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NAVIGATING THE NEW CURRICULUM LANDSCAPE

How States are Using and Sharing Open Educational Resources

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The Learning Technologies Project seeks to ensure that public education is equitable and open so all students have access to the information, tools, and experiences they need to succeed in the Digital Age.

About CCSSO

The Council of Chief State School Officers (CCSSO) is a nonpartisan, nationwide nonprofit organization of public officials who head departments of elementary and secondary education in the states, the District of Columbia, the Department of Defense Education Activity, and five U.S. extra-state jurisdictions. CCSSO provides leadership, advocacy, and technical assistance on major educational issues. The Council seeks member consensus on major educational issues and expresses their views to civic and professional organizations, federal agencies, Congress, and the public.

Acknowledgements

Corrected at 1:00pm on June 11, 2018: This report has been changed to correct the number of states that are sharing curriculum materials online and the number of states partnering with a third-party platform to provide a content repository. While several districts in Connecticut are partnering with Amazon Inspire, Connecticut's state education agency has not formally partnered with any specific third-party platform and is not, in any official state capacity, sharing materials online. Therefore, 31 states, not 32, are sharing materials online, and 13 states, not 14, are partnering with third-party platforms.

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Introduction

Across the United States, students are encountering curriculum and instructional materials that look very different than those of 20 or 30 years ago. Increasingly, students have access to their own laptops and devices in the classroom, and districts and schools have leveraged these new tools to adopt a broad range of digital textbooks and online content, alongside an abundance of print books and materials.

And it is not just the format of content that is changing. In navigating this digital shift, most states have adopted more rigorous academic standards. These new college- and career-ready standards in English language arts, mathematics, and science have required teachers to make significant changes in how they teach these subjects. Teachers have needed to update curriculum to reinforce these instructional shifts.

In many places, this confluence of technological and instructional change has presented an exciting opportunity to implement engaging new curricula that leverage web-based platforms, online resources, and new digital tools and software. Districts are supporting deeper student engagement and learning through innovative applications of digital tools and more interactive resources.

Except where they cannot.

Next to images of teachers and students using brand-new resources and technologies to support deeper learning, it is jarring to see the outdated books and materials still in wide use in many classrooms. It is not just that these materials may be decades old; the problem is that these resources clearly are not of high quality and do not support the new, rigorous academic standards states have adopted. As education dollars continue to be scarce in the wake of the Great Recession, these materials cannot help teachers support students in reaching their academic goals.

It is in this context that many state leaders have taken a renewed interest in helping districts navigate the changing curriculum landscape. How can states help districts evaluate the quality of all these new curricula? What kind of training will district leaders and teachers need to implement these resources in the classroom? And how can states ensure districts have equitable access to high-quality curricula, especially facing the reality of limited state and local budgets?

A promising new trend is providing an answer to many of these questions. For more than a decade, open educational resources, or OER, have been providing an alternative to the traditional model of instructional materials. The broad copyright permissions granted through openly-licensed resources allow users to

freely download, change, combine with other resources, and share in ways that are not possible with proprietary resources.

To better understand how states are using OER to meet curriculum and instructional materials needs, the Council of Chief State School Officers (CCSSO) and New America analyzed thousands of pages of state policies, legislation, and curriculum documents from all 50 states and the District of Columbia. Based upon this nationwide scan, we homed in on 14 states undertaking innovative work leveraging OER and conducted in-depth interviews with education leaders from those states. (See **Appendix A** for more on our research methodology, and **Appendix B** for a full list of interviews conducted.) Our research and conversations with state leaders uncovered a wide range of ways that states are using OER to improve teaching and learning and revealed a variety of collaborations that facilitate sharing this work.

We found that while there is wide variation in approaches, states are deeply integrating OER. Strategies range from including OER in existing curriculum reviews to developing and curating new openly-licensed resources. States are working to better link curriculum with instruction through professional development and connecting all of these openly-licensed resources online using state websites and content repositories. Some are promoting open licensing by funding specific OER projects and have enacted legislation that defines, promotes, or prioritizes open content. Across all states, we found evidence that frequent collaboration, communities of practice, and regular communication have helped to spread and build upon this work.

While very few states require districts to adopt specific curricula, state leaders play an important role in providing guidance on which curricula are well aligned to academic standards. Regardless of how involved a state is in district curriculum adoption, each one should ensure that all of its districts—no matter their size or capacity—have the accurate and up-to-date information they need in order to make knowledgeable curriculum decisions. Further, states have a role in ensuring that districts provide equitable access to high-quality curriculum for all students.

This paper delves deeply into the specific work states are undertaking around openly-licensed curricular resources, how states are supporting OER implementation, and what lessons can be learned. The report also spotlights examples of new approaches for promoting and sustaining open, relevant, and high-quality instructional materials. It concludes with five key takeaways for state leaders to consider as they improve the quality and affordability of the materials teachers are using every day.

Background: Curriculum, Open Educational Resources, and Quality

In the education field, terminology is often used without a clear definition or shared understanding. Before diving in, we start by discussing how this paper defines *curriculum*, *open educational resources,* and *quality*. We also highlight the current research and evidence that supports our understanding of curriculum quality and look at emerging research around the quality of open curricula.

Basics of Curriculum and OER

In the PreK–12 context, the term *curriculum* is commonly used to refer to all of the academic lessons and content taught in the classroom. These lessons are arranged to present the content for each subject area in a logical order for each grade level, spanning the entire academic year. In some cases, textbooks constitute a significant portion of the curriculum, but the term also includes the full range of other instructional materials used to teach a subject, including fiction, primary source documents, hands-on activities, and other supporting materials. In the U.S., curriculum and instructional materials have primarily been produced and distributed by textbook publishers. School districts typically select and purchase their resources directly from these publishers.

As a growing number of states and school districts have begun to evaluate, develop, and adopt OER, however, this model has begun to change. Simply put, OER are freely available materials that are published using an open content license. Openly-licensed content has broader copyright permissions than traditional proprietary content: materials published using an open license can be freely and legally downloaded, used, changed, built upon, and redistributed by any person in perpetuity.[1] In the PreK–12 context, teachers and instructional leaders may use OER to keep lesson content up-to-date, adapt materials to meet the needs or interests of students, or share effective content with other educators across classrooms. (For more on district and school use of OER, see **PreK-12 OER in Practice** below.)

The term *OER* describes a full range of educational resources. A photograph, single lesson, unit of study, or full-year comprehensive curriculum can all be published using an open content license, just as any of those resources can be published using a more restrictive, all-rights-reserved license. Additionally, OER can be either print or digital, though digital OER are significantly easier to adapt and share. Initially, most OER were individual instructional artifacts, like worksheets and lesson plans, intended to supplement classroom learning. Increasingly, OER have become better organized and more comprehensive,

expanding to include textbooks, full curricula, and online courses designed to map out learning for an entire school year.

Earlier this year, New America's Public Interest Technology and Education Policy programs launched the project, *Making Connections: PreK-12 OER in Practice*. This interactive guide shares more about how districts are using OER on the ground, and provides a toolkit of resources for how to get started.

For more, see: **https://www.newamerica.org/in-depth/prek12-oer-in-practice/**.

What We Know About Curriculum Quality

Just as the grain size of content varies, so too does the quality. This is true for both proprietary resources as well as OER. A growing body of research overwhelmingly concludes that a high-quality curriculum can dramatically improve student learning. To guide decisions on choosing high-quality curricula, the education community has primarily used two key measures: (1) how well a curriculum is aligned with state academic standards, and (2) whether implementing the curriculum in the classroom leads to positive gains in student learning, typically measured using standardized assessment scores.[2]

Throughout this report, when we refer to *high-quality curricula,* we are primarily referring to content that is both aligned with state standards and vetted for its usability in the classroom. (For more, see the following section on curriculum and quality.) We are not saying that all the curricula discussed in this report have been evaluated to show a positive impact on student learning outcomes, because this kind of quantitative research does not exist for the range of new instructional materials available. This section explores more fully the research on these two measures of curriculum quality and looks at emerging research focused specifically on open curricula.

Curriculum and Quality

For most states and districts, a critical component of curriculum quality is the degree to which it is aligned with state academic standards. After the majority of

states adopted new standards in 2010, education leaders were concerned that curricula were not being updated fast enough to reflect the substantial shifts called for in those standards. A significant 2015 study conducted by Morgan Polikoff, associate professor at University of Southern California Rossier School of Education, found evidence that those concerns were justified. He looked at commonly used fourth-grade math textbooks and found clear areas where those resources were not aligned with new math standards.[3]

This growing concern prompted a range of efforts to provide better information about curriculum and standards alignment. In one leading example, the nonprofit organization, EdReports.org, worked with states to identify commonly used ELA and math curricula. EdReports then partnered with education reviewers, most of whom are teachers, to review dozens of the most frequently used curricula available. Its review process focuses both on standards alignment —meaning each of the academic standards are covered by the material with the appropriate depth and rigor—and the usability and design of the materials.[4] These kinds of evaluations provide important qualitative information for school leaders making choices about which materials to implement in districts and classrooms.

After ensuring curricula are aligned with academic standards and are designed to be easy for teachers to use, an important second step is to show how curricula impact student learning. Unfortunately, compared to other school-based interventions, rigorous academic research on curriculum efficacy is relatively thin. Available research has clearly demonstrated that curriculum can be an important tool for improving student learning. The quantitative research currently available, however, does not provide sufficient insight into which curricula are the most effective, or what specific elements and features of a curriculum make it more or less effective.[5]

A recent report authored by David Steiner and his team at Johns Hopkins School of Education examined the available research on curriculum and student achievement. Their review found that in general, curriculum choices have a significant impact on student learning outcomes.[6] This finding is consistent with other research, including a 2012 Brookings analysis by Matthew Chingos and Russ Whitehurst, as well as a 2015 look at curriculum reform from the Center for American Progress.[7]

On the other hand, Steiner's team found limited research on how specific curricula impact student achievement. Researchers are trying to fill in these gaps. Last summer, a small-scale study published by the Brookings Institution— authored by Polikoff and Cory Koedel, associate professor of economics and public policy at University of Missouri—sought to determine which elementary school math textbooks in use in California had the greatest impact on student learning. The researchers used historical data on textbook adoptions and student achievement data to see which books were associated with larger increases in

student learning, and found that certain textbooks resulted in greater student learning gains.[8] Additional research focused on curriculum efficacy would be an important complement to the growing body of information on curriculum and standards alignment.

Emerging Evidence on Open Curriculum and Quality

As an increasing number of open curricula become available, more information about the quality of these resources has also emerged. Reviews from states, nonprofits like EdReports, and other sources have uncovered a striking trend: of the new curricula available to districts and schools, many of the top standards-aligned resources are OER. In fact, many of these new open curricula were designed and written to align with state academic standards.

Similar to other available curricula, there is little quantitative research showing the impact of open curricula on student learning. In a small number of recent studies, however, the use of specific open curricula has shown promising gains in student learning. In a 2016 post on the CCSSO website, Austin Beck identified three articles focused on OER adoption in PreK–12 tracked by the Open Education Group, a team of researchers interested in understanding the impact of OER on student learning.[9] As the CCSSO article describes, the three studies focus on the adoption of an open science curriculum in Utah public schools, initially finding cost-savings and, in a later study, finding positive gains in student learning.[10]

More recent research published by RAND Corporation on open ELA and math curricula currently in use in New York and Louisiana also point to promising gains in student learning.[11] These studies provide insight into the effect these new curricula are having on student learning, but continued research is needed to better understand how curriculum choices impact student learning.

What Are States Doing?

The potential of high-quality, standards-aligned curricula in the classroom, combined with the cost savings of OER, means that states are thinking of ways to support the identification, development, and effective use of these resources. We found four primary approaches that states are taking to support local implementation. First, they are working to better incorporate OER into their curriculum review processes. Some states are filling gaps in available curriculum by developing OER that reflect their specific standards and local needs. This free and open content is also creating new opportunities for states to connect curriculum to professional learning. Finally, they are finding ways to store and share newly adopted and developed OER through state websites and repositories.

1. Reviewing Curriculum and Instructional Materials

Ensuring that the curriculum and instructional materials available to teacher and students meet the highest quality standard is of paramount importance. Because not all materials that claim to be standards-aligned are actually high quality, several states have established curriculum and instructional materials review processes intended to provide information about quality to district and school leaders. A number of states have included open curricula in this work, holding all content—regardless of license—to the same high standard. With a growing number of printed and digital instructional materials available, states have developed strategies that range from state-led reviews to teacher-user crowdsourced reviews.

While many states have stepped back from mandating adoption of specific curricula,[12] at least **36 states** continue to provide information and guidance to districts on curriculum quality.[13] According to our research, 20 of those states lead curriculum reviews, judging the quality of content against standards and other state-specific criteria. Due to limited staff capacity or policy barriers that keep states from directly reviewing curricula,13 states point districts toward external reviews, rubrics, and other resources to assess content quality. At least five states rate materials through teacher-user reviews, giving teachers themselves the opportunity to evaluate and curate well-designed classroom materials.[14] Some states use more than one strategy for reviewing educational materials. This information is made publicly available and shared with district and school leaders in order to support them in making decisions about instructional materials.

Through our interviews, we have identified several states in each of these categories that have explicitly integrated OER into the information and guidance they provide districts about curriculum quality. Aligning reviews for all curricula,

regardless of license, is important because education leaders have expressed a natural skepticism about the quality of openly licensed content. Rather than make assumptions about quality based upon content licensing, the state and local leaders we interviewed in the following examples are holding all resources to the same high bar.

Figure 1 | How States Are Providing Information About Curriculum Quality

State-led Reviews

In Louisiana, education leaders continue to review curricula at the state level to determine whether available resources align to the state's new content standards. Though the state agency does not require districts to adopt state-reviewed materials, it continues to ensure districts have clear information about available curricula, including both proprietary and open content. Specifically, the state posts instructional materials reviews on its state website, classifying a Tier 1 resource as exemplifying quality, a Tier 2 resource as approaching quality, and a Tier 3 resource as not representing quality.[15] These quality ratings are derived from the extent to which curricula aligns with the state standards, a

determination made by teacher leaders hired by the Louisiana Department of Education. Louisiana only reviews full-year curricula rather than units or lesson banks; the reason for doing so, Assistant Superintendent of Academic Content Rebecca Kockler explained that "coherence and completeness matters."

Using Louisiana's review process as a model, the Texas Education Agency has developed its own quality review process to determine which instructional materials will be eligible for local adoption. TEA is working to tier instructional materials according to their alignment to its academic standards—the Texas Essential Knowledge and Skills (TEKS)—as determined by a review panel comprised of educators, academic experts, parents, and state board members.[16] Penny Schwinn, chief deputy commissioner of academics in the Texas Education Agency, said that rather than focusing on offering a breadth of supplemental resources, the review process has tasked the state agency with prioritizing the depth of instructional content. Texas has identified and developed open curriculum and instructional materials that align with TEKS through the state review process.

Similarly, Utah leverages teacher expertise from across the state to vet materials by evaluating state standards alignment. State leaders work to evaluate OER using the same criteria as any other instructional resources and post these materials reviews online. They have also launched a special task force that not only reviews and rates OER, but also curates open content based on teacher recommendations and research into other state resources. During the curation and review process, Utah prioritizes comprehensive OER units rather than supplemental resources. Alan Griffin, Utah's curriculum content specialist, said, "curriculum that meets only a single objective is hard to review and to utilize because the focus is so narrow."

External Reviews and Resources

In many states, education leaders do not have the authority or capacity to provide information and guidance on specific curricula. Washington's Office of Superintendent of Public Instruction (OSPI), for example, is prohibited from providing specific guidance on the standards-alignment of curricula. OSPI can, however, point districts to external reviews such as EdReports to assess the rigor, alignment, and quality of instructional materials.[17] Many states also direct districts toward commonly used curriculum review tools and rubrics. By pointing to these resources on their websites, states are able to help establish a shared understanding of how to evaluate the quality of materials. One commonly used rubric is IMET (Instructional Materials Evaluation Tool), which aims to help evaluators determine the quality and alignment of curriculum.[18]

Rubrics provide a basis for quality, but states and districts also recognize the need to provide adequate training on their use. In Washington State, officials spend

time working with district leaders to help them understand how to look for quality materials, according to Barbara Soots, OER and instructional materials program manager for OSPI. "We spend a lot of time building district capacity around using OER," she said.

User Reviews and Content Curation

Other states find that OER can be valuable supplements to comprehensive curricula. These single learning artifacts are not intended to replace full-year, but rather offer opportunities to personalize and adapt learning to meet diverse student needs. For smaller OER grain-sizes, states have turned to user ratings grounded in standardized rubrics to allow teachers to learn from each other and crowdsource reviews. A commonly used tool is Achieve's EQuIP (Educators Evaluating the Quality of Instructional Products) rubric, which helps to identify standards-aligned lessons and resources.[19]

Michigan sees promise in the potential to use OER to personalize student learning. Michelle Ribant, director for 21st Century Learning in the Michigan Department of Education, explained: "OER started as online resource support for curriculum and has evolved to provide materials for more personalized learning that may better address student needs." Michigan's model is user driven, allowing teachers to rate supplemental OER online by evaluating them against the rubric that is baked into the OER Commons platform. In this way, teachers keep content relevant to their classrooms, evaluate the adapted content for alignment, and share what they know about effective materials with their colleagues.

As users review content, some states find a need to better organize materials flagged as high quality. They are working to actively curate OER specific to local needs and house them in accessible state resource libraries. For example, Val Emrich, director of instructional technology at Maryland State Deparment of Education, noted that her office hosts a series of curation and creation workshops. During these trainings, district leaders and teachers learn about the benefits of OER, interact with open content, and create, sort, and organize resources appropriate for their schools and classrooms.

2. Developing Standards-Aligned Curriculum

For many states, evaluating available content has led them to put more effort into developing curriculum and other educational resources, especially when reviews have identified clear gaps in high-quality curricular materials. States that have taken on this work have pursued different strategies for content development, based on context and capacity. Each state, however, specified that the content it developed would be openly licensed. Louisiana's Rebecca Kockler encapsulated

why states are choosing to make these resources available as OER: "If we're going to take taxpayer dollars and build instructional content and materials," Kockler said, "making those resources proprietary seems ludicrous."

We have identified **12 states** (including the District of Columbia) that have been directly involved in partnerships to develop new open curricula and resources. Across the country, states have contributed to the development of comprehensive, standards-aligned curricula in ELA, math, science, social studies, and a range of other content areas.

Figure 2 | States Creating Open Curriculum and Instructional Materials
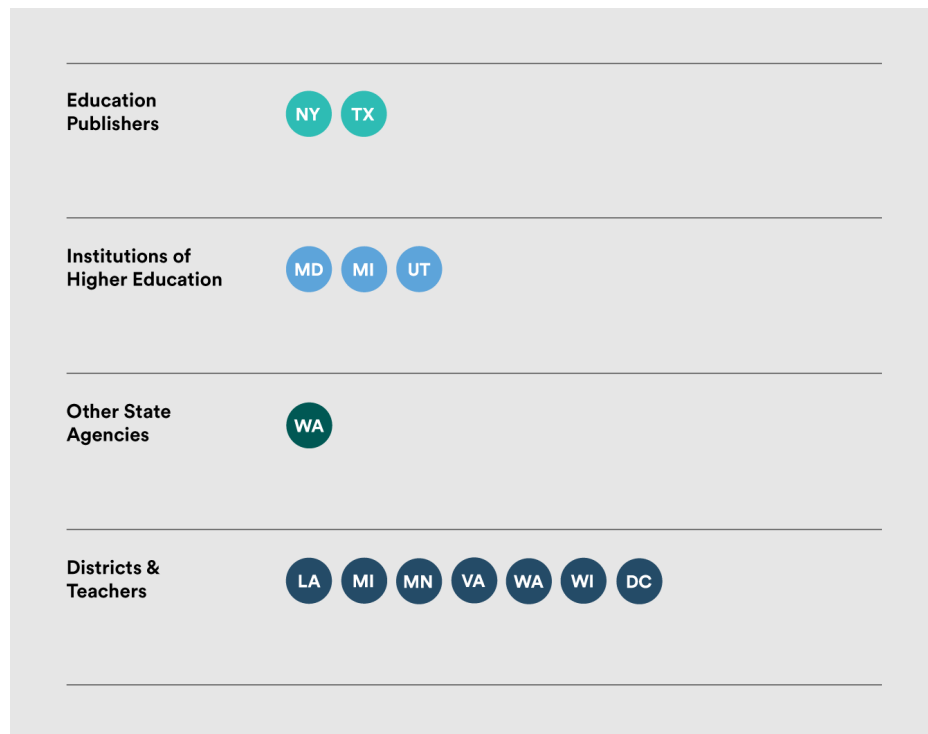
Source: *Data are based on author research, including state website scans and interviews with education leaders.*

State education leaders have partnered with a range of other organizations to develop open curricula: smaller education publishers, institutions of higher education, other state agencies, and school districts and educators. Often, states have collaborated with multiple organizations on one or more open curriculum initiatives. (Many organizations have worked to develop open content without state involvement—those valuable efforts are beyond the scope of this report.)

Education Publishers

One of the most significant state investments in curriculum to date is New York's work to develop its EngageNY materials, which include comprehensive PreK–12 ELA and math curricula. New York requested proposals from writers across the country interested in developing these resources, but with an important new requirement: "the materials would be available on the [state] website for free," John King, former commissioner of education in New York and previous U.S. secretary of education, shared. As a result, he said, "we ended up with a set of vendors that had to believe in our OER approach."[20]

After putting out a request for proposals, state leaders identified four organizations to develop ELA curriculum for specific grade ranges. Core Knowledge developed the PreK–2 curriculum; Expeditionary Learning created grade 3–8 resources; and the Public Consulting Group developed high school materials. Additional units were added by Odell Education for grades 6–12. One organization, Great Minds, won the bid to develop math curriculum for every grade level, PreK–12. The resulting curricula have been widely adopted: not only have districts and schools within New York leveraged these materials, but other states have embraced these resources as well.

Similarly, Texas identified a need for curricular resources in high-enrollment high school STEM courses. In 2015, the state put out a request for proposals to identify partners to develop the materials. In the initial phase of the project, Penny Schwinn said, "there was conversation around how the state could be more effective with taxpayer dollars. Could OER free up dollars in other places?" Initially, the state did not require that all materials created with state funds be released under an open content license, but moving forward, any additional materials created using state funds will be released as OER. In the long term, Schwinn said, the state hopes that investing in open resources will free up funds to allow districts to spend dollars differently.

After putting out a request for proposals, the state identified two organizations, OpenStax and Study Edge, to develop curricular resources for nine high school STEM courses that are aligned with the state's academic standards, the Texas Essential Knowledge and Skills. The resources from OpenStax are similar to traditional textbooks, while the resources from Study Edge are video-based lessons. (OpenStax has released its materials using an open content license; Study Edge materials are available online free of charge but are not openly licensed.) These materials were developed with Texas learning standards in mind, but several of the textbooks developed by OpenStax were developed for Advanced Placement (AP) courses and have been added to the College Board's list of approved texts, meaning that AP educators across the country could easily adopt these materials. "While Texas is a very proud, independent state," said

Schwinn, "there are a lot of ways that we're open and willing to share materials with any state in the country."

State Institutions of Higher Education

Soon after adopting its new academic standards, the Utah State Office of Education solicited bids from potential writers to create middle school math textbooks. Unlike New York and Texas, however, the responses that Utah received were from state institutions of higher education. Two of the criteria the state used to choose between proposals were demonstrated ability to create the curricula, and the expertise of the staff; many colleges and universities have significant experience and expertise in curriculum development. (Indeed, several of the organizations listed above have university affiliations—for example, OpenStax is based at Rice University in Texas.) In the summer of 2012, state leaders selected the University of Utah to develop seventh and eighth grade math textbooks.[21]

In a separate effort, Utah also worked to create high school math curricula. "In the secondary space, [our state] chose to go to an integrated mathematics model," said Sarah Young, digital teaching and learning coordinator in the Utah State Office of Education. "It created an instance where there weren't curricular resources that were off the shelf, based on the standards," she said. The resulting curriculum, known as the Mathematics Vision Project (MVP) was developed based on Brigham Young University's Comprehensive Mathematics Instruction Framework. All of the resulting math curricula for middle and high school have been evaluated by EdReports and found to be highly aligned with the Common Core standards.[22]

Other State Agencies

In the state of Washington, the legislature has passed several bills addressing curriculum requirements. For example, it passed a bill in 2015 that required the incorporation of a tribal curriculum in schools so that districts teach students about tribal sovereignty and the state's local tribes. Washington has the third-largest number of federally recognized tribes after California and Oklahoma, and few resources existed that captured the unique history of the area's indigenous peoples.

To provide districts with the materials they needed to meet this requirement, Barbara Soots said that her office of public instruction partnered with state agencies and a number of Washington's 29 federally recognized tribes to develop a comprehensive open curriculum aligned with the Common Core standards for ELA. These materials tackle essential questions about tribal sovereignty, examining complex issues such as the legal status of tribes who negotiated

settlements for the loss of their homelands.[23] The curriculum is specific to the tribes located within the state of Washington, but the framework could be adapted by other states and districts looking to educate their students about the history of tribes in their area.

Districts and Educators

In addition to working with publishers, institutions of higher education, and other agencies, states have also partnered with districts and teachers to create new content. For example, Washington has provided districts with financial support to adapt, develop, or implement standards-aligned OER to meet specific local needs. The state provided a modest grant to Tumwater School District, a small district right outside the state capital, to adapt its open high school math curriculum—it chose the Math Vision Project, originally created for Utah—to create interventions for students struggling with key math concepts. As a part of this work, districts have made their adapted resources available through Washington's state content repository.[24]

In Maryland, state leaders have worked with district leaders to create OER cohorts to develop a better understanding of OER with the goal of creating local curricula that can be shared across the state. Val Emrich said that this started with a meeting of the state's 24 assistant superintendents for instruction that aimed to develop a deep understanding of OER and establish e-communities to share ideas and resources.

In Louisiana, state leaders found gaps in available ELA resources that the state could help to fill by working with teachers across the state. To fill this need, Rebecca Kockler said that the state brought together master teachers from districts across Louisiana, in partnership with national experts, to develop ELA units for grades 3 through 12. The resulting Guidebooks are available online under an open content license, free for other districts to adapt and use. Similarly, Michigan's Open Book Project has funded and coordinated efforts with educators from across the state to develop social studies resources. This multi-year effort has resulted in social studies curricula for most grade levels: educators have developed comprehensive curricula for grades K–3 and 7–8, as well as high school curricula for U.S. history, world history, and civics.[25]

3. Connecting Curriculum to Professional Learning

Good content helps to improve teaching, but content alone is not enough. As state leaders evaluate and create curricula, they have increasingly seen how OER can more intentionally connect curriculum with professional learning. In contrast to professional learning that focuses on general teaching practices, professional learning built around open content is "curriculum-embedded." This

supports teachers in deepening their knowledge of the content they are using in the classroom.

High-quality open curricula offer a unique opportunity for districts, as freely accessible materials can offset some of the costs associated with any corresponding professional learning. That is to say, OER gives districts the opportunity to invest more in professional learning opportunities, which is more difficult to do when districts allocate more money to accessing the content itself. Further, in order to effectively use OER, district leaders and teachers need new kinds of professional learning opportunities. District leaders and teachers can more successfully use OER when they have in-depth knowledge of open licenses, best practices for adapting and combining different kinds of content, and an understanding of how OER supports state standards.

Figure 3 | States Connecting Curriculum to Professional Learning Using OER
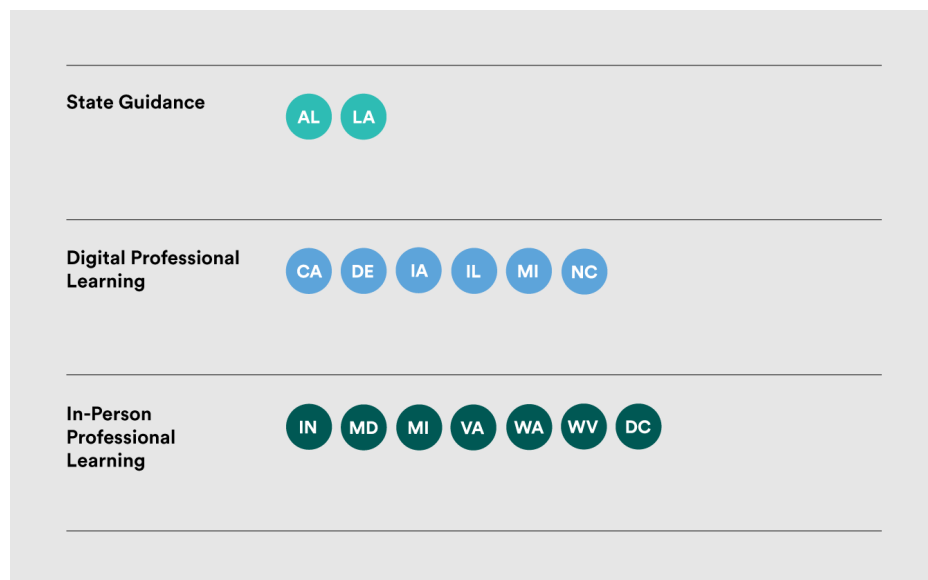
Source: *Data are based on author research, including state website scans and interviews with education leaders.*

That said, connecting curriculum to professional learning through OER is an emerging practice in states. Based on our research, state interviews, and publicly available data, we have identified **14 states** (including the District of Columbia) that are connecting curriculum and professional learning through OER, though we recognize that this likely does not capture the full range of work happening. Across the country, states are connecting professional learning and curriculum in three main ways: developing state guidance on professional learning; providing

free, on-demand digital modules; and offering in-person opportunities for collaborative learning.

State Guidance on Professional Development

In Louisiana, the state provides guidance on professional learning opportunities that are curriculum-embedded. The state not only offers districts information on high-quality resources, but also provides a guide detailing professional development opportunities that are aligned with Tier 1 curriculum. Further, state leaders host quarterly, regional collaborations with their teacher leaders throughout the school year. Linking professional learning to curriculum has been easier in an OER environment.[26] Rebecca Kockler explained that OER has allowed Louisiana to more fully integrate its education system, meaningfully aligning curriculum with professional learning for teachers, training for school leaders, and even some assessment systems. "When materials aren't open, it's really hard to build an integrated system because we don't have permissions—that's the power of OER," she said. "The curriculum can play its true role as the center of the instructional vision, and everything can reinforce it."

In North Carolina, state leaders are elevating teacher professional learning connected to their work around OER. "We need to make sure our teachers are good consumers of digital content," said Verna Lalbeharie, director of digital teaching and learning with North Carolina's Department of Public Instruction. "We need professional development around how to use rubrics wisely and make sure the content will help meet learning objectives," she said. Lalbeharie also stressed the value of OER in helping to integrate curriculum within professional development to better support student learning.

Digital Opportunities for Professional Learning

Illinois' ED360 platform not only links to its OER repository, iOER, but also links to the digital professional learning platform, Ed Leaders Network.[27] The fact that most OER are provided in digital formats has allowed the state to provide digital opportunities for professional learning that are on-demand, available anytime, anywhere an educator can connect online. Through this platform, educators can access learning modules specific to their practice. This has the potential to promote more equitable opportunities to deepen content understanding, regardless of local capacity. Mary Reynolds, Illinois' executive director of Innovation and Secondary Transformation, said that interoperability is vital between where OER content and professional development modules are stored: "the key is to help teachers find these resources, and align it to all the other pieces and initiatives they are looking for."

California also has begun to use a new digital platform, Collaboration in Common, to house instructional training resources. According to Julia Agostinelli, education programs consultant in the California Department of Education, these resources primarily come from the county offices of education. The Instructional Leadership Corps, a Stanford Center for Opportunity Policy in Education (SCOPE) that brings together more than 200 teachers each quarter to deepen their understanding of instructional standards, also uses the platform to collaborate and share self-made training resources. Housing professional learning resources from these in-person meetings online allows teachers to access them later and share them with their districts, enabling ongoing conversations.

In-Person Professional Learning

Each year, Washington hosts in-person OER meetings across the state. Barbara Soots described the content of the sessions as ranging from the general basics of OER to the impact of OER on specific content areas. Louisiana also offers an annual summit that brings together 6,500 educators, focusing on building content knowledge of high-quality instructional materials.[28]

Regional OER meetings are also emerging across the country to engage neighboring states, districts, and educators in shared OER learning. These meetings, hosted by states such as Virginia and Michigan, offer opportunities for classroom, state, and district leaders to learn about and collaborate on OER topics applicable to their region's standards, students, and priorities. OER meetings acknowledge the breadth of information needed to fully understand and use OER, addressing topics like vetting resources, accessibility for individuals with disabilities, privacy considerations, copyright and licensing, and the permissions granted through OER.

4. Building State Websites and Repositories

As state leaders have delved into the work of reviewing curricula, developing new content, and connecting content to teacher professional learning, states have been focused on identifying space to organize and share high-quality resources with districts. Because so much of the curriculum and instructional materials that states have reviewed, developed, and curated—often in partnership with districts —is openly licensed, states have been able to more easily share these resources online.

While the majority of states have some kind of web presence to share resources, many leaders have found that as their needs have evolved, the online tools they have used in the past are no longer sufficient. As a result, a number of state

websites and repositories are currently in flux as leaders work with contractors, vendors, and other organizations to find tools that meet a variety of identified needs. One of the most pressing concerns for every education leader interviewed for this report has been interoperability, making sure that the different resources and tools that have been created can be easily used together.

Figure 4 | How States Are Sharing Curriculum and Instructional Materials Online

Sources: Data are based on author research, including state website scans and interviews with education leaders; data were also checked against other sources, including "Digital Instructional Materials Acquisition Policies for States," State Education Technology Directors Association (SETDA), October 2015, http:// dmaps.setda.org/.

While states acknowledge that much of this continues to be a work in progress, we have found that **31 states** currently are sharing high-quality curriculum and instructional materials online. Currently, we found that four states have gotten started by using their state websites to share the content they have created. Further, 16 states have built their own content repositories, and 13 states have used third-party platforms to share their work.[29]

State Websites

While the state of Texas is working to both review and develop content for its teachers, it is still developing its portal to share these resources. The portal will contain quality review information as well as the content that the state has developed. But while Texas works to find a partner to help build its portal, it has already created valuable, high-quality curriculum and instructional materials that were made available as soon as they were ready through the state agency website. Similarly, Louisiana has used its Louisiana Believes website to share content reviews, link to high-quality resources, and promote the open ELA curriculum developed in partnership with its teachers.

In New York, the state created a dedicated website to host its new ELA and math curricula, EngageNY.org. That website started with the two curricula but has been built out over the past several years to include additional state resources focused on professional learning, including a video library of expert instructors.

State Content Repositories

As Illinois considered how to share OER with educators, it developed a state-specific content repository. The state platform, iOER, hosts a range of open content, from individual lessons to more comprehensive curricula. As Illinois has built out its larger portal for educators, ED360, it has been important to ensure that iOER connects with that portal to provide greater interoperability and easy access for teachers. State leaders wanted to be sure that they connected OER to other efforts to improve high-quality, personalized instruction. The platform now connects with the state data system, online professional learning opportunities, and other tools for educators.

Similarly, Georgia's state office of technology services has built a content repository to meet the needs of its educators. Angela Baker, technology services manager in the Georgia Department of Education, explained that her team is robust enough to be able to build its own tools, rather than work with a third party to develop a platform. As the state has continued to refine its platform for sharing content, Baker said, "the thing I'm most excited about is that there's a take-off in the quality of open resources."

Shared Third-Party Platforms

States have also turned to outside organizations to meet their needs. Many have partnered with OER Commons, an online library of open educational resources and other free content, to create a state platform for resources. While OER Commons maintains a freely accessible platform for anyone to use, it has also worked with individual states to develop state-specific microsites hosted on their platform. Leaders in Utah, Washington, and Michigan highlighted how they are working together to share resources through this platform.

States have also partnered with a variety of other third-party organizations to share OER. For example, while Louisiana has additional plans for how it will share out its ELA Guidebooks, currently those resources are hosted on Learnzillion, a website that provides a library of interactive curricular resources, along with other tools. (While Louisiana's Guidebooks are OER, other content on Learnzillion is not openly licensed, and access to some vetted content is fee-based.) Delaware has partnered with Schoology, while Indiana is working with Amazon Inspire.
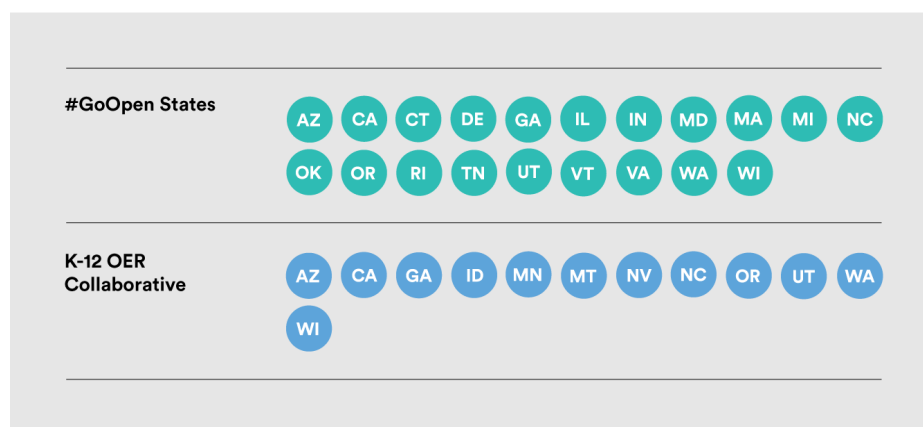
How Are States Doing It?

Across the country, state education leaders are undertaking a range of activities to support adoption of high quality instructional materials, many of which are OER. These efforts have taken off in a relatively short period of time, and have created momentum for similar efforts nationwide. State leaders are employing four critical strategies to support this work. First, the majority have built collaborations across states, as well as within them. Second, they have developed a communications strategy to share what they are doing with other key stakeholders. Third, they have identified different sources of funding to sustain their initiatives. Finally, several states have established policies to support this work.

1. Fostering Collaboration Across and Within States

OER has inspired a range of collaboration efforts. Across the nation, states are collaborating with other states through communities of practice to elevate best practices related to open resources. Within states, education agencies are collaborating with other agencies and local universities to better leverage and align each other's efforts to move high-quality OER forward.

Figure 5 | Multi-State Collaborations

#GoOpen States
AZ CA CT DE GA IL IN MD MA MI NC
OK OR RI TN UT VT VA WA WI

K-12 OER Collaborative
AZ CA GA ID MN MT NV NC OR UT WA
WI

Sources: "#GoOpen States," Office of Educational Technology, https://tech.ed.gov/open/states/; and "Our History," Open Up Resources, http://openupresources.org/open-up-resources-history/.

One of the promises of OER is that it allows for a more open system of sharing across classrooms, districts, and states. Collaboration, then, is a natural byproduct of OER work that further advances best practices, resource development, and partnerships across the community. Through interviews with education leaders, we found that OER has provided fertile ground for collaboration that otherwise might not have existed, and states are leveraging these partnerships to enhance and advance OER use.

Between States

In 2015, the Department of Education launched the **#GoOpen** campaign to encourage states, school districts, and educators to expand the use of OER. The goal of the campaign is to provide all students with high-quality OER that are affordable, relevant, and equitable. As of 2018, 20 states have joined the #GoOpen movement. These states regularly engage in calls to discuss technological strategies, content repositories and state websites, and other activities needed to support OER.[30] Bobby Keener, Virginia's chief technology innovations officer, told us that the #GoOpen initiative has created a community of practice that legitimizes state work, provides a platform for sharing new strategies, and cultivates a trusted pool of resources. Many of these conversations have explicitly focused on the quality of OER. Said Michigan's Michelle Ribant, "#GoOpen helped [us] get smart about OER by adding alignment and standards to the work."

Another community of practice focused on high-quality instructional materials is the K–12 OER Collaborative. In 2014, the Learning Accelerator launched the K–12 OER Collaborative as a 12-state planning effort aimed at addressing the lack of comprehensive, high-quality, standards-aligned, full-year OER for grades K–12 in ELA and math. Input from the multi-state cohort—along with CCSSO, Creative Commons, Lumen Learning, Achieve, Student Achievement Partners, the State Educational Technology Directors Association (SETDA), the State Instructional Materials Review Association (SIMRA), and the Association of State Supervisors of Mathematics—led to the launch of Open Up Resources, a nonprofit committed to developing the highest quality open curricula. The organization's full-year middle school math curriculum by Illustrative Mathematics and K–5 ELA curriculum by EL Education are among the most highly-rated materials reviewed by EdReports.[31]

Other state-state collaborations have arisen more informally. Wisconsin and Michigan, for example, share geographical proximity and similar contexts which allows them to more easily collaborate. Working with Wisconsin, Michigan has considered how to leverage OER Commons to develop its own state microsite to host OER content. According to Michelle Ribant, the states have also worked with Utah to consider how they can leverage OER Commons to share resources

across states. Maryland is also seeking collaboration with neighbors; according to Val Emrich, it has recently invited some West Virginia teachers to participate in its fall 2018 regional summit focused on OER learning.

Across States, Education Service Agencies, and Districts

Many states recognize that alignment between state and district-led efforts is essential to advancing OER. Virginia's Bobby Keener stresses that the limiting factor for the success of OER is often stakeholder involvement. "Remember that you have stakeholders who are all over the place," he said. "You have them at all levels—state, district, and school level." With this knowledge, Keener said that Virginia is careful to bring together the expertise of these stakeholders, including local librarians who have helped to curate high-quality OER.

North Carolina actively works to connect initiatives across its state education agency so that digital content and broader instructional strategies align. North Carolina's Verna Lalbeharie works closely with the K–12 Standards, Curriculum, and Instruction team. She said, "we've launched an awareness campaign so that our curriculum leaders at the state education agency and across the state know what our OER strategy is, and help us determine if we're on the right track."

Washington also promotes shared learning opportunities between the state, its regional education service districts (ESDs), and its school districts. Washington partners with its nine ESDs to host regional OER events where district bright spots and expertise are highlighted, and where voices from local, regional, and state levels are brought together. "By having a program at the state level," said Barbara Soots, "we can...shine a light on districts that are doing really good work. They can talk about what has worked for them, including the benefits and challenges [of OER]."

Between K–12 and Higher Ed

Some states are leveraging the expertise of their higher education institutions to assist with content development, funding, and thought partnership. Michelle Ribant said that state universities and community colleges have played an integral role in creating OER. The University of Michigan, Michigan Tech, and Michigan State have produced digital content and organizational documents for K–12 education. Modules produced by these universities are designed primarily for supplemental online personalized learning, a focus for the state's OER initiative. Additionally, Lansing Community College, Grand Valley State University, and Michigan Colleges Online have been essential strategic partners for the OER initiative planning at the state level. Ribant explained that in education, "kids are supposed to collaborate, so we should too as a state."

Val Emrich said that in Maryland, the K–12 community works closely with its university system. As directed by Senate Bill 494, the Maryland State Department of Education (MSDE) has been collaborating with the state university system to expand eTextbook and OER efforts. Moving forward, Emrich sees potential for a shared OER repository between K–12 and higher education. This partnership can also impact how preservice teachers learn, as state universities work with MSDE to shape programs that help teachers-in-training better understand and use OER.

2. Working on Communication Strategies

OER can only be used well and at scale if open licenses, educational standards, and the materials themselves are widely understood. Communicating the basics of OER, then, is a pillar of several states' OER strategies. Communication strategies include state-led OER events, virtual communication through social media and newsletters, and teacher word of mouth.

Through in-person convenings, states are able to promote deeper understanding of OER development, licensing, and vetting of content at the local level. These events also often serve as networking opportunities where attendees can connect in person about the work, sometimes sparking future collaboration across districts, organizations, and regions. Virtual communications allow states to spread information quickly, efficiently, and economically. Still, some states find that teachers tend to trust other teachers more than state departments of education or other external organizations; teachers, then, can be some of the most effective messengers of high quality OER options within states. State communication strategies have built OER momentum, facilitating sharing and adapting of best practices and resources by others.

Hosting Events

State-hosted OER events act as both vehicles for collaboration and communication. According to Val Emrich, MSDE has developed OER cohorts to represent local education agencies (LEA) statewide and attend regional two-day workshops. During these workshops, the LEA cohorts learn more about OER considerations and develop strategic plans to implement OER in their districts. Maryland's OER cohorts communicate throughout the year to build upon discussions and share new and developing ideas about how OER can better support student learning.

Similarly, when Virginia became a #GoOpen state, the Virginia Department of Education started conducting OER roadshows, 30-minute sessions on OER for local audiences. According to Bobby Keener, the state also developed a tool, the

OER Adoption Maturity Model, to communicate what it means to "go open" as a district.[32] The first phase of this model, "OER Initiate," is all about communication. The model suggests that before districts can effectively use OER, they need to build general OER awareness, learn about OER and its potential cost-saving benefits in depth, discover existing high-quality OER options, and engage in dialogue within and between districts.

Social Media, Newsletters, and Virtual Communication

States are also leveraging social media to spread OER news and engage in conversations about state progress, challenges, and other relevant topics. In Indiana, the state-led INeLearn network of educators engages in weekly Twitter chats to explore a range of teaching and learning topics, including pedagogy, digital citizenship, and the use of OER to improve student learning. This network has a wide reach; as of April 2018, INeLearn had 11,100 followers. Molly Yowell, digital content grant coordinator in the Indiana Department of Education and English teacher at Danville Community High School, said, "it's neat to see how collaborative our state is, and everyone lives in the spirit of sharing—that's what gives us such potential as we move forward with our OER work."

Other states keep in touch with districts and teachers through email communications. In Utah, for example, Sarah Young told us that individual subject areas have opt-in listservs for teachers where news and resources can be shared. Frequent communication encourages engagement about curriculum between states and districts, allowing for local stakeholder feedback about available instructional materials.

Teacher Word of Mouth

Utah has found that one of the best ways to spread the word about OER best practices, particularly as they relate to using OER to supplement curriculum, is through teacher users themselves. Young works with Utah's 41 districts to identify high-impact educators to be involved in state-level OER projects, including reviewing open curricula for standards alignment. These teachers also serve as OER ambassadors, acting as liaisons between their districts and the state, supporting fellow teachers in making informed decisions about OER use.

3. Identifying Sustainable Funding Sources

With the wide range of work being undertaken across the country, the funding models that support these efforts vary widely from state to state. Though OER are free to access online, it takes time and funding to create or vet high-quality open content. There are also costs associated with updating, adapting, and printing

resources for students to use. States and districts are responsible for ensuring students have access to curriculum, whether through procuring proprietary materials or investing in OER.

To identify public funding to sustain this work, states do not necessarily need to find new dollars, but instead may need to redesign their budgets. Federal and state agency funds, primarily dispersed as competitive grants, have been a major source of financial support for states and districts that have worked to adopt, develop, or share OER. State legislatures have also appropriated funding to support state work, though dollar amounts have varied significantly from state to state.

Federal and State Agency Funding

At the federal level, significant funding was made available to states through competitive programs over the past few years to implement a wide range of reforms—while the majority of states focused on other systems changes, a few states chose to focus on curriculum improvement. For example, using a portion of its $700 million federal Race to the Top (RTTT) grant—a program that the Obama Administration created to spark and sustain innovation in the states—New York was able to develop the EngageNY ELA and math curricula to provide a clear model for high-quality, standards aligned curricula.[33] Maryland used a portion of its $250 million federal RTTT grant to update and create new open materials aligned with its state curriculum frameworks.[34] Some states that received RTTT funding to support the creation of longitudinal data systems were able to build out those data systems into larger state websites and repositories that host open content.

States have also used competitive funds to promote district work to innovate and improve upon curriculum. Over the past few years, Washington has offered small grants to districts to adapt, develop, or implement OER, disbursing over $400,000 in total.[35] These grants aim to innovate using open curricula but also support teachers as they review these open resources for quality and begin to use them in the classroom. According to Barbara Soots, districts have typically received between $10,000 and $15,000 to help support this work; the largest award was $20,000. "It doesn't totally cover the scope of the work, but it provides a supplement," she said.

There are a variety of other sources of federal and state agency funding that states can leverage to support their work. For example, the Student Support and Academic Enrichment Program, funded through Title IV of ESSA, can be used by districts to promote and support the use of OER. The language of Title IV says that states may choose to use funds in order to make "instructional content widely available through open educational resources, which may include providing tools and processes to support local educational agencies in making

such resources widely available."[36] With increased Title IV funding through the spending bill recently passed in Congress, states and districts may choose to use these dollars to support OER initiatives.

For some of the technical components of the work, especially in thinking through building a repository, states have looked to state technology funds for support. Michigan, for example, has used its Technology Readiness Infrastructure Grant to help support its work. These grants have supported a range of activities related to increasing capacity to support personalized instruction and support online learning.[37]

State Legislature

In Utah, Texas, and Washington, legislatures have specifically funded pieces of the work. The actual funding levels have varied widely, depending on state budget context, as well as the scope of the work being undertaken. For example, the Utah legislature appropriated $600,000 in 2012 for the creation of middle school math textbooks. In Texas, the legislature appropriated $10 million in 2015 to support the creation of high school STEM materials. During its most recent legislative session, it appropriated another $20 million to develop ELA curricula. [38]

The Washington state legislature passed a bill in 2012 supporting the development of OER for K–12, directing OSPI to develop a library of openly licensed courseware aligned with state learning standards, and to provide professional development and guidance for their creation and ongoing improvement. According to state legislation, this was an opportunity to both "reduce the expenses that districts would otherwise incur in purchasing these materials," as well as "provide districts and students with a broader selection of materials, and materials that are more up-to-date."[39] Since the initial bill was passed, the state has invested $1.25 million in the project. Though the original bill was due to expire in June 2018, new legislation passed this March removed the expiration date due to the project's ongoing success.

4. Adopting Supporting State Policies

In addition to collaborating with a range of stakeholders, developing a clear communication strategy, and obtaining funding to sustain ongoing work, several states have also worked to ensure the policy environment is inclusive and supportive of work regarding high-quality curriculum and OER. Policies often signal state priorities and ensuring that state policies are supportive of OER efforts is a key piece of integrating the work into broader curriculum reform efforts and sustaining this work moving forward. While state policies often touch

indirectly upon curriculum, they can influence what options districts consider, how funds can be spent, and more.

There are a range of ways that states have looked to integrate OER into their policy frameworks. Several have included this work in their state ESSA plans, providing a clear framework for how OER fits into their overall educational vision. Others have considered ways in which they need to amend procurement policies, or provide additional guidance, to accommodate open curricula. Finally, considering the many ways in which state and district stakeholders develop educational content, a few have explored open licensing policies that provide explicit guidance on ownership rights for resources developed with public funds.

State Plans Under ESSA

Under the Every Student Succeeds Act, or ESSA, every state is required to submit a plan that reflects its vision and goals, along with detailed information about how it will meet those goals, in a broad range of areas. Within their plans, nine states indicated that OER would be a part of their strategy for making high-quality instructional content widely available. Oklahoma state leaders emphasized their ongoing OER work and collaboration with other states in their ESSA plan, noting that "resources are continuously being vetted and updated on the OSDE website for access by educators. Specific vetting of open education resources (OER) is underway, as Oklahoma is part of the USDE's #GoOpen campaign."[40] This statement signals the range of work that state leaders have undertaken to support districts in selecting curriculum and instructional materials.

In Delaware, the ESSA plan "recognizes the need and a desire for a thoroughly vetted repository of quality open educational resources aligned with Delaware standards in every discipline/subject and at every level." The ESSA plan notes that Delaware has developed an OER strategy for providing these materials to educators across the state and is working to establish a state content repository to share high-quality open curriculum and instructional materials. According to Alyssa Moore, executive director of the Delaware Center for Educational Technology, "this work is a priority, and having it in our ESSA plan gives us backing for doing it."

Procurement Policies

While OER are openly available online and free of charge, there are many ways in which procurement policies can introduce real or perceived barriers to their adoption. Every state has a different approach to how it manages the process of reviewing and purchasing curriculum and instructional materials, and these differences in policies can make it difficult for both districts and content creators

to know how best to put high-quality materials in front of students.[41] In several states, however, these processes are being updated to show districts how open materials can be considered alongside proprietary content.

For example, the Washington State School Directors' Association (WSSDA) helps to set model policies for school boards throughout the state. In 2015, the state school board updated its model policy for curriculum development and adoption. This new model policy recommends that districts establish more frequent course design review, based upon student needs, rapidly changing demographics, and available funding; previously, districts were encouraged to review materials every seven years. Districts are encouraged to consider OER based upon the same criteria as other proprietary resources.[42]

Open Licensing Policies

As states spend public dollars to create educational content—whether it be curricular resources or other kinds of materials—a few leading states have begun to put into place policies that require these materials be released using an open content license. Nationally, open licensing policies have become increasingly common. The federal government has led the way, with the Departments of Labor and Education both adopting open licensing rules for educational materials produced through competitive grant programs.[43]

In 2016, Washington's education agency adopted a new Copyright and Open Licensing Policy, requiring any educational materials produced by staff, contractors, or grantees to be released under an open content license. The purpose of the policy is to allow districts and other education stakeholders "to realize the educational impact from the substantial investments the state, the federal government, and private foundations have made (and will continue to make) in educational resources created by OSPI employees."[44] Washington is the first state to adopt such a comprehensive policy, though many more states have added open content licensing requirements for specific grants and contracts.

Key Takeaways

State leaders are beginning to think deeply about the role they can play in supporting districts and schools as they make curriculum decisions. While the vast majority of states leave these choices to local education leaders, state leaders have a critical role in information sharing, promoting equitable access to high-quality materials, and removing barriers to adoption. The insights provided by leaders across the country have highlighted five key takeaways for other states hoping to tap into OER to provide more equitable access to high-quality curricula.

1. Integrate OER Initiatives Within State Curriculum Work

States are making huge strides in their work to ensure districts and schools have access to the best materials, regardless of how those materials are licensed. The most successful efforts have integrated OER initiatives within state curriculum work. State leaders across offices of instruction, assessment, technology, and others have found the most success when tackling this work collaboratively.

Where state leaders have undertaken specific OER work, they have discovered another benefit: open content has allowed them to more seamlessly connect their curriculum efforts. In the curriculum review process, states have encountered fewer barriers to accessing all components of an open curriculum. Additionally, states have been able to seek out and vet curriculum-embedded professional development opportunities built around open curricula. They have also found that a larger variety of vendors—not to mention service agencies and districts— are able to support teachers using specific content that they are using in the classroom. Further, states have found that OER can be connected in one place, integrated within and across a variety of online platforms and solutions.

2. Adapt, Improve, and Share, Rather Than Start From Scratch

With a wealth of openly licensed curricula, instructional materials, rubrics, and professional development supports, states looking to initiate this work are finding that they no longer need to start from scratch. The vast majority of state efforts have adapted and improved upon work that started elsewhere. While every state and district context is different, none need to start from scratch or undertake this work alone. Further, because every state has taken a slightly different approach to this work, there is a large network of state leaders to turn to for best practices and lessons learned.

States have adapted, improved, and shared resources developed by other states, the most prominent example being the number of states across the country that

have shared the high-quality EngageNY curricula with their districts and teachers. States have also shared rubrics for evaluating materials, shared information and best practices through state collaborations, and considered ways in which other states' policies can be adapted to their own contexts.

3. Identify Sustainable Funding

States that have undertaken OER efforts have begun to find that once they invest in the initial development costs, the long-term savings can be substantial. Though OER are free or low-cost to use and print, these high-quality open curriculum and instructional materials can require ongoing investment to create and maintain. States that have demonstrated the value of their OER work and found ways to integrate their efforts into existing funding streams have been most successful in sustaining this work.

Further, where no other resources currently exist, states have been able to step in to ensure that district curriculum needs are met. Especially in subject areas outside ELA and math, states may find that these investments are more cost-effective than having every district create its own resources from scratch.

4. Consider Implementing State-Level Policies to Support Efforts

State education leaders are beginning to embrace the idea that publicly funded educational resources should be openly available for the public to view and use. As this view takes hold, state leaders have considered policies that can support it. At the highest level, this can include adopting policies that ensure resources created by the state are openly licensed. Further, states have identified other ways in which they can ensure the materials they are producing with taxpayer funds are openly available, whether through updating terms of state contracts, conditions of grant agreements, or procurement policies.

5. Invest in Rigorous Curriculum Research

Today, states are helping to evaluate curriculum quality based upon qualitative information about standards-alignment and usability of resources. While this is a good place to start, states would benefit from more efficacy research focused on how specific curricula impact student learning outcomes. Historically, this research has been difficult to conduct, in part because the vast majority of curricula and textbooks have been proprietary. The growing number of open curricula provide states with exciting new opportunities for efficacy research.

The transparency and adaptability of open curricula offer up new research designs that have not been possible in the past. For example, a study could examine a newly adopted curriculum, and study its implementation in different

classrooms using print, digital, and digital adaptive versions. States have the opportunity to partner with districts and researchers to begin to answer specific questions about the kinds of elements and features that make a given curriculum more or less effective.

Conclusion

State OER initiatives are connecting conversations about curriculum and technology to ideas about quality and innovation. States have leveraged OER to supplement or replace outdated curricula, adapt materials to meet local needs, and share resources to realize long-term cost savings. This work has illustrated the potential for high-quality OER to enhance personalized learning, accessibility, and, ultimately, equitable access to curriculum and instructional materials.

The practices highlighted in this report represent promising approaches for implementing OER. States play a critical role in supporting districts to identify high-quality open curricula, offering guidance on how to best use these materials, and housing easily searchable, vetted content. States are also well positioned to sustain and scale this work through collaboration, ongoing communication with stakeholders, and consideration of funding and policy requirements.

This report is a snapshot of the current state OER landscape, though this work continues to evolve as new technologies and instructional needs emerge and OER awareness spreads. Just as OER can be adapted and widely shared, state OER initiatives aim to build on early successes and move forward collaboratively to ensure that all teachers and students have access to relevant, high-quality curricula.

Appendix A: Research Questions and Methodology

This paper set out to answer two key research questions: (1) What state initiatives and projects are underway that leverage OER? and (2) How are states integrating these OER initiatives into their work to ensure equitable access to high-quality curriculum and instructional materials?

In order to answer these questions, we reviewed the existing literature and research on curriculum, open educational resources, and quality. We examined the websites of all 50 state education agencies, as well as the District of Columbia. We analyzed thousands of pages of state policies, legislation, and curriculum documents. Based upon these data, we contacted and interviewed 14 education leaders whose work stood out for its innovative approach to leveraging OER and integrating that work into existing efforts to support the adoption of high-quality curricula. While these interviews did not capture all state-led OER activity, they do represent a diversity of approaches, strategies, and contexts. These interviews were conducted between February and April of 2018.

Based upon this work, we identified the four primary types of work that states are undertaking, as well as the four ways that states are supporting the implementation of this work. We also identified five key takeaways for states hoping to leverage OER in their efforts to improve student access to high-quality curriculum and instructional materials.

Appendix B: List of State Interviews

These are the 14 telephone interviews conducted for this report between February and April of 2018:

- California Department of Education: Geoff Belleau, education programs consultant, Educational Data Management Division; Julia Agostinelli, education programs consultant, Educator Excellence and Equity Division
- Delaware Department of Education: Alyssa Moore, executive director, Delaware Center for Educational Technology
- Georgia Department of Education: Angela Baker, technology services manager, Office of Technology Services
- Illinois State Board of Education: Mary Reynolds, executive director, Innovation and Secondary Transformation; Jeanne Kitchens, associate director, Center for Workforce Development; Marci Johnson, director, Curriculum and Instruction
- Indiana Department of Education: Molly Yowell, digital content grant coordinator, Office of eLearning and English teacher, Danville Community High School
- Louisiana Department of Education: Rebecca Kockler, assistant superintendent, Academic Content
- Maryland State Department of Education: Val Emrich, director, Instructional Technology
- Michigan Department of Education: Michelle Ribant, director of 21st century learning, Office of Education Improvement and Innovation
- North Carolina Department of Public Instruction: Verna Lalbeharie, director, Digital Teaching and Learning
- Texas Education Agency: Penny Schwinn, chief deputy commissioner of academics, Assessment & Accountability and Standards & Programs Divisions
- Utah State Board of Education: Alan Griffin, curriculum content specialist, Digital Teaching and Learning Team; Sarah Young, digital teaching and learning coordinator, Digital Teaching and Learning Team
- Virginia Department of Education: Bobby Keener, chief technology innovations officer, Office of Educational Information Management & Technology Innovations; Elsie Dawson, lead project manager, Educational Information Management System
- Washington Office of Superintendent of Public Instruction: Barbara Soots, OER and instructional materials program manager, Learning and Teaching Department
- Wisconsin Department of Public Instruction: John Johnson, team director, Literacy and Mathematics Team; Janice Mertes, assistant director, Digital Learning Team – Content and Learning

Notes

1 Creative Commons—an international nonprofit organization with affiliates in over 85 countries—developed and maintains the most well-known of these open content licenses, which it makes available for free. For more about these open licenses, see "About the Licenses," Creative Commons, November 7, 2017, https://creativecommons.org/licenses/

2 David Steiner, Curriculum Research: What We Know and Where We Need to Go (Washington, DC: Standards Work, March 2017), http://standardswork.org/wp-content/uploads/2017/03/sw-curriculum-research-report-fnl.pdf

3 Morgan S. Polikoff, "How Well Aligned Are Textbooks to the Common Core Standards in Mathematics?" American Educational Research Journal 52, no. 6 (December 2015): 1185–1211, http://journals.sagepub.com/doi/abs/10.3102/0002831215584435

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