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2025

Early Learning Success: Literacy and Math Fundamentals

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EDITOR'S NOTE

Early childhood education is essential for students' long-term academic success. From laying the groundwork for algebraic thinking in kindergarten to developing math fluency through problem-solving and strengthening reading comprehension through knowledge building, these articles offer valuable perspectives. Discover the importance of phonemic awareness instruction, the power of classroom conversations in boosting reading proficiency, and the role of public libraries in supporting literacy development.

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Kyle Green/AP

Teacher Honi Allen, right, supervises as children test how far they can jump at the St. John's Preschool in American Falls, Idaho.

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A New Study Shows How Schools Can Maximize Full-Day Pre-K's Benefits

By Sarah D. Sparks

A new look at Chicago's long-standing, intensive preschool program highlights how elementary school leaders can help sustain the benefits students get from early education.

A study published online in the Journal of the American Medical Association this week finds that low-income students who participated in district-run, full-day preschool programs aligned with—and located in or near—elementary schools performed significantly better than students in school-based half-day preschool or less in reading and math by the end of 3rd grade. The full-day preschool students also showed better social-emotional development and were nearly three times less likely to repeat a grade during that time.

The benefits of preschool were greatest for students in schools where the principal and preschool teachers and family liaisons collaborated closely to align curriculum, teacher training, and family supports between preschool and primary grades.

"Obviously [the length of] instructional times are making a difference, but I think without the leadership quality, you wouldn't see these differences," said Arthur Reynolds, child development professor at the University of Minnesota-Twin Cities and the lead author of the study. "There's a leadership structure that's really creating a school climate for strong relationships among all key stakeholders: children, families, teachers, [and] the principal."

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>
> **ARTHUR REYNOLDS**
> Child development professor, University of Minnesota-Twin Cities

The findings come at a time when, according to Urban Institute research, more than 60 percent of public elementary schools now have an attached preschool, but most states and districts provide little guidance for principals on how to align the early-childhood classes with the primary grades.

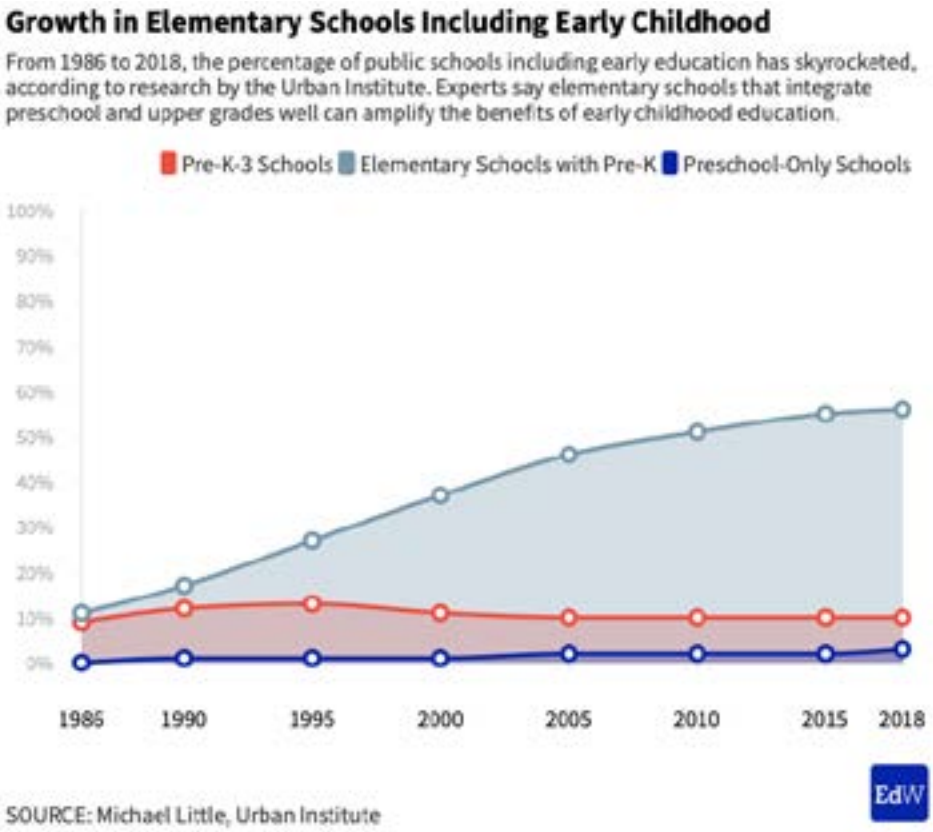
"Research shows us principals take one or two paths," said Michael Little, an assistant professor in early childhood education policy at North Carolina State University, who studies preschool-elementary alignment issues but was not involved in the Chicago study. "They can either see the pre-K program as simply renting space in the building, and engagement is very, very low. Or in some cases, the principal can really see the value of the program for the broader school environment and really integrate the school. In that case, [locating preschools in elementary schools] presents an opportunity for a really rich level of engagement."

Elementary and secondary teachers often think primarily of play in preschool. Lori Zaimi, the principal of Helen C. Peirce School of International Studies, which includes one of the Chicago centers, said school leaders and teams need to "go in [preschool classrooms] and observe—What does classroom culture look like? What does, communicating with students look like? What does questioning and discussion look like?—and then identify areas of strength and opportunities for growth from that.

"It's important for principals to understand and ... start to tell those stories about what's happening in K-3 and how pre-K helps to get [students] to their goal," she said.

Intensive model

Chicago's 2012 expansion of the Child-Parent Education Program has been one of the most intensive preschool alignment programs in the country. The child-parent centers, operating for more than 50 years, provide coordinated education, health, and family services for children in preschool through 3rd grade. Most of these centers are located on or next to elementary school campuses.



These school-sited preschools include health, family, and social services for students, small classes of 16-18 students, a leadership team with a head teacher and two family coordinators, curriculum aligned with elementary grades, and ongoing professional development for preschool teachers, who are paid at the same scale as their elementary counterparts.

Researchers led by Reynolds tracked the progress of nearly 1,000 low-income 3- and 4-year-olds at 11 Chicago schools that offered both half-day and full-day on-site preschool programs. About 70 percent of students who started in the preschools matriculated into their associated elementary schools.

By the end of 3rd grade, more than 38 percent of students who had attended full-day preschool read proficiently on the Partnership for Assessment of Readiness for College and Careers (PARCC), a widely used test. That was nearly 13 percentage points more than students who had attended half-day programs in preschool. In math, 25 percent of full-day students and 17 percent of part-day students performed proficiently in 3rd grade. To put that into context, only about 1 in 5 of all Chicago 3rd graders read and do math on grade level, with performance for low-income students significantly lower. While the majority of students who attended full- or part-day preschool still perform below grade level, they outperformed their peers.

A little more than 3 percent of students who had participated in the full-day preschool program had been held back by the end of 3rd grade, compared with 9.5 percent of 3rd graders who had participated in half-day preschool.

Coordinated leadership crucial

In the JAMA study, 40 percent of students who attended full-day preschool in schools with high-quality implementation—including strong preschool leadership teams and teacher training—read proficiently by the end of grade 3. That's 13 percentage points higher than the reading proficiency rates for students in less well-implemented full-day preschool programs.

Five years ago, the preschool center at Edmund Burke Elementary School seemed like another school entirely. Elementary teachers didn't know their preschool colleagues' names or the areas where their youngest students needed more support.

"That was definitely a disservice to kids, and it defeated the power that we could have if we did a better job of working together," said Burke Principal Lauren Norwood.

Today, teachers at the Burke Child-Parent Center have common professional development and planning time with elementary teachers and meet quarterly to review student data and curriculum across grades.

Each year, kindergarten and preschool teachers create a list of the 10 most-needed skills to ease the transition for rising preschoolers—things like writing their first and last names and generating rhymes for a given word. "If kids aren't able to do those things, then they spend more time than necessary in kindergarten trying to master" the skills, Norwood said. "So this has been very successful for us in ... making sure that kids have nailed it before they move on to kindergarten."

"Our kids are just with it," Norwood said. "They are happy about school, not getting adjusted to a new environment because they know it."

However, experts say school leaders, most of whom are not certified in early childhood education, need more training in how to incorporate early grades.

In a separate survey of principals in North Carolina, Little, the North Carolina State expert, found they "overwhelmingly support preschool in concept. ... However, when we start to ask about the specific practices that they engage in and their knowledge, things start to fall off."

For example, only about 35 percent of elementary principals reported including pre-K teachers in vertical professional learning community teams. And only 10 percent of principals were familiar with North Carolina's early learning and development standards, intended to be used to evaluate preschool teachers and align learning goals.

Norwood said school leaders who aren't endorsed in early childhood themselves can often, "let the early childhood-endorsed people do their thing, and I'm going to manage the other kids."

"Principals definitely need to jump in the sandbox and not feel as if, because you are not endorsed in early childhood, that you may be less able to really make change in those departments," she added. ■

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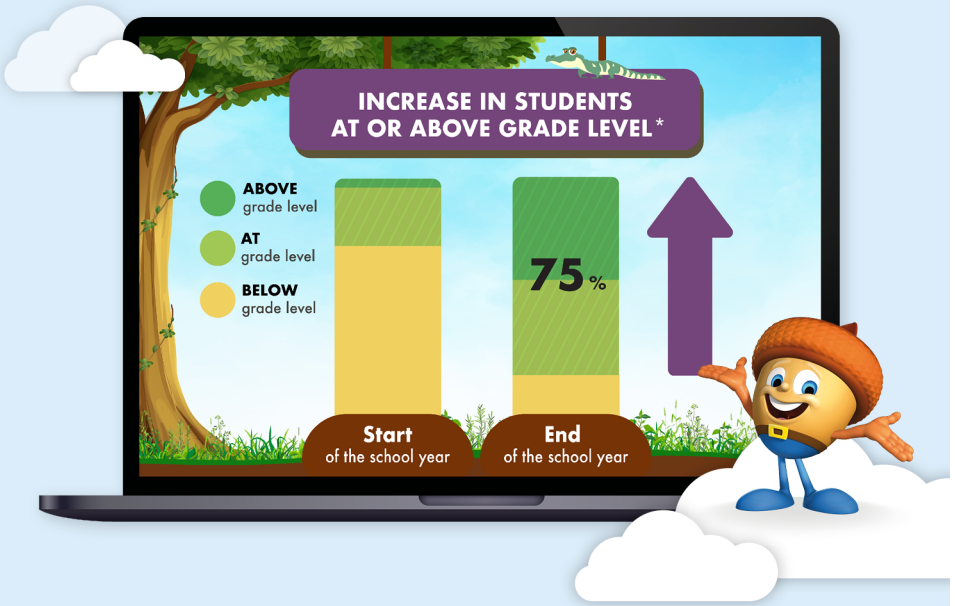

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Published October 9, 2024

Can Kindergarten Math Lay the Foundation for Algebra? New Study Aims to Find Out

By Sarah Schwartz

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The vast majority of students won't take algebra until middle or high school.

But teachers can start laying the groundwork for this pivotal class a lot sooner, some researchers say—and instilling these algebraic thinking skills when children are young could improve their math ability overall.

That's the theory behind Project LEAP, an early algebra program developed by researchers at TERC, a math and science education research nonprofit, and several colleges and universities.

Studies have shown that the intervention improves measures of algebra content knowledge and thinking skills for students in grades 3-5—gains that persist into 6th grade. Now, ongoing research funded by the National Science Foundation asks whether these lessons can benefit students in K-2 as well.

The research connects to larger debates about how much conceptual knowledge young students need as they learn early math. Surveys have shown that K-12 educators tend to place more importance on math fact fluency, while the post-secondary instructors who train them are more likely to emphasize problem-solving and mathematical thinking.

But research suggests that many of these skills actually develop in an iterative process, with procedural knowledge supporting deeper conceptual understanding, and vice versa.

Building algebraic skills in elementary school follows the same logic. "The kinds of things we're doing, operations on numbers, are deeply synergistic with the arithmetic they're doing," said Maria Blanton, a senior scientist at TERC and a principal investigator on the project.

Traditionally, early grades math focuses on arithmetic: foundational skills like adding, subtracting, multiplying, and dividing. Students ideally get comfortable manipulating numbers. But then, "they're dropped into a class where, all of the sudden, the numbers become letters," said Blanton.

Project LEAP aims to smooth that transition, preparing students to speak "the language of algebra," said Angela Gardiner, a senior researcher at TERC and a co-principal investigator on the study.

> **"Our focus is not on the [equations] you do, but the ways you think."**
>
> **MARIA BLANTON**
> Senior scientist, TERC

The elementary schoolers aren't working with Algebra 1 content—they're not solving equations or simplifying radical expressions, Blanton said. Instead, the lessons introduce "habits of mind" that are core to the subject, such as generalizing, representing, and reasoning.

"Our focus is not on the [equations] you do, but the ways you think," she said.

Lessons focus on conceptual understandings

In the current study, 41 schools were assigned to either implement Project LEAP lessons in K-2 or continue with their usual math instruction. Teachers started using the materials this September, and the study will track outcomes through May 2027.

The lessons focus on teaching core concepts that underpin success in algebra—like understanding the meaning of the equals sign.

The equals sign represents a relationship: The quantities on one side are equal to

the quantities on the other. Other research has shown that understanding the relational nature of the equals sign supports students' ability to solve equations in algebra.

But young children can have the misconception that the equals sign is an operational symbol that means "the answer comes next," the Project LEAP lessons explain.

"I assumed that this was a very elementary concept, and they would have that going into it. I assumed that those early lessons would be a review, but it wasn't," said Robin Hiatt, an elementary math teaching and learning specialist in Johnston County schools in North Carolina, who participated in the Project LEAP 3-5 study as a 3rd grade teacher.

Hiatt remembers students not understanding expressions that didn't include an operation—they were confused by the idea that 8=8, for example. "We had to take it back to a real hands-on, conceptual level," Hiatt said.

The lessons don't take the place of arithmetic instruction, but rather extend it, said Blanton. In early grades, for example, students learn which numbers are even and odd, and why, she said. The early algebra lessons teach students about the characteristics of these numbers, allowing them to make generalizations about how odd and even numbers operate.

That might sound complicated and abstract, but the lessons aim to make these ideas concrete. For example, they represent numbers with cubes. Every even number is made up of pairs of cubes, but odd numbers have an extra singleton.

This aspect of odd numbers explains why two odd numbers added together always make an even number—because their singletons join together to make a pair. "That type of representation-based argument is general," Blanton said.

In the previous study in grades 3-5, students using Project LEAP got better at making these kinds of representational arguments, which are core to algebra, compared to their peers in the control group. But their overall ability was still low, Blanton said.

Hopefully, she said, giving students even earlier practice with this skill could boost scores further. ■

Published September 25, 2024

Math Fluency Is All About Problem-Solving. Do We Teach It That Way?

By Sarah D. Sparks

To learn math, students must build a mental toolbox of facts and procedures needed for different problems.

But students who can recall these foundational facts in isolation often struggle to use them flexibly to solve complex, real-world problems, known as procedural fluency.

"Mathematics is not just normalizing procedures and implementing them when somebody tells you to use that procedure. Mathematics is solving problems," said Bethany Rittle-Johnson, a professor of psychology and human development at Peabody College in Vanderbilt University, who studies math instruction. "To solve problems, we have to figure out what strategy to use when—and that tends to get too little attention."

In a series of ongoing experiments, Rittle-Johnson and her colleagues find students develop better procedural fluency when they get opportunities to compare and contrast problem-solving approaches and justify the approaches they use in different situations. While some students may develop this skill on their own, most need explicit instruction, she found.

Rittle-Johnson spoke with Education Week about how teachers can use such comparisons to help students develop a deeper understanding of math. This interview has been edited for space and clarity.

How often do teachers talk to students about multiple strategies, and how to select them, in math problem-solving?

Students in the [United States] are very rarely doing rich contextual problems. Even more rarely, they're being asked to compare strategies to solve them. I don't hear teachers talk about [using different strategies] a lot, and textbooks tend to do a pretty bad job of explaining it.

For example, in Algebra 1, solving systems of equations, there are many standard solutions strategies that are taught in

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separate chapters and textbooks, ... but I see shockingly little time spent having students think and compare and choose which strategy to use. In one study where teachers were trained [to compare math strategies], only about 20 percent did in the classroom—and only about 5 percent of teachers who [did not receive training.]

Sometimes I hear teachers say, "Well, multiple strategies, that's great for my high-end learners, but I don't want to show that to my struggling learners. ... So maybe multiple strategies is the ideal, but I'm not going to get to it because I'm tight on time and my kids are behind." But we hear from struggling learners that they really appreciate the multiple strategies and we see that it helps them, too, across the grade bands and across contexts.

How can teachers decide when to bring in and compare different strategies while introducing a new math concept?

We find comparisons can be useful in all different phases of instruction.

It can be helpful for kids to have had some time to think about one strategy before they think about multiple strategies, maybe at most a lesson. But the risk is in general, if you wait too long, kids just get attached to one strategy. You run the risk of kids becoming really attached to one strategy, and then they become more resistant to wanting to think about and use multiple strategies.

What does this sort of comparison look like in the classroom?

One best practice is to have the steps of the different strategies written out. It can be kids' strategies that they wrote on the board. It can be projecting strategies from textbooks or your solutions, but one thing we know is: Make sure both strategies are visible so that kids don't have to remember. Then we ask kids to think about similarities and differences and think about, when is each a good strategy?

Sometimes we have students compare correct and incorrect strategies and explain the concepts that make the correct strategy correct. Just because you teach kids correct ways of doing things, that doesn't mean the incorrect strategies disappear. Students really need help thinking and reasoning through why those are wrong.

What are the more common struggles for teachers to teach multiple strategies?

The No. 1 barrier we face is time. Teachers just feel they're under so much pressure to cover so much content that they feel like they can't take the time to do this, and that they see the value and the payoff in it. It does pay off for what is assessed [in standardized math tests], but it's not directly assessed, and so that makes teachers nervous.

Also, sometimes teachers really don't like to say this way is better than this other way. Even though mathematicians would say, "yeah, this way is clearly better in this context, and this other way is clearly better in that context," ... sometimes teachers feel uncomfortable that they're making a value judgment.

But the evidence is really clear that it's helpful to show correct and incorrect examples and talk through them. ■

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Published February 9, 2024

How Much Time Should Teachers Spend on a Foundational Reading Skill? Research Offers Clues

By Sarah Schwartz

iStock/Getty Images + Education Week

A reading block in an elementary school classroom can feel like a carefully choreographed 120-minute dance.

Time is a finite resource, and it often falls to teachers to make decisions about how much instructional time to devote to the many interrelated components of reading. What's the dosage of each that will ensure kids get it?

A new study offers insight into that question for one key component of early reading development: phonemic awareness. It finds, in essence, that you can have too much of a good thing.

Phonemic awareness is the ability to identify and manipulate the individual sounds in words—to blend the sounds /c/, /a/, and /t/, into the word cat, for instance. It serves as a kind of springboard for reading and spelling by giving young children knowledge they can map onto written letters, aiding them in sounding out words.

Instruction in this skill is important. But at some point, students master this ability, and don't need further teaching. The new study, from a team at Texas A&M University, aimed to figure out where that point might be.

The researchers examined 16 experimental and quasi-experimental studies on phonemic awareness instruction, all conducted in small groups or one-on-one settings with students in grades pre-K-1. They found that the more time teachers spent, the better students became at the skill compared to a control group—but only up to a certain point: 10.2 hours total. Programs that spent longer on phonemic awareness instruction after that point showed diminishing returns.

Practice with this skill is crucial, the study concludes, but also that an "overemphasis" on phonemic awareness may not be beneficial, said Florina Erbeli, an assistant professor of educational psychology at Texas A&M and the lead author on the paper.

"We have to remember that phonemic awareness is not the goal of the whole instruction. The goal is to teach the students to read," she said. "Phonemic awareness instruction is just one of the steps that will bring us to kids starting to read and spell. ... After a while, you wouldn't expect a typical child to go on forever and ever needing this."

Research doesn't provide a 'magic number'

As the "science of reading" movement has spread across the country, more schools have taken up phonemic awareness instruction as part of their early literacy approach. A 2022 EdWeek Research Center survey found that about a quarter of preK-2 and special education teachers use Heggerty, an early literacy curriculum provider that offers popular daily phonemic awareness lessons.

The study is one of the first to provide research-based guidance on dosage for phonemic awareness. It comes at a time when questions about how to structure classroom time loom large in the science of reading movement.

While many states have passed new legislation mandating that schools use evidence-based practice, these laws and accompanying state guidance don't often come with a roadmap for structuring an effective literacy block. The lack of concrete instructions can leave some teachers feeling frustrated—wanting to change their practice, but not knowing exactly how. Some educators have offered examples of what their lessons look like.

But there's not one singular research-based schedule, in part because dosage is difficult to study, said Matt Burns, a professor of special education at the University of Florida who studies reading interventions. Burns was not involved with the Texas A&M study.

The same amount of cumulative time can have different effects depending on how it's divided up, he said. For example, 30 minutes once a week of practice with a skill might lead to different outcomes than 10 minutes three times a week. Many studies don't report this kind of detailed information about dosage. And then students' needs vary—some may need more practice and repetitions, and others fewer, Burns said.

Such differences should be considered in interpreting the study, Erbeli said.

"10.2 hours is not some magic number," she added. "We say in the paper that this number does not tell us anything about a particular class, a particular individual." Teachers should plan phonemic awareness instruction based on the needs of students in front of them, she said.

Still, this study can provide a useful guidepost, Burns said. "If you're spending more than [10.2 hours], take a look at your practice. If you're spending much less than that, take a look at your practice."

Phonemic awareness: With or without letters?

The study also touches on a distinction that has become a source of debate in the reading field: Whether it's better to teach phonemic awareness orally, or alongside written letters.

Many teachers use materials that are designed for oral practice only. The teacher will say a word, and then ask students to segment the sounds within it, for example. But some researchers argue that having students look at the letters in a word as they practice this skill can reinforce their understanding—and some studies have shown that students' reading and spelling outcomes are better when phonemic awareness instruction includes letters.

In the Texas A&M study, the researchers found that phonemic awareness instruction with letters led to bigger returns over a longer period of time—the intervention groups continued to show better phonemic awareness skills than control groups after 16 hours of instruction over the course of the program. (These programs also spanned grades pre-K-1.)

That may be because phonemic awareness and decoding ability are reciprocal skills, Erbeli said. Seeing how sounds are connected to letters could help students manipulate sounds more precisely. ■

Building a Strong Foundation: The Interconnected Role of Literacy and Math in Early Learning Success

Introduction

Early education is crucial for setting students on a path toward lifelong success, yet recent data reveals that young learners in the U.S. are struggling with grade-level proficiency in literacy and math. According to the National Assessment of Educational Progress (NAEP), proficiency rates in K–3 literacy and math have dropped below 40% in some states, highlighting an urgent need for a holistic, integrated approach in early learning.

Research underscores the intertwined nature of literacy and math skills. Both disciplines enhance cognitive abilities and reinforce one another, providing a foundation that fosters learning across subjects. By focusing on a balanced approach to math and literacy, educators can support academic growth, address skill gaps, and achieve essential performance goals.

The Critical Connection Between Literacy and Math

Research consistently shows that early literacy and math skills are mutually reinforcing, with each aiding in overall cognitive development. However, early education often prioritizes literacy over math, limiting students' exposure to essential math concepts. This imbalance may impact students' ability to develop logical thinking and analytical skills, both of which support broader academic growth.

- Instructional Time: Studies show that preschoolers typically spend more time on literacy than math. Shifting to a more balanced approach can help address this disparity.
- NAEP Findings: Recent NAEP data reveals a 5-point decline in reading scores and a 7-point decline in math scores among 9-year-olds, underscoring the need to reinforce both areas in early education.

A balanced emphasis on literacy and math not only boosts each skill area but also prepares students for future academic success by promoting comprehensive cognitive development.

Building a Strong Foundation:
The Interconnected Role of Literacy and Math in Early Learning Success

Strategies for a Balanced Approach

An integrated approach to literacy and math involves creating connections so that students see these subjects as complementary. Below are practical strategies for incorporating math into literacy activities and vice versa.

Math in Literacy

- Story Problems: Use stories with math concepts (e.g., counting objects or adding items) to create engaging math-related questions. This approach reinforces comprehension and math application while linking narrative elements to numerical relationships.
- Sequencing and Counting in Stories: Use stories with counting sequences, such as "Five Little Monkeys Jumping on the Bed," and ask students to predict the sequence of events. This method develops number sense while enhancing comprehension.

Literacy in Math

- Math Vocabulary: Introduce math terms (e.g., "sides," "edges") alongside descriptive language, prompting students to use these terms in sentences. This practice strengthens understanding in both math and language.
- Math Journals: Encourage students to write about their problem-solving process, which not only enhances comprehension but also bridges language and math skills.

Cross-Disciplinary Projects

- Measurement and Estimation: After reading a story involving measurement, set up a hands-on activity where students estimate and measure distances or sizes. This reinforces both literacy and math through practical application.
- Graphs to Track Story Elements: Use stories with recurring elements and guide students to track and graph these occurrences, reinforcing skills in counting, data interpretation, and literacy comprehension.

Engaging Early Learners

- Movement and Music: Use songs or chants that combine counting and rhyme patterns, such as "The Ants Go Marching." Pair with movements like clapping to reinforce counting, rhythm, and language development.
- Manipulatives in Story Retelling: Use blocks or counters in storytelling to visually demonstrate math concepts, such as sharing or grouping, enhancing comprehension through tactile learning.

Building a Strong Foundation:
The Interconnected Role of Literacy and Math in Early Learning Success

Conclusion

Integrating literacy and math in early learning supports well-rounded cognitive growth and essential skills for academic achievement.
By adopting strategies such as story-based math problems, vocabulary building, and practical applications like graphing, educators create dynamic, interconnected classrooms.

Starting with small steps—such as adding story-based math problems or encouraging math journals—educators can build an academic foundation that supports both literacy and math, preparing students for a future of learning and success. A balanced approach in early education not only addresses current gaps in proficiency but also sets students on a lifelong path of confidence and capability in every academic discipline.

Allison Shelley/All4Ed

A 1st grade teacher speaks with a student about an assignment at Capital City Public Charter School in the District of Columbia.

Published April 15, 2024

Want to Improve Reading Proficiency? Talk to Kids More

By Elizabeth Heubeck

Ask an early educator to explain the science of reading, and phonics will likely headline the response. But phonics, and its emphasis on word recognition, covers only part of the reading-proficiency puzzle. Oral language skills are equally important.

Yet, too often, oral language skills are not getting the emphasis they deserve in early education classrooms, say literacy experts.

Sonia Cabell hopes to help teachers change that.

Cabell, an associate professor in the School of Teacher Education and the Florida Center for Reading Research at Florida State University, believes there's a straightforward way for teachers to improve the oral language skills of young learners, starting as early as preschool: Engage in meaningful one-on-one conversations with students throughout the school day. They don't have to be long or complicated, Cabell explained. In fact, she and fellow educational researcher Tricia A. Zucker co-authored a book that provides a simple framework for time-strapped teachers to have these interactions with students that take as little as a minute but can have long-lasting, positive consequences.

Cabell recently spoke to Education Week about this approach for boosting students' oral language skills. The interview has been edited for length and clarity.

Why should teachers focus on improving students' oral language skills?

Unlike reading, which is a secondary skill, oral language is a biological primary skill of humans. So the idea that we're hard-wired to learn oral language does raise the question: Why do teachers have to focus on oral language development? It really is about gaining exposure to the more formal language used by teachers in the classroom—language to which children need exposure in order to read and write proficiently.

How early should teachers focus on oral language skills?

Some of my own research has shown that the conversations in preschool classrooms relate to children's vocabulary growth and that the language teachers use, and the complexity of that language, matters.

But, as you point out in your book, Strive-for-Five Conversations, the back-and-forth of conversations is critical, right?

That's right. The benefits of going back-and-forth and having multiturn conversations, some call them "serve and return," is well-documented in the literature. The idea is that you're building on what students say and then providing them with another opportunity to be an active participant in the conversation.

In these multi-turn conversations, what's the ideal number of turns?

The idea is that you try to have five conversational turns with a student: I say something, you say something, and so on. It doesn't take very much time. Each of these conversations takes about one minute of instructional time, but they accomplish a lot.

How does the 'five-turn conversation' compare with a typical teacher-student exchange?

What tends to happen [in typical interactions] is that I, as the teacher, ask a question, the student says something in return, and then the teacher stops the conversation by saying something like: "Good job!" Most teacher-student conversations stop at that third turn.

How can teachers extend these conversations?

Based on whether the student responded correctly, partially correctly, or incorrectly, you think about how you as the teacher might scaffold them. For instance, if the student responded correctly, you might scaffold them upward, providing them with an additional challenging question. If they answered incorrectly, you could scaffold them downward by helping them to come to a more correct answer. You might do that by reducing the choices they have or you might ask them to fill in the blank, pushing them to give you another turn. It's that piece of sticking with that child that seems to not happen very frequently.

Are these conversations designed to be one-on-one?

Yes, but they can take place in a whole group as well. For example, in book reading, you ask guiding questions, telling students before you begin reading: "I want you to think about this."

During this exercise, teachers are encouraged to use [Popsicle] sticks—every student will be thinking about the question because they all know their name could be called. Then you read the book and come back to that earlier [guided] question. You pick one Popsicle stick out of the group and take at least five conversational turns with the student you call on. You can then ask that same guiding question to three other kids.

Do many teachers balk at all the classroom time these conversations could take?

We're not saying that every conversation has to be a five-turn conversation. But we are saying: Deliberately have these conversations with each child every day.

Which students benefit most from these five-turn conversations?

Research has shown that it's those students who have lower-language skills or who are English learners or who are shy and who won't come to the teacher and say, "I want to talk to you about something"—they typically have fewer conversations with their teacher in class. They aren't getting the same practice with oral language skills because they aren't asking for it. The five-turn conversation is a way for teachers to make sure the learning is equitable.

What is your message to teachers who think this approach is not worth their time?

We don't want teachers to see this strategy as rigid. But we do want to encourage teachers to be more deliberate about their conversations with students. We're asking teachers to make a marginal shift in what they're already doing, which is having conversations with kids all day long. We also see this as a way for teachers to give students a language boost without actually saying: "Now, we're going to do an oral language lesson." ■

Published January 15, 2024

Reading Comprehension Hinges on Building Knowledge. New Curricula Aim to Help

By Sarah Schwartz

Portage, Mich. -

Portage, Mich., is more than 500 miles from the ocean—so students here who attend Moorsbridge Elementary don't have much experience with tropical storms. They hardly ever make it up to the Great Lakes region.

And yet, the 4th graders at Moorsbridge know a lot about hurricanes.

In an English/language arts lesson last November, the class directed their teacher, Courtney Eiseler-Ward, as she drew a hurricane diagram at the front of the room. The students explained how to represent the storm, drawing on books they had read and videos they had watched.

The hurricane should look like a circle from above, they told her, because the collision of the hot air from the water and cold air from above makes it spin. Draw it in the middle of the ocean, they said, because that's where hurricanes form before making their way to the coast.

Conversations about wind speed and low-pressure systems might usually be the province of science classes. But in Portage, these subjects—along with topics in history, civics, and world cultures—are the bedrock of the English/language arts program.

Portage is one of a growing number of districts across the country to use what the field has begun to call a "knowledge-building curriculum." These ELA materials are designed to systematically grow students' content knowledge about the world, often by integrating social studies and science topics. The district implemented its program this year with middle school teachers. A group of early-adopter elementary school teachers began, too.

Unlike other ELA curricula, which often give teachers choices of books or allow students to pick their own, knowledge-building programs feature tightly constructed sequences of text that are all thematically related. And while students still practice comprehension strategies—such as summarizing or inferring—the curriculum prioritizes deeply understanding the content, rather than isolated skill exercises.

Emily Elconin for Education Week

First grade students work with teacher Megan Gose to craft alternate endings for stories they wrote together at Moorsbridge Elementary School in Portage, Mich.

These programs stem from the idea, backed by research, that having a broad array of background knowledge makes individuals better readers. General world knowledge is correlated with reading-comprehension ability.

Versions of knowledge-building curricula have been around for decades, but the idea has recently gained new acolytes. Advocates in the "science of reading" movement have championed these programs, and the concept has been repopularized through the book The Knowledge Gap, which argues that teaching decontextualized reading skills is the root cause of the country's educational inequalities.

"The idea of ELA being about something is a really good one," said Gina Cervetti, a professor in the University of Michigan's Marsal Family School of Education who studies the intersection of literacy and content-area learning. It can help students think more deeply about big ideas, make connections across topics, and show their understanding through their writing, she said.

Still, what that content should be, how teaching it should integrate strategy instruction, and how to approach this large shift in teaching practices are open questions—and researchers and educators don't always agree on the answers.

The research behind 'knowledge-building'

A knowledge-building curriculum turns the focus on comprehension instruction on its head. Its primary goal is to teach content. Skills and strategies are still present, but they're a means to the end—not the end itself.

"The content becomes a chief driver," said Sonia Cabell, an associate professor at Florida State University's College of Education, Health, and Human Sciences. Cabell has co-authored several meta-analyses on the effect of teaching literacy skills and subject-area content in tandem.

Studies show that knowledge-building approaches that work in English classes share a few common traits, Cabell said.

Units are organized around content topics—such as plants or seasons—rather than general themes, such as "what makes a good friend?" They use text sets—readings and read-alouds—on conceptually linked topics

to help students build a schema, or a mental model that allows them to apply what they've already learned to understand something new. The programs identify vocabulary words to teach explicitly that will repeat throughout a unit. And writing and discussion prompts connect directly to the text and give students an opportunity to analyze what they've learned.

The texts that students are reading in these curriculum series are generally more complex than those in an average ELA class, said Jackie Eunjung Relyea, an assistant professor of literacy education at North Carolina State University.

In classrooms where teachers use leveled texts, which purport to match students' individualized reading levels, "the priority and emphasis is on readability," she said." But the texts they use in knowledge-building ELA programs challenge the students to engage critically," she said.

Comprehension strategies are still important in this equation, Relyea added. Teaching these strategies explicitly can help students become better readers, a large body of research shows. But students can use these strategies more proficiently when they have some knowledge about the text they're reading, said Cervetti.

"We have limited attention," she said. "If we're working really, really hard to understand a text that we're totally unfamiliar with, it's unlikely that we'll be leveraging those strategies."

(Recent EdWeek Research Center data, representing nearly 300 educators' responses, found that most agreed that both teaching content and comprehension skills were important. But more of them put a top priority on the skills.)

Even if the theory of action behind the knowledge-building approach is sound, researchers note that there are still things to learn about how it works. Knowledge about a specific topic makes it easier to read text about that topic—knowing a lot about ocean animals, for example, might help one understand a book about deep sea diving. But it's not always clear how far that knowledge can transfer to support understanding of other topics. Would knowing a lot about ocean animals help someone on a test of general reading comprehension?

Some research has shown that a couple of commercially available knowledge-building programs can lead to better general reading-comprehension scores. But few programs that schools can purchase have gone through these independent tests, and as Cervetti put it, "there's a great difference between a controlled efficacy trial and use in the real world."

She also cautioned that any ELA program, no matter how rich in social studies and science content, shouldn't be considered a replacement for those courses. There are ways of reading, writing, and thinking that are unique to science, for example—analyzing and interpreting data or planning investigations.

If students' only science instruction is learning about science content in ELA, "we lose a lot of what is most essential about acquiring disciplinary understanding," Cervetti said.

How these curricula work in classrooms

In Eiseler-Ward's 4th grade classroom in Portage, where students were discussing the hurricane diagram, she and her co-teacher, Susan Pullo, prepared the class for their daily writing assignment: Write about why and how hurricanes form, using cause and effect sentences.

"Will your drawing help you?" Eiseler-Ward asked, referencing the diagram the class made together. "What else could you use?"

Students worked together in teams, flipping through the book they had read earlier that day on hurricanes to pick out key information. At one table, a student started to write that hurricanes form in oceans. Another jumped in to correct—"warm oceans," the second student said.

At the elementary school level, most of the lessons in the program that Portage uses follow the same format. First, teachers explicitly teach important vocabulary words or concepts—in this lesson, "atmosphere" and "evaporation." Then students read a text. (In earlier grades, they listen to a read-aloud.) Finally, the class completes a written response.

This structure isn't unique to a knowledge-building approach. But the questions that the curriculum asks students are vastly different from those in the district's previous programs, said Courtney Huff, a district literacy coach.

For instance, she said, the 4th grade team had always read Shiloh, a novel by Phyllis Reynolds Naylor about the bond between a boy and his dog, a text teachers felt was dull. This curriculum also happens to include Shiloh. But the lesson was transformed.

"The unit we were doing before was so surface-level," Huff said. The new unit plumbs deeper themes: What do the characters believe? What do they value? How do they change? "The kids would whine when it was time to put the books away," Huff said.

And in 5th grade, students study human rights by exploring young women's experiences in the Middle East under Taliban influence. They read The Breadwinner, a novel about an 11-year-old girl in Kabul, but also memoirs and first-person accounts from real children living in Afghanistan and a book about Malala Yousafzai, the Pakistani women's rights advocate who won the Nobel Peace Prize as a teenager. Incorporating knowledge from throughout the unit, students write about such sweeping questions as: "How do beliefs, ethics, and values influence behavior?" And: "When should you take a stand against injustice?"

"These big driving questions, kids can't get enough of talking about them—versus, 'who is the main character?'" said Mackenzie Sheahan, the district's director of K-8 curriculum and professional development.

Debating the question: Whose knowledge?

Having students read the same books and articles allows them to share a common language in class discussions. But taking this kind of prescriptive approach to the texts students read can also court controversy.

English classrooms have long been at the center of a political battle about whose voices to center in the classroom. A knowledge-building curriculum prescribes these decisions for an entire district, and it can bring these issues to a head.

Some commercially available knowledge-building programs have been criticized for having a Eurocentric slant, placing disproportionate emphasis on white, male authors and figures in history. Portage district leaders kept that in mind as they went through the curriculum-selection process. "We were really approaching it from the lens of, we want to represent every single person in our community," said Sheahan. The district is about 77 percent white, 6 percent Black, 8 percent Latino, 7 percent Asian, and 9 percent two or more races.

One of Portage's final choices didn't pass muster on its diversity, equity, and inclusion metrics. A consultant pointed out that it featured some illustrations that seemed to offer a distorted historical representation, including one of enslaved children playing happily on a plantation.

"That was kind of shocking to us," Sheahan said.

The program the district eventually picked met the district's DEI benchmarks. But this past summer, before schools even began using it, some school board members and parents started to speak out against the program, calling it "biased" and "socio-politically driven" in a tense board meeting.

The district responded by hosting a family literacy night to walk parents through the curriculum and answer any questions they

had. Going forward, Sheahan said, it will be important to invite parental input and approval earlier about these kinds of curriculum changes. "What I've learned is we have to do the back work," she said.

In other districts, teachers are figuring out how to navigate some of the gray areas—a prescribed list of texts that meets their goals for representation in some ways but falls short in others.

In Evanston, Ill., 5th grade teacher Steve Yasukawa is in his first year using the district's new knowledge-building curriculum, a different program from Portage's.

He appreciates the tight link to social studies in the ELA materials, but he's had mixed feelings about the way the curriculum depicts Indigenous people in U.S. history. In the year's first unit, students explored the history of U.S. westward expansion and its effect on Indigenous tribes, specifically the Nimiipuu, also known as the Nez Perce.

That unit incorporated many primary sources that depicted Nimiipuu culture and presented maps that used not the state boundaries of today but the historic homelands of different Indigenous nations—choices that set students up for a "mental shift," Yasukawa said. The program was, literally, centering Indigenous voices.

But Yasukawa didn't agree with the curriculum writers' decision to use the term "Nez Perce" instead of Nimiipuu throughout the materials and felt that one novel in the unit inaccurately portrayed the relationship between the Nimiipuu and the U.S. government.

On balance, Yasukawa thought the pros of the unit outweighed the cons and knows that one curriculum won't perfectly meet all his needs. But the knowledge-building curriculum is harder to flex.

"The knowledge building in these modules is so specific to the text that if we moved away from these texts, it would take years" to adapt the lessons, he said.

Trying a new way of teaching

This is a key feature of knowledge-building programs: The texts are set, unlike programs that are based on student choice.

In the Evanston/Skokie schools, where Yasukawa teaches, district leaders have talked about the change as a way to advance equity. Reading programs that match children with different books often operate on a leveling system that can keep students who score lower on reading-comprehension tests perpetually behind their peers.

"If students are always given materials that are below grade level, they will never be able to achieve grade level," said Shyla Kinhal, the district's director of literacy.

With the new ELA program, all students read the same texts. Now, Kinhal said, district leaders are working to help teachers offer other kinds of support for students with different reading abilities. Before moving on to specific texts, teachers can teach important vocabulary and concepts, or they can pair students to read the text together—without changing the text itself.

In Portage, instructional coaches have also created worksheets that students can use to organize their thoughts as they read or before they write—resources that make explicit some of the reading and writing strategies that are more implicitly conveyed in the curriculum.

Even with all this support, though, students still struggle with some of the lessons. Teachers and district leaders in Portage agree that they're holding students to higher standards than they have in the past.

In one 6th grade English class, students were discussing similarities and differences between two brothers in the novel they were reading. Then, their teacher asked them to make connections to a news article they had read in an earlier class period about researchers' different theories for why siblings develop diverging personality traits. She asked them: What evidence does the novel demonstrate for any of these theories?

This question stumped the group for a while. Translating the scientific ideas in the article to apply to the brothers in the book was a heavy lift.

Yasukawa, in Evanston, has also struggled at times to help students synthesize information from class discussions and the curriculum's texts into their written work.

Still, students' interest in the discussion demonstrates to him that the curriculum is helping students really connect with the text they're reading.

"They love it. They love arguing," he said, remembering how students kept raising their hands, agreeing, and laughing with one another during a recent Socratic seminar.

In education, people always talk about the pendulum swing, Yasukawa said—the way that thought leaders and district administrators seize onto a new idea and decree that everything about the way teachers approach their work should change.

"I hope what I'm experiencing right now is not the end of the swing," he said. "I hope it's still bringing us in this direction of knowledge-building and making connections—because the kids are really engaged." ■

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OPINION

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Students Are Struggling With Literacy. The Public Library Can Help

How partnering schools with local libraries can help students learn to read

By Marjeta Bejdo

It is not a secret that many students across our nation are struggling with literacy skills, especially students from historically marginalized groups. According to the National Assessment of Educational Progress, only 37 percent of 12th graders performed at or above the NAEP "proficient" level in 2019. Three years later in 2022, the results were also grim for 4th and 8th graders, who scored 31 percent and 33 percent, respectively.

While schools and school libraries are the official institutions responsible for educating our future generations, public libraries are one of the best community resources that schools can partner with to improve students' literacy outcomes. Libraries are "educational support centers" rich in resources that can enhance learning. They offer not just a plethora of books in many languages but also literacy-focused programs for different age groups. Schools and the wider community must leverage these services if they want to see improvement in children's reading and writing skills.

I teach in a school where we are blessed with a wonderful school librarian who works hard to diversify our school library's catalog, create a resourceful and welcoming environment, and advocate for our students. Unfortunately, her resources are limited. Although the school library is a great place for students to explore books, it is just for students in our school and is only open during the school year.

In light of this, our school librarian is my primary supporter to increase collaboration between the public library and our school. The public library is available to everyone, no matter their age. From infant story time to robotics for teens, to basic computer skills and English classes, the public library has something for everyone. And, for students in particular, libraries offer an inviting space for doing homework, locating language-learning resources, and accessing computers and printers, all of which positively impact learning.

But most importantly, joining school libraries with public libraries can open a whole new world for young people, especially those who need additional academic support with reading and writing. This is especially important for the schools across the country that are losing school librarians—or don't even have a school library.

As an early-childhood educator who specializes in working with multilingual students, I began a collaboration with the public library with the intention of improving English-literacy outcomes for these students. To learn about how schools and local libraries could partner to improve English literacy for multilingual students, I interviewed two children's librarians at a public library and surveyed 21 staff members at the elementary school where I work in the Pacific Northwest.

Although my focus was initially on helping multilingual students, engaging with the stakeholders in this project made it clear that all students benefit from such partnerships. Starting with the early-childhood years, public libraries offer engaging, structured learning through story time. Research has highlighted the benefits of reading to young children in supporting vocabulary development and early literacy skills.

The librarians I interviewed shared that they offer story time in languages other than English, which supports multilingualism for children who speak a different language at home and gives some students a chance to hear their favorite stories in another language. This is a great way to expose monolingual English-speaking children to a variety of languages and to support emerging multilingual students' language development.

The librarians I interviewed also said that they view the library as an open and welcoming education setting, much like a community center. The staff members that I surveyed shared that they also take advantage of the public library. Many use their educator accounts to check out up to 50 books at a time to support their lessons—books that may have been unavailable or available in limited supply at the school library. Staff also emphasized the importance of making sure all students have a library card and that all families are aware of the public library's resources.

Librarians are passionate educators in their communities. They design and implement different programs for students, including summer reading, art, STEM, and performances, in which musicians, magicians, and others visit the library to showcase their talents. Libraries also provide students with opportunities to meet authors and illustrators, which can be rare in a public school setting but can be profound, enriching experiences. According to the librarians I interviewed, virtual author

visits are something that libraries continue to provide and reach out to teachers about.

While I understand how much we teachers need to fit into our day, we must take advantage of these resources to inspire our students to read and write. Based on what I learned from my survey, here are what librarians and staff members suggest as the best ways to get started.

- Organize a field trip to the library. Introducing students to what the public library has to offer is a great step toward encouraging them and their families to use it. This is also an opportunity to sign up children for their library cards, tour the different sections and departments, and allow kids to ask questions.

- Share library resources with families. Even just informing families that resources are available is a great starting point. The public children's librarian and I sourced brochures with book lists for incoming kindergartners and added them to their welcome packages. Our school also invited the librarian to set up a table at school events to connect with families about the free literacy resources and programs they offer that can help with reading and writing practice.

- Invite children's librarians to classrooms for story time. The children's librarians I interviewed shared that they would love to come to classrooms for story time. This is a great way for students to meet the public librarians in a safe place and know whom to look for when they visit. Being familiar with the librarians encourages kids to visit them and attend library events. This is also a way to build and strengthen community bonds.

Schools and libraries both provide critical services for our society and have a heavy influence on literacy outcomes. I encourage teachers and school leaders to find ways to partner with their local libraries to ensure students are actively engaging with their public library to expand access to helpful reading materials and the many educational programs they can take advantage of long after graduation. ■

Marjeta Bejdo is an early-childhood educator in Seattle, Wash. Her work focuses on bridging the opportunity gap in literacy between multilingual students and monolingual English-speaking students.

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