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Curriculum literacy in schools of education?

The hole at the center of American teacher
preparation

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David Steiner wrote this report. Jacqueline Magee, Ben Jensen and James Button made significant contributions.

This project is a collaboration between Learning First and Johns Hopkins Institute for Education Policy.

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Series overview

Across the world, too few education policymakers have seen curriculum as a powerful lever for reforming schools. That might seem surprising. After all, “curriculum” is what we teach, and what we teach surely matters to student learning. As leading curriculum researcher Dr. David Steiner of Johns Hopkins University in Baltimore puts it: “What we teach isn’t some side bar issue in American education: it *is* American education.”¹

Yet for some years, curriculum has been overlooked as a pillar of school improvement strategy. Education reform has focused on teacher quality, and often seen curriculum as simply a tool that teachers use. Curriculum’s role as a battleground for ideologues has also led policymakers to avoid the subject. But that is beginning to change.

The research is increasingly clear that the effective and full implementation of quality curriculum matters to student achievement. What’s more, there is emerging evidence to suggest that quality curriculum has a larger cumulative impact on student achievement than many common school improvement interventions – and at a lower cost.

Much recent research on the impact of curriculum on student learning has emerged from the US since the development of the Common Core State Standards. While the definition of curriculum remains contested (see our working definition overleaf), this research focuses on content-rich, standards aligned curriculum materials, especially textbooks. Several US states and districts, such as Louisiana, have begun to develop systems to identify and make available high-quality curriculum materials – and the approach seems to have paid off. The experience of these American states and districts reinforces some of Learning First’s research findings in high-performing systems such as Finland, Singapore, Japan, Hong Kong, and British Columbia. In these places, high-quality curriculum is always part of the story.

Of course, what we teach matters. But what does this mean for educators and policymakers? How do we ensure that schools have the support they need to select or develop high-quality curriculum aligned with rigorous standards for student learning? How do we narrow the gap between the achievement standards that sit on department of education websites, and what is *actually taught* in classrooms? How can policymakers meaningfully engage with teachers, support and make the most of their instructional expertise, and encourage uptake of quality curriculum? What is there to learn from how other systems have designed and implemented standards and curriculum, and what are the implications for related policy levers, especially initial teacher education, ongoing teacher professional learning, and student assessments? Finally – and critically – how do we define high-quality curriculum in the first place?

The answers to these questions have profound implications for education policy in Australia, the United States, and around the world. This series of reports, – a collaboration between Learning First and Johns Hopkins Institute for Education Policy – draws on international research to help inform the conversation.

This report, *Curriculum literacy in schools of education? The hole at the center of American teacher preparation*, argues that teachers across the United States are under-prepared to select and develop quality curriculum. It seeks to show why this situation is so damaging, and what might be done to remedy it. It surveys the current landscape of content that is actually being taught in schools, and reviews how teacher preparation programs approach the matter of content – if at all. Finally, it suggests what could be done better, and how, to create curriculum literate teachers. While this report invokes American examples, many of its observations and their implications are relevant to Australia and other systems internationally.

¹ Steiner, 2017, p. 11.

Box 1: Defining “curriculum”

“Curriculum” is a notoriously contested term. In a recent blog post, Chester E. Finn, Jr. of the Thomas B. Fordham Institute likened the line between standards and curriculum to “the pavement on Copacabana Beach. No two people describe it in the same way”.² Such varying definitions within and among school systems muddy the waters of an already complex debate about the role of curriculum in school improvement. A shared understanding of the term “curriculum” is required before any collective consideration of its impact on student learning can occur.

When Australians talk about “curriculum”, they tend to be referring to the Australian Curriculum or its state derivatives – frameworks of standards, alongside content descriptions, general capabilities and cross-curriculum priorities.³ Conversely, when Americans talk about curriculum, they tend to mean textbooks or other day-to-day instructional materials. The definitions below are rooted in the American context to more usefully support international readers’ interpretation of the research set out in this report series:

Standards are expressions of the goals of student learning, typically at the state or federal level. Standards typically aim to outline what we expect students to know and be able to do at different stages of schooling, usually expressed in year levels.⁴ Examples of standards include the Achievement Standards of the Australian Curriculum, and the Common Core State Standards in the United States.

Curriculum is the means to achieve the goals expressed in the standards. It is the teaching and learning program, and can include lesson plans and activities, scope and sequence documents, textbooks, computer programs, and even related pedagogical advice and embedded formative assessments.

² Finn, Jr., 2017.

³ For more information, see <https://www.australiancurriculum.edu.au/f-10-curriculum/structure/>

⁴ Houchens, 2017.

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1 Why our teachers are under-prepared for the classroom

The politics of American education are enormously complex, and the reform strategies that emerge from those politics are likewise both diverse and disputed. Some educators believe the reasons for poor educational outcomes are largely fiscal: insufficient funds for teachers and schools, and for healthcare and housing for underprivileged students and their families. Others contend it's a lack of choice – the uniform system of public education from which the less fortunate cannot escape. Others propose a vast array of specific reforms, from personalized learning to individual tutoring. But in the end, it is the answer to two questions that tells us most about the quality of our nation's education: What are we teaching, and how effectively are we teaching it?

Until now, the first question — What are we teaching? — has barely been asked: the academic content of public education has been left variously to states, districts, schools, and teachers. Although states have the power to determine what is taught in public schools, they have interpreted and used that power very differently. To date, only one state, Louisiana, has a single math and single English Language Arts (ELA) curriculum that the great majority of school districts and teachers use.⁵ In other states, the situation is far more fluid. A number of states have textbook adoption processes that could lead one to believe that their teachers use only the material approved by the state – in essence, a limited- and defined-content curriculum. But in fact, this is less and less the case: fewer states adopt textbooks and those that do are less strict about school district compliance than they have been in the past.

The second question — How effectively are we teaching it? — has been asked, but independently of the first. In other words, while we have worried about the quality of teaching, we have segregated teaching quality from the content our teachers deliver. The result is that teachers are underprepared to select, develop and teach curriculum. As Jon Saphier of Research for Better Teaching notes, teachers can face any number of circumstances relating to curriculum when they reach the classroom.⁶ Among them:

- There isn't one (a curriculum)
- There used to be one, it might be around here somewhere
- There is one, but nobody teaches it
- There is one, but people teach what they want out of it, making students' experiences inconsistent
- There are no common assessments
- The curriculum is the textbooks
- The curriculum has neat activities, but no focus on student learning
- There is a curriculum, but it does not match the standards teachers are responsible for.

Saphier might have added: There *is* a curriculum that claims to be standards-aligned, but *EdReports*⁷ analysis shows that it is not.

We know that in this environment, teachers spend a great deal of time constructing their lessons, even when the district provides specific curriculum and expects it to be taught. A 2016 Rand survey reveals that almost half of all the teachers surveyed, and two-thirds of high school teachers, create their own lessons – and almost half of them spend at least four hours a week doing so.⁸ Consequently, students encounter a vast array of content of varying quality in their schools. The next section provides a brief survey of curriculum in American classrooms, highlighting the wide range of quality and rigor encountered by students.

⁵ For more information about Louisiana's approach, see Magee & Jensen, 2018.

⁶ Saphier, Haley-Speca, & Gower, 2017, p. 444.

⁷ EdReports is a US non-profit organization that reviews curriculum materials EdReports, 2018

⁸ Opfer, Kaufman, & Thompson, 2016, p. 42-43.

2 Curriculum in American classrooms

American school curricula – especially in English Language Arts (ELA) – vary considerably on a multitude of dimensions. These include structure, pedagogical philosophy, readings, specific skills, explicit links to state or national standards, inclusion or exclusion of various forms of assessments, guidance to teachers, and homework assignments.

A couple of examples will bring home the vast differences in curriculum designs. At the fundamental level of educational pedagogy, we find everything from Direct Instruction⁹ curriculum to “constructivist” approaches that by definition eschew prescriptive course content¹⁰ in favor of enabling children to pursue their own lines of inquiry and discovery. In terms of the curriculum content itself, compare one heavily-used ELA curriculum – *Journeys*¹¹ – with *Guidebooks*,¹² the online curriculum used by most public school teachers in Louisiana. See Appendix 1 for a frame-capture from a page of *Journeys*, followed by one from *Guidebooks* in Appendix 2.

The differences are as stark as those between the Direct Instruction and constructivist approaches. In *Journeys*, the clear focus is on discrete learning skills. Indeed, *Journeys* has target skills: “Fact and Opinion, Question, Conclusions and Generalizations, and Infer/Predict,” followed by learning exercises in the correct use of such domains as spelling, vocabulary, and grammar to support the development of the skills. Certainly, the students use texts – in this case a set of non-fiction and fiction texts – that serve as the source for all this work. But the texts are clearly secondary to the primary task of skills development.

In *Guidebooks*, by contrast, the teacher is asked to place a given text (in this case Shakespeare’s *Romeo and Juliet*) at the center of the lesson. While there are certainly some skills involved (“identify patterns of language”), they are highlighted because they are the means to unpack the multiple layers of meaning in that anchor text, rather than as ends in themselves.

The two curricula are based on entirely different premises about content and instruction. The first rests on the foundational assumption that the core aim is to acquire correct spelling and grammar, and to grow in the ability to decode and comprehend a text. In the second, the key is for students to be immersed in a text and for teachers to render their immersion more rewarding by asking them probing questions and encouraging them to seek answers through multiple, interpretive approaches.

In mathematics, one might expect curricula not to differ greatly in their details given the more finite domain of skills and knowledge to be mastered. That is not so. The knowledge required of teachers to teach each math curriculum effectively also greatly differs. Consider two 7th-grade math lessons—from Eureka¹³ and Digits¹⁴—that both seek to teach students to calculate the volume of a right prism. The teaching knowledge required — even in the beginning of the lesson — is very different.

The Eureka lesson in Figure 1 provides teachers with an opening exercise that both explicitly connects to prior learning and is a task that virtually all students can complete. The new content of the day’s lesson then builds explicitly and systematically on this prior knowledge, before providing and discussing the formula for the volume of a right prism. The Teacher’s Guide provides teachers with suggested pacing; examples of complete student work; suggested language for teaching the lesson; question prompts and

⁹ National Institute for Direct Instruction, 2018.

¹⁰ Redigan-Barman, 2014.

¹¹ Houghton Mifflin Harcourt, 2018.

¹² LearnZillion, 2018.

¹³ Great Minds, 2018.

¹⁴ Pearson Education, 2018.

suggested student answers to look for; and “scaffolding” opportunities to address common student misperceptions.

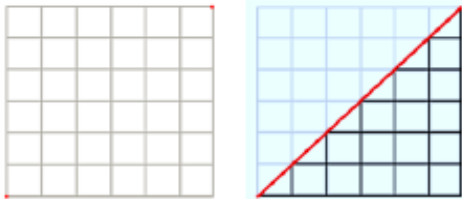
Figure 1: Opening exercise from Eureka Math

Opening Exercise

The volume of a solid is a quantity given by the number of unit cubes needed to fill the solid. Most solids—rocks, baseballs, people—cannot be filled with unit cubes or assembled from cubes. Yet such solids still have volume. Fortunately, we do not need to assemble solids from unit cubes in order to calculate their volume. One of the first interesting examples of a solid that cannot be assembled from cubes, but whose volume can still be calculated from a formula, is a right triangular prism.

What is the area of the square pictured on the right? Explain.

The area of the square is 36 units² because the region is filled with 36 square regions that are 1 unit by 1 unit, or 1 unit².



Draw the diagonal joining the two given points; then, darken the grid lines within the lower triangular region. What is the area of that triangular region? Explain.

The area of the triangular region is 18 units². There are 15 unit squares from the original square and 6 triangular regions that are $\frac{1}{2}$ unit². The 6 triangles can be paired together to form 3 units². Altogether the area of the triangular region is $(15 + 3)$ units², or 18 units².

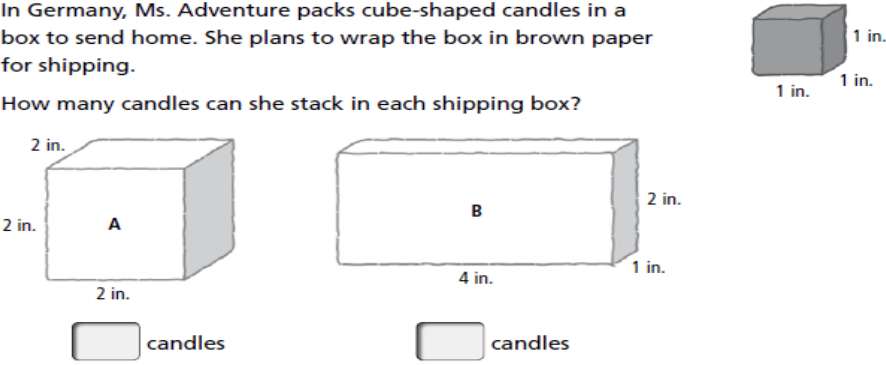
Source: Great Minds, 2018

By contrast, the Digits lesson in Figure 2 begins with a word problem that actually requires students to calculate the volume of a right prism, effectively asking students to apply the content of the lesson before it has even been taught. Students are next asked, “How can you apply what you know about finding the volume of a right rectangular prism to finding the volume of any right prism?” before being presented with the formula for finding the volume of a right prism. Like the Eureka math lesson, the Digits Teacher’s Guide provides a pacing guide, samples of complete student work, and question prompts. Yet the Teacher’s Guide provides teachers with very little support for how to actually explain this mathematical content to their students. For example, in addition to the inappropriate opening lesson problems (i.e. asking students to use a mathematical concept that they have not yet been taught), the Teacher’s Guide only offers the following guidance on how to help students to solve these problems: “most students will benefit from using manipulatives, such as blocks and boxes.”

Figure 2: Digits lesson launch

In Germany, Ms. Adventure packs cube-shaped candles in a box to send home. She plans to wrap the box in brown paper for shipping.

How many candles can she stack in each shipping box?



Box A: 2 in. (height), 2 in. (width), 2 in. (depth). Labeled 'A'.

Box B: 4 in. (length), 1 in. (width), 2 in. (height). Labeled 'B'.

Candle: 1 in. (width), 1 in. (depth), 1 in. (height).

.....

Which box should she choose? Explain your reasoning.

Reflect

Do boxes with the same amount of space inside always have the same surface area?
Why is this important?

Source: Pearson Education, 2018.

Digits' lessons, therefore, require teachers to know how to explain this mathematical content in a student-friendly way; to determine what sufficient evidence of student understanding looks like (no suggested student responses are given to help teachers gauge what it looks like); and how to explicitly link the new learning to prior knowledge. In contrast to Digits, Eureka's lessons require less teacher knowledge about how to assess students' understanding, as the Teachers' Guide provides numerous "Questions for Understanding" prompts.

These two examples give some sense of the huge range in the design and content of curricula that teachers need to navigate. And teachers, of course, have access to not only the curriculum their district approves and provides, but also the limitless array of options available on the internet. Teachers use the internet to access a dizzying array of materials, from full curricula to individual lessons, stand-alone assessments, and content resources. To fully grasp the chaos of this environment, one needs to enter it. In order, here are the five online sources of materials that American teachers consult most often, according to the Rand survey.¹⁵ Note that this list excludes the curriculum materials from EngageNY,¹⁶ as some 44 per cent of the surveyed teachers use at least some math or ELA material from this source.¹⁷

- **Google:** By definition, an inexhaustible selection of disparate offerings
- **Pinterest:** Once again, an extensive set of resources that span everything from teaching tips to reading materials to wall charts

¹⁵ Kaufman, Thompson, & Opfer, 2016.

¹⁶ Engage NY, 2018.

¹⁷ Kaufman et al., 2016.

- **Teachers Pay Teachers:** A large variety of content, from standards-linked, annotated texts (in ELA), to graphic organizers, artifacts, and “task-kits” (in math)
- **Readworks:** Mostly text passages with question sets and vocabulary activities
- **TeachingChannel:** Videos that focus on subject-related teaching skills.

The lack of common agreement about what constitutes good curriculum, and teachers’ lack of exposure to high-quality curriculum, severely limits teachers’ capability to select and implement quality curriculum in the classroom. The next section outlines the role teacher preparation programs have played in the creation of this situation.

3 Curriculum in teacher preparation programs

One reason for the hole at the center of American teacher preparation is the lack of national consensus about the proper content for our classrooms.¹⁸ Our failure to agree on what our young people should learn, coupled with the huge variety of instructional materials used by districts and schools, make it unsurprising that teacher preparation programs do not emphasize defined, subject-matter content.

However, most top-performing education systems take the opposite approach, and support a systemwide, core curriculum. As a result, future teachers are prepared to teach the curriculum not only through schools of education but also through their own K-12 experience. For example, the National Institute of Education, the sole provider of teacher preparation in Singapore, works closely with the Ministry of Education to ensure it effectively prepares teachers to teach the national curriculum.¹⁹ Similarly, initial teacher education courses in Finland familiarize candidates with the curriculum and support candidates to use these during their practice.²⁰ The landscape in the US could not be more different than that in Finland, or Singapore, for instance. American teacher preparation programs – again, unsurprisingly – prepare teachers to teach in ways that are agnostic about curriculum.

Methods courses

Instead of preparing teachers to use any specific curriculum or even to inculcate specified content, American programs focus on generic “methods of teaching.” What do these teaching-methods courses actually prepare teachers to do? Table 1 below describes the content of a typical methods course.²¹

Table 1: Typical methods course outcomes

By the end of this course students will be able to:
1. Create effective and supportive learning environments based on an understanding of student diversity and effective instructional practices
2. Plan and teach effective lessons using a variety of teaching methods
3. Use technology as a tool to enhance teaching and learning
3. Align instructional objectives, instruction, and assessment
4. Design instruction and assessment based on an understanding of students, their needs, and professional educational standards
5. Understand and be able to develop and use different forms of student assessment
7. Know about the process of second language acquisition and about strategies to support the learning of students whose first language is not English
8. Model the characteristics of an intentional and professional teacher. In particular, engage in an ongoing process of reflection about their own teaching and the teaching of others, supporting their constructive critiques with reference to principles from this course, from supplementary readings, and from field observations
9. Demonstrate their achievement of the above outcomes and of their continuing development as an educator through their portfolio aligned with professional education standards (INTASC, MN SEP, ISTE, and Education Department themes).

¹⁸ Equally important has been the prevailing philosophy of education at the great majority of teacher preparation programs – essentially a constructivist view that is skeptical – or hostile – to canonical texts.

¹⁹ Toon & Jensen, 2017

²⁰ Jensen, Roberts-Hull, Magee, & Ginnivan, 2016

²¹ Mongan-Rallis, 2004.

This outline makes no mention of content. Indeed, the text book used, *Methods for Effective Teaching* by P.R. Burden and D. M. Byrd (2003) is *intended* to be unrelated to any specific subject domain.²² It is not possible to tell from either the syllabus of this teaching methods course or the main text book what subject matter the future teacher is being asked to teach. One might conclude, not unfairly, that teacher preparation programs in the United States provide teachers with the appropriate skills to teach nothing in particular.²³

Neither do the methods courses mention specific curricula. On the contrary, such coursework often suggests that “authentic” teaching occurs only when teachers create their own lessons. One of the most frequently assigned textbooks in methods courses, Jon Saphier’s *The Skillful Teacher*, takes teacher-created curricula for granted.²⁴ Saphier’s references to formal curricula are rare and slighting:

Each teacher must understand the “network of concepts that relate to the specific content to be taught”....Curriculum materials cannot be relied on to hold these connections, much less make them explicit for students. Skillful teachers are wary of a curricula that provides a script (p.4).

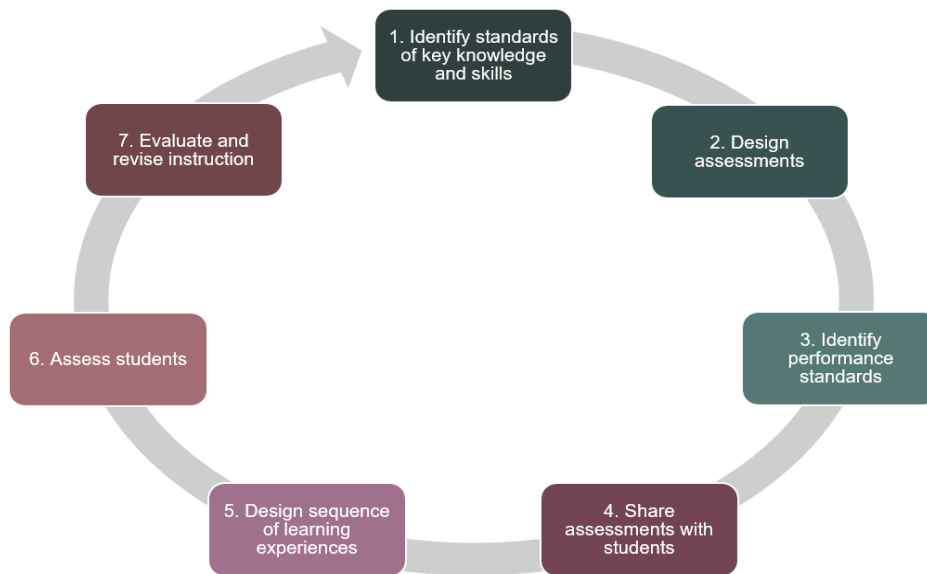
Saphier’s section on curriculum (a mere four pages in a 660-page book) is even more revealing for what it omits. His instructional model does not mention curriculum at all, but rather clearly indicates that teachers will “design [the] sequence of learning experiences” (see Figure 3 below).

²² Alibris Books, 2018.

²³ For a further example of these generic teaching methods courses, see: University of Washington, 2018.

²⁴ In October 2016, in an Essay published in *Educational Leadership* v74 n2 p34-38 entitled “How to Partner with Your Curriculum,” Janine Remillard references “The so-called “good-teacher doctrine” [that] has long perpetuated the idea that good teachers don’t use pre-packaged curriculum materials,” and mounts a critique of that doctrine.

Figure 3: Saphier's instructional model



Source: adapted from Saphier, Haley-Speca, & Gower, 2017.

Subject-matter courses

Future teachers are, however, often required to take methods courses that are subject specific. Of what do they consist? The following examples are taken from English Language Arts teacher preparation programs at the University of Central Arkansas,²⁵ Fresno Pacific University,²⁶ the University of Michigan²⁷ and Western Michigan University.²⁸ These programs are deliberately chosen from a variety of teacher education programs, including from a top-ranked school, a school of education ranked *outside* the top 200, a denominational school, and a leading provider of on-line teacher certification programs. In these examples, we can observe that:

- There is no consistent approach in these English Teaching Methods Courses. This broad conclusion is supported by more detailed analyses of the ELA methods offerings of many schools of education²⁹
- Some refer explicitly to national or state standards; others are silent
- Some recommend a particular “philosophy” of education; others ask students to compare and contrast such philosophies
- No syllabus refers to any of *EdReports’* top-ranked ELA curricula
- Only one refers explicitly to any literary content (to a text on teaching Shakespeare)
- Many of the skills listed in the various syllabi overlap substantially with the teaching strategies found in the generic methods classes
- Some syllabi endorse pedagogies that run counter to the great majority of research findings (such as the endorsement of a “whole language” approach to reading instruction in the first example)
- Not one syllabus refers explicitly to the major research studies in English Language Arts (such as the Report of the National Reading Panel).³⁰ This is perhaps unsurprising given that many states

²⁵ Bane, 2010

²⁶ Center for Professional Development, 2016.

²⁷ Birdyshaw, 2008.

²⁸ Webb, 2006.

²⁹ For one example of the variation among many schools in one state, Illinois, see Greenberg & Walsh, 2011.

³⁰ National Institute of Child Health and Human Development, 2000.

do not require teachers to demonstrate knowledge of foundational concepts related to reading instruction³¹

- Several syllabi take as foundational that teachers will be constructing their own course content.

In summary, generic teaching methods courses offer some background to the organization of a lesson irrespective of the content being taught, while methods courses that focus on a single subject offer widely different approaches to conveying that subject matter to students. As a rule, methods courses are devoid of reference to specific curricula in the relevant subject.

Content standards courses

It is true that a number of ELA methods courses reference state or national standards. It could be argued that an awareness of the standards, coupled with lesson organization and (assumed) background knowledge of the relevant subject matter, adequately rounds out teachers' pre-clinical preparation. But this argument would be wrong: the standards themselves *presuppose* that the teacher – in this case in ELA or in mathematics – already understands **how** to teach a variety of skills that are called for in the standards.

Take, for example, the Michigan standards referenced in the one of the methods courses above. Standard C.E.3.1.2 states:

Demonstrate an understanding of literary characterization, character development, the function of major and minor characters, motives and causes for action, and moral dilemmas that characters encounter by describing their function in specific works.³²

Course outlines from the other three methods courses reveals the same void, in that they do not prepare teachers to help students master this skill. How can this be? Why the gap? Essentially, because *those future teachers are expected to have learned how to teach students these skills in their content courses. But because their ELA methods courses are still about the techniques of teaching rather than teaching the subjects at hand, future teachers are not being prepared to teach young people how read literature.*

In mathematics, the problem is the same. The second math practice standard from the Common Core State Standards reads:

Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to *decontextualize*—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own.³³

Deborah Ball, the recognized national expert on the teaching of math, puts the same objective this way:

*Teaching requires being able to represent ideas and connect carefully across different representations – symbolic, graphical, and geometric. Representation is a central feature of the work of teaching; skill and sensibilities with representing particular ideas or procedures is as fundamental as knowing their definitions.*³⁴

Criticizing current practice in teacher preparation in the same essay, Ball also notes that having an adult knowledge of math content falls far short of understanding how to teach these core mathematical representations:

³¹ "NCTQ Databurst: Strengthening Reading Instruction through Better Preparation of Elementary and Special Education Teachers," 2018.

³² Michigan Department of Education, 2010.

³³ Common Core, 2018b.

³⁴ Ball, 2014.

The usual solution is to require teachers to study more mathematics. Many propose additional coursework for teachers, and some argue that elementary teachers should be specialists. But increasing the quantity of teachers' mathematics coursework will only improve the quality of mathematics teaching if teachers learn mathematics in ways that make a difference for the skill with which they are able to do their work. The goal is not to produce teachers who know more mathematics. The goal is to improve students' learning.³⁵

Yes, there is a critical hole or gap at the core of teacher preparation. Future teachers are given some guidance in how to teach, and how to organize lessons. They are expected to have learned about the content of their field during undergraduate course work (and in the case of future highschool teachers in some states, some graduate course work also). But central to effective teaching – as underlined by the standards applicable in each subject domain – is the capacity to translate knowledge about a subject, and a generic understanding of teaching techniques, into effective teaching of specific content to children.

It is difficult for teachers to know how to teach specific content to children unless they are taught how. But most teacher preparation programs in the United States do not teach them how effectively teach specific content and curriculum to children. Instead, teachers are largely left to figure it out on their own, relying on Google and Pinterest, among other dubious sources, to cobble together teaching and learning plans of varying quality – to the detriment of students' learning.

³⁵ Ball, 2014.

4 Recommendations for supporting curriculum literacy in schools of education

The failure to properly prepare teachers to develop, select, and teach curriculum can and should be remedied. There are steps teacher preparation providers can take to better support prospective teachers' curriculum literacy, and their ability to translate their understanding of the subject and the curriculum into meaningful learning opportunities for students. The sections below outline how providers can improve both the coursework and the clinical work components of their programs to better prepare teachers to develop, select, and teach curriculum.

Coursework

Every state in the US possesses accrediting authority over its teacher preparation programs. Every state can withhold accreditation if programs fall short of its expectations. States can require all accredited programs to include a course, or an assessed set of competencies, that teaches and tests knowledge of:

- The research on the impact of teaching effective curricula with strong fidelity of implementation from the US
- The research on the impact that different pedagogies (from whole language to phonemic awareness; from constructivist to content-rich) have upon student learning
- The existence of credible curricular ratings, including those from Louisiana³⁶ and EdReports,³⁷ and how to use them
- The availability of such tools as IMET³⁸ (Instructional Materials Evaluation Tool) that enable the evaluation of as-yet-unrated curricula, and EQUiP,³⁹ a similar tool used to evaluate an individual lesson. While full training on either tool would be extremely time-consuming and thus not feasible, programs could introduce future teachers to the main criteria and how to apply them, thereby giving teachers the tools to review their schools' chosen curricula
- Exposure to sample curricula in their subjects, including the most frequently used (such as *Journeys* in ELA and *Saxon Math*) and the highest-rated on EdReports (such as *Guidebooks* in ELA and *Eureka Math*). Teachers could be shown how to spot the differences between them and how these differences are likely to affect student learning outcomes
- Guidance on how to navigate real-world circumstances in which:
 - a poorly rated curriculum or one with a theoretical perspective that has no evidentiary basis, are "mandated"
 - no curricular guidance is provided
 - materials the school has been using ("who knows why") are manifestly neither standards-aligned nor academically rigorous.

The core of such a course would be focused on the last item, namely, on the real-world circumstances future teachers are likely to face in their schools, and how to manage them. Courses could introduce student teachers to curricula such as Montgomery's Curriculum 2.0 – which has major deficiencies, according to published research⁴⁰, and use them to help future teachers recognize and remediate such scenarios. In the case of Montgomery's Curriculum 2.0, for example, one identified problem was that many of the set texts were well below grade level. Where could a teacher find replacement texts and high-quality supporting material? How could she or he insert that material into the course structure? What would be the impact upon required interim assessments?

³⁶ Louisiana Department of Education, 2018.

³⁷ EdReports, 2018.

³⁸ Achieve the Core, 2016.

³⁹ Educational Evaluating Quality Instructional Products, n.d.

⁴⁰ The Johns Hopkins Institute for Education Policy, 2018

Or in math. The *Digits* curriculum, discussed above, includes a very weak lesson launch. Future teachers could learn how to modify this launch so that it would explicitly tap into students' prior knowledge of calculating areas, and thus create a far stronger lesson. By contrast, exposing future teachers to highly-rated curricula such as *Eureka* would make it more likely that, once in the classroom, teachers could draw upon such exemplars to effectively teach math content to students.

It might plausibly be argued that there are a vast number of elements in a given curriculum, and that different elements within one curriculum may vary in terms of quality – and also that the quality of certain elements matters more than the quality of others. A review of any *EdReports* full analysis of a given curriculum will confirm that assumption. For example, one of EdReports' quality indicators (1e) reads: "Anchor texts and series of texts connected to them are accompanied by a text complexity analysis and rationale for purpose and placement in the grade level. In a review of an ELA curriculum⁴¹ from the American Reading Company (ARC), *EdReports* found that Standard 1e had been met because ARC includes this proviso: "To determine reading level, every book is double-blind, hand-leveled using the three legs of text complexity and located on our developmental taxonomy of reading acquisition." Do all future teachers need to understand how "hand-leveling" works? Would the curriculum be less equipped to improve student outcomes if the ARC had not located each book on its "developmental taxonomy?" Thus, this particular standard, 1e, may be less relevant to teachers than to textbook publishers.

In its review of the fourth grade ARC curriculum, *EdReports* analyzes some 49 separate indicators, often in considerable detail. Clearly, this level of detail goes far beyond what future teachers need to master in their introduction to the basic features of different curricula. Faculty at schools of education are going to need support to determine what aspects of curricula truly matter most. And help is available. Almost all the major standards in ELA and math have certain anchor standards,⁴² or foundational practice standards⁴³: standards in which the major strands of learning - on which the multiple other standards rest – can be clearly identified.⁴⁴ If student teachers were able to identify why a particular curriculum performs strongly or poorly against these key standards, that would already be more than they could do today.

Clinical Work

Identifying and understanding the importance of differences between curricula in theory is very different than applying that knowledge in the classroom. Once student teachers start their clinical placements, or "student teaching," in schools, they will face their first real-world curricula challenges. They will confront the entire spectrum of curricula practices listed above and will have to be ready with a repertoire of appropriate pedagogical responses. In all likelihood, they will be required to teach whatever their host school is using: only the most open-minded of mentor teachers will support a student-teacher's argument that the wholesale substitution of her or his preferred curriculum materials would benefit the students.

Nevertheless, the observing faculty from the teacher preparation program should be working with their student teachers to support whatever remedies to the printed material, or the given practices of the host school, may be required. These remedies will be proportionate both to the flexibility of the mentor teacher and the scale of the problem. A concise list below gives a sense of the spectrum, from major to more subtle adjustments.

- When the student teacher encounters materials that are not challenging her or his students, that student teacher introduces grade-appropriate texts or mathematical problems, with supporting material from a highly-rated curriculum

⁴¹ EdReports, 2017.

⁴² Common Core, 2018a.

⁴³ Common Core, 2018b.

⁴⁴ See for example the ELA standards from Texas (IXL Learning, 2018). In an example from grade 5, there are clearly 13 major standards from which the more granular examples are derived.

- When the student teacher determines that classroom students simply cannot manage what would otherwise be the only material to be taught, he or she adds more accessible short readings or mathematical challenges
- When the text or mathematics problem is appropriate, but the supporting material or pre-existing lesson plan is deficient, the student teacher substitutes material from a stronger curriculum
- When the student teacher uses the same materials, but re-structures the activities of one or more lessons based on having seen other curricula that offer students a more rigorous and thorough exposure of the topic.

Teacher preparation programs afford their student teachers the opportunity – most often in seminars that accompany student teaching – to debrief and reflect on their classroom experience. Ideally, using video of the student-teacher’s classroom teaching, these seminars should focus on the full range of skills and knowledge that the student teacher is demonstrating in the classroom, pinpointing areas of greatest challenge. The curriculum literacy of student teachers – understood here as the ability to identify and remedy deficiencies in the materials they are told to teach – should be an important skill set being evaluated. If a student teacher is unable to make major needed changes to what is clearly a very weak curriculum because the mentor teacher is simply unwilling to authorize such changes, the teacher preparation program should consider terminating its partnership with that host school – especially if it sees such a pattern across multiple mentor teachers. But for this to occur, the supervising faculty at our schools of education will need to become far more curriculum-literate themselves.

5 Conclusion: bridging the hole at the center of teacher preparation

On completion of their teacher preparation, American teachers are under-prepared to best support student learning. Their studies have typically not helped them to understand the impact of well-taught, high-quality curriculum on student learning, nor how to select or develop such materials.

This situation hurts both students and teachers. It means that far too many students are far too likely to miss out on experiencing rigorous, high-quality curriculum at school. The situation hurts teachers by placing them in a barely tenable position, where they are forced to cobble together curricula for each class of each day, day after day, with inadequate expertise or support to do so well. Any teacher will tell you that developing curricula is a hugely time-consuming activity. It is also a demoralizing one when it inevitably does not result in improvements in the classroom. Teachers in the United States, and in many countries internationally, are grimly familiar with the grinding combination of anxiety, pressure and confusion that results from the requirement to construct curricula from scratch, particularly in those difficult first few weeks and months in the classroom. If we want the best and brightest among us to take up the challenge of educating our children, we must do better by them and help make sure they are as well prepared as possible.

Teacher preparation providers are operating in a very difficult context, typically with no one agreed-upon curriculum to prepare teachers to teach. This context is unlikely to change dramatically in the near future, and this report has offered suggestions to help teacher preparation providers support prospective teachers' curriculum literacy in this difficult context. It has shown how providers can take steps to bridge the hole at the center of American teacher preparation. It has recommended several key changes to coursework and clinical work that, when implemented, will help support under-prepared teachers to become more curriculum literate. These changes will support teachers as they transition from their studies into schools by helping them to better navigate the dizzying mess of curriculum options of varying quality that they are likely to encounter both in schools and online. A greater focus on curriculum during both course work or clinical work will bring American teacher preparation providers more closely in line with international high-performers and will help support teachers to develop the pedagogical content knowledge required to teach the curriculum in a way that gives students the opportunity to learn it.

However, reforming teacher education is not a task for providers alone. School systems, too, have an important role to play. System leaders must ensure their accreditation processes set high expectations for supporting teacher curriculum literacy, and they must withhold accreditation when these expectations are not met. Decisions regarding teacher accreditation are among several key considerations for system leaders who wish to anchor their school improvement efforts to quality curriculum. Others, including considerations about determining curricula, the structure and content of ongoing teacher professional learning and student assessment, are discussed in other reports in this series.

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Report title

Appendix 1: Excerpt from *Journeys* ELA curriculum

Lesson	READING LITERATURE & INFORMATIONAL TEXT		FOUNDATIONAL SKILLS		SPEAKING & LISTENING		LANGUAGE			WRITING
	Selections	Text-Based Comprehension	Decoding	Fluency	Speaking and Listening	Target/Academic Vocabulary	Spelling	Language	ELD Language Workshop Lessons	Writing
28	<p>Anchor Text Fossils: A Peek Into the Past Genre: Informational Text</p> <p>Paired Selection Trapped in Tar! Genre: Informational Text</p> <p>"Journey of the Woolly Mammoth," "Fossils" Genre: Poetry</p> <p>Trade Book Skunk Scout Author: Laurence Yep Genre: Realistic Fiction</p> <p>Trade Book Frindle Author: Andrew Clements Genre: Realistic Fiction</p>	<p>Target Skill Fact and Opinion</p> <p>Target Strategy Question</p>	Greek Word Roots	Expression	<p>Read Aloud Sue Tells a Story</p> <p>Speaking/Listening: Listen to Identify Excitement Signaled by Exclamation Points</p> <p>Speaking and Listening Skill Participate in a Debate</p>	<p>Review Vocabulary <i>viewpoint, surveyed, advantages, previously, legendary, retreat, persuade, aspects, rural, organize</i></p> <p>Vocabulary Strategies Idioms</p>	<p>Spelling Principle Greek Word Parts</p> <p>Spelling Words Basic Words: <i>telephone, autograph, microscope, photograph, televise, biology, microphone, paragraph, symphonic, telegraph, megaphone, microwave, photocopy, biography, saxophone, telescope, calligraphy, xylophone, homophone, homograph</i></p> <p>Review Words: <i>athlete, history, melody, type, topic</i></p> <p>Challenge Words: <i>telecommute, bibliography, phonetic, microbe, autobiography</i></p>	<p>Grammar Skill Commas in Sentences</p> <p>How English Works Condensing Ideas</p>	<p>Language Skills and Strategies</p> <p>Collaborate: Offer Opinions to Persuade Others</p> <p>Interpret: Evaluate Author's Language Choices</p> <p>Produce: Plan a Presentation</p> <p>How English Works: Use Future Tense Verbs</p> <p>Vocabulary Network: Words About Archaeology</p>	<p>Writing Mode Informative Writing</p> <p>Writing Form Summary</p> <p>Focus Evidence</p> <p>Write About Reading Performance Task</p>
29	<p>Anchor Text The Case of the Missing Deer Genre: Realistic Fiction</p> <p>Paired Selection Fossil Fish Found! Genre: Informational Text</p> <p>"Encounter," "Deep in the Forest" Genre: Poetry</p> <p>Trade Book Skunk Scout Author: Laurence Yep Genre: Realistic Fiction</p> <p>Trade Book Frindle Author: Andrew Clements Genre: Realistic Fiction</p>	<p>Target Skill Conclusions and Generalizations</p> <p>Target Strategy Infer/Predict</p>	Latin Word Roots	Stress	<p>Read Aloud Fossils</p> <p>Speaking/Listening: Listen for Conclusions and Generalizations</p> <p>Speaking and Listening Skill Oral Presentation</p>	<p>Review Vocabulary <i>record, incredibly, destination, suspense, required, insights, dependent, effective, diminishing, marveling</i></p> <p>Vocabulary Strategies Greek and Latin Roots <i>tele, photo, graph, meter; scrib, rupt, port, ject</i></p>	<p>Spelling Principle Latin Word Parts</p> <p>Spelling Words Basic Words: <i>inspect, export, erupt, predict, respect, bankrupt, dictate, porter, report, spectacle, depart, interrupt, dictator, import, disrupt, portable, transport, spectator, verdict, dictionary</i></p> <p>Review Words: <i>support, hospital, polite, recent, memory</i></p> <p>Challenge Words: <i>spectacular, contradict, corrupt, retrospect, rupture</i></p>	<p>Grammar Skill More Commas</p> <p>How English Works Text Structure</p>	<p>Language Skills and Strategies</p> <p>Collaborate: Gain and/or Hold the Floor</p> <p>Interpret: Use Words for Different Effects and Shades of Meaning</p> <p>Produce: Write a Drama</p> <p>How English Works: Use Noun Phrases and Possessive Nouns</p> <p>Vocabulary Network: Words About Nature</p>	<p>Writing Mode Informative Writing</p> <p>Writing Form Informational Essay</p> <p>Focus Organization</p> <p>Write About Reading Performance Task</p>

Source: Houghton Mifflin Harcourt, 2018.

Appendix 2: Excerpt from Louisiana *Guidebooks 2.0* ELA curriculum

TEXT SEQUENCE	TEXT USE
<p>LESSON 3:</p> <p>Act II, <i>Romeo and Juliet</i>, William Shakespeare</p> <p>“Teenage Brains Are Malleable and Vulnerable, Researchers Say,” Jon Hamilton</p>	<p>TEXT DESCRIPTION: Act II of <i>Romeo and Juliet</i> presents the rising action of the play, in which Romeo and Juliet make secret plans to marry in haste. The Jon Hamilton text provides information that refines students’ understanding of how teenagers process risks and make choices.</p> <p>TEXT FOCUS: The rising action of Act II complements the content of the Hamilton text as students consider Romeo and Juliet’s conflicting motivations (their love/passion for each other, their loyalty to their parents, and the feud between their families).</p> <p>MODEL TASKS</p> <p>LESSON OVERVIEW: Students read and analyze key scenes in Act II of the play, focusing on how the pattern of language and imagery develop a theme of the play. Students continue to apply knowledge gained through reading informational texts to understand more deeply the motivations and decisions of the characters in the play. Students use that knowledge as the basis for their Extension Task essay.</p> <p>READ AND UNDERSTAND THE TEXT:</p> <ul style="list-style-type: none"> • Support students in reading the archaic language and understanding references, movements, and placement of characters throughout the act by showing clips from either the Zeffirelli or Luhrmann films in advance of reading or by using an audio version of the play. If using the films, watch Act II in advance of reading it. As students watch the film version of the play and read the play, have them keep track of the differences between the two mediums. Access a handout for this here¹⁵. (RL.9-10.7) • Continue to update the class T-chart begun in Lesson 2. • Have students summarize¹⁶ the act. (RL.9-10.2) • Using the provided dialectical journal template from Lesson 1, have students continue to identify patterns of language throughout the act that reveal possible motifs in the play (light vs. dark, high vs. low, dreams/sleep vs. reality, etc.). (RL.9-10.4, L.9-10.5a-b) For each example they locate, have students record an interpretation of the language and a connection to a theme or central idea. (RL.9-10.1, RL.9-10.2) • Working independently or in pairs as appropriate, have students closely read Friar Laurence’s soliloquy at the opening of Act II, Scene 3, and summarize the speech’s literal meaning. (RL.9-10.2) <ul style="list-style-type: none"> ○ Working sentence by sentence, prompt students to determine the literal and figurative meanings of the key words and phrases. After students record their notes for each sentence, have them review their notes and the text to determine the central idea of the speech.¹⁷ Have students record their thinking in annotations or dialectical journals. (RL.9-10.1, RL.9-10.2, RL.9-10.4, L.9-10.4, L.9-10.5a) ○ Then, have students determine how the order and meaning of the ideas foreshadows the tragic ending of the play. (RL.9-10.4, L.9-10.5a) Students should record their thinking in annotations or dialectical journals, connecting specific structural elements to meaning. (RL.9-10.1, RL.9-10.2) • Have students engage in a whole-class discussion about how the language and structure of the speech develop a central idea of the play. (RL.9-10.1, RL.9-10.2, RL.9-10.4, RL.9-10.5, L.9-10.4, L.9-10.5a, SL.9-10.1, SL.9-10.4) • Have students independently read and summarize the article “Teenage Brains Are Malleable and Vulnerable, Researchers Say.” (RI.9-10.2, RI.9-10.10)



Source: LearnZillion, 2018.