the 1,748 teachers who were included in our analytic sample. The table shows the number and percentage of teachers who: (1) identified a certain number of main materials, (2) reported using materials that were required or recommended by their school or district,⁵ and (3) reported exclusively using main materials that are not published curricula.⁶ Relative to the full sample of 2,079 middle or high school teachers of ELA or mathematics, the analytic sample of 1,748 teachers worked in schools serving significantly higher

⁵ We did not find any significant differences at the $p < 0.05$ level when comparing the differences in perceptions of engagement, appropriateness of challenge, and usability among teachers who exclusively used school- or district-required or -recommended materials and those who did not.

⁶ Teachers who reported using only self-created materials as main materials are omitted from the sample, as described previously. However, teachers who listed self-created materials as one of their main materials in addition to other materials are included in the analysis.

TABLE A.1

Unweighted Main Materials Selection Statistics Among Analytic Sample Teachers

Teachers identifying . . .	<i>N</i>	Percentage
Number of main materials		
One main material	532	30
Two main materials	529	30
Three main materials (maximum allowed)	687	39
Use of school- or district-required or -recommended materials		
At least one school- or district-required or -recommended material	1,557	89
Only use school- or district-required or -recommended materials	1,089	62
Use of nonpublished curricula as main materials		
A self-created material as a main material	524	30
A school- or district-created material as a main material	309	18
A non-curriculum instructional material as a main material	959	55

NOTE: $n = 1,748$.

proportions of Hispanic students (26 percent versus 22 percent) and FRPL-eligible students (51 percent versus 42 percent). Analytic sample and full sample teachers were similar with regard to school Black student enrollment, school urbanicity, and teacher years of experience.

Appendix B. Summary Statistics for Perception of Main Materials Items

Table B.1 shows the summary statistics for teachers' perceptions of main materials.

TABLE B.1

Teachers' Perceptions of Main Materials

My main ELA/mathematics materials . . .	N	Percentage Agree	M	SD
Main perception items				
. . . are engaging for my students (engagement)	1,711	87	3.25	0.73
. . . are at the right level for the majority of my students (appropriateness of level of challenge)	1,746	71	0.71	N/A
. . . are easy for me to implement (usability)	1,714	92	3.44	0.69
Other perception items				
. . . help my students master my state's [ELA/mathematics] standards	1,709	96	3.60	0.60
. . . cover content addressed by benchmark or districtwide assessments sufficiently	1,683	95	3.59	0.61
. . . cover content addressed by my state-mandated assessment sufficiently	1,689	94	3.58	0.62
. . . provide differentiated (i.e., scaffolded) materials to meet the needs of different students	1,708	81	3.21	0.82
. . . meet the needs of students with IEPs or 504 plans	1,696	80	3.19	0.86
. . . are culturally relevant	1,689	82	3.16	0.81
. . . meet the needs of ELs	1,547	76	3.01	0.83
. . . help me accelerate the learning of students who are performing below grade level	1,697	73	2.97	0.84
. . . provide texts that are linguistically appropriate for ELs	1,531	67	2.84	0.89

NOTES: N/A = not applicable. This table provides the percentage of teachers somewhat or strongly agreeing with each perception item and the mean and standard deviation of the original 1–4 or 0–1 scale score for each item. For all items except Appropriateness of Level of Challenge, teachers indicated, using a four-point Likert scale, the extent to which they agree (1 = strongly disagree, 2 = somewhat disagree, 3 = somewhat agree, and 4 = strongly agree) with each item. Appropriateness of challenge was operationalized as a binary indicator of whether a teacher indicated that their main materials were at the right level for the majority of students on an item with three response options (“too challenging,” “at the right level,” and “not challenging enough”). Readers interested in full item responses for the complete 2020 AIRS should reference the 2020 AIRS Technical Appendix (Doan et al., 2020).

Appendix C. Interview Sampling

In sampling teachers for the interviews, we used their responses to the spring 2019 AIRS. We considered middle school teachers to be those that indicated that they teach grades 6–8, while high school teachers were defined as those teaching grades 9–12. Some teachers might have taught across grade spans or might have taught both ELA and mathematics. When taking the AIRS, teachers in these situations were randomly assigned into either the middle or high school “grade path” and either the ELA or mathematics “subject path” and completed survey questions accordingly. For the interviews, we sampled teachers based on this grade and subject determination. We considered teachers to serve a high proportion of Black and Hispanic students (*high HB*) if they taught

in a school with more than 75 percent of the enrollment identified as Black or Hispanic, according to the 2016–2017 NCES CCD; otherwise, the teacher was considered to teach in a school with a low proportion of Black and Hispanic students (*low HB*). Approximately 3 percent of teachers in the AIRS sample had missing NCES CCD data on Black and Hispanic student enrollment. These teachers were counted as *low HB*. Finally, we created two separate categories for alignment of teachers' main materials: more aligned and less aligned. We coded teachers' materials as “more aligned” if, in the 2019 AIRS, they reported regularly using at least one comprehensive curriculum material that was rated as “fully aligned” by EdReports; otherwise, they were in the “less aligned” category. Approximately 40 percent of

teachers in the AIRS sample (ELA and mathematics combined) reported using unrated materials. They are coded as *less aligned*.

Because we sampled teachers based on their responses to the Spring 2019 AIRS—which pertained to the 2018–2019 school year—but interviewed teachers about the 2019–2020 school year, their teaching context might have changed. For example, teachers might be teaching a different grade level and their instructional materials might be different. Hence, at the start of each interview, conducted in spring 2020, we asked teachers to report their present contextual conditions: subject and grade level taught, name of main materials that they used (which we used to determine standards alignment), and estimated proportion of Black and Hispanic students that they taught. Note that this last criterion differs from the criteria on which we initially sampled, which was based on *school-level* figures as reported in the 2016–2017 NCES CCD data. The analyses of interviews for this report are based on the categorizations shown in Table 1 of the report.

As mentioned, the interview sample of teachers is not necessarily representative of the population of middle and high school ELA and mathematics teachers because we sought to interview an equal number of teachers in all cells, shown in Table 1. Compared with the analytic sample used to report survey findings, the interview sample is more likely to use a standards-aligned material (41 percent versus 20 percent) and more likely to serve in a school with a high proportion of Black and Hispanic students (54 percent versus 24 percent). Interviewed teachers were more likely to serve more than 10 percent ELs (57 percent versus 38 percent) and less likely to serve more than 10 percent SWD (57 percent versus 69 percent). The interview and survey samples were comparable with respect to grade level (48 percent of the interview sample were high school teachers, compared with 52 percent of survey sample teachers) and years of teaching experience (16–20 years of experience in the interview sample versus 15 years of experience in the survey sample).

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About This Report

The American Educator Panels (AEP) are nationally representative samples of teachers and school leaders across the country. In this report, we build on past studies by using survey data from the RAND American Instructional Resources Survey (AIRS), a nationally representative sample, to examine how middle and high school ELA and mathematics teachers use and perceive their instructional materials in terms of engagement, challenge, and usability. In addition, we use interview data to understand teachers' perceptions about what makes instructional materials engaging, appropriately challenging, and usable.

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