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Biliteracy and the Science of Reading

Overview

Literacy is defined as the ability to read and write, an act that in today's environment engages texts in multiple formats. Notably, literacy emerges from, through, and with language, including acts that involve speaking and listening. Literacy is also described as a social endeavor; individuals use language to think and act as a member of a socially meaningful group, connecting language to identity and discourse. For instance, an American might have a type of literacy or discourse that slightly differs from someone born in Australia. Language can further be understood as a tool for communication that allows individuals to form relationships, socially interact, express and make sense of experience or ideas, and transform thinking. This complexity of literacy and language is informed by research that includes linguists, neuroscientists, as well as socio-cultural and cognitive researchers in education among others.

As noted in the [LESC brief](#) produced in October 2022, without a strong foundation in literacy skills, children often fall behind in their academic journey. Low literacy rates have long-term consequences. Repercussions also extend into adulthood. Low literacy deeply impacts adult outcomes because literacy proficiency is correlated with several important domains including health, income, and employment.

Biliteracy is the ability to speak, listen, read, write, convey ideas, and engage socially within two languages. In New Mexico, this has been an expressed benefit for Spanish speakers since the creation of the state constitution. [Research](#) on bilingualism clearly points to significant benefits including substantial cognitive, social, cultural, and economic [advantages](#). Consequently, as the legislature embarks on a long-term vision to support stronger literacy for all New Mexico students, a nuanced and keen understanding of literacy and biliteracy can help policymakers better support students, educators, and families.

The purpose of this report is to provide a history of what has recently been done to strengthen English literacy outcomes for New Mexico students through the science of reading beginning in 2019 and bridge this with legal and other well-established reasons to provide high-quality biliteracy instruction.

Key Takeaways

Literacy rates in New Mexico are low among all students with state assessments showing 34 percent proficiency across all students, and 13 percent proficiency for English learners, in the 2021-2022 school year.

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Legal imperatives and obligations, both at the federal and state level, support bilingual education in New Mexico.

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There is meaningful overlap in structured literacy approaches consistent with the state's current literacy approach and best practices in instruction for English learners.

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Policy considerations could address the intersection of the science of reading and bilingual education to achieve biliteracy.

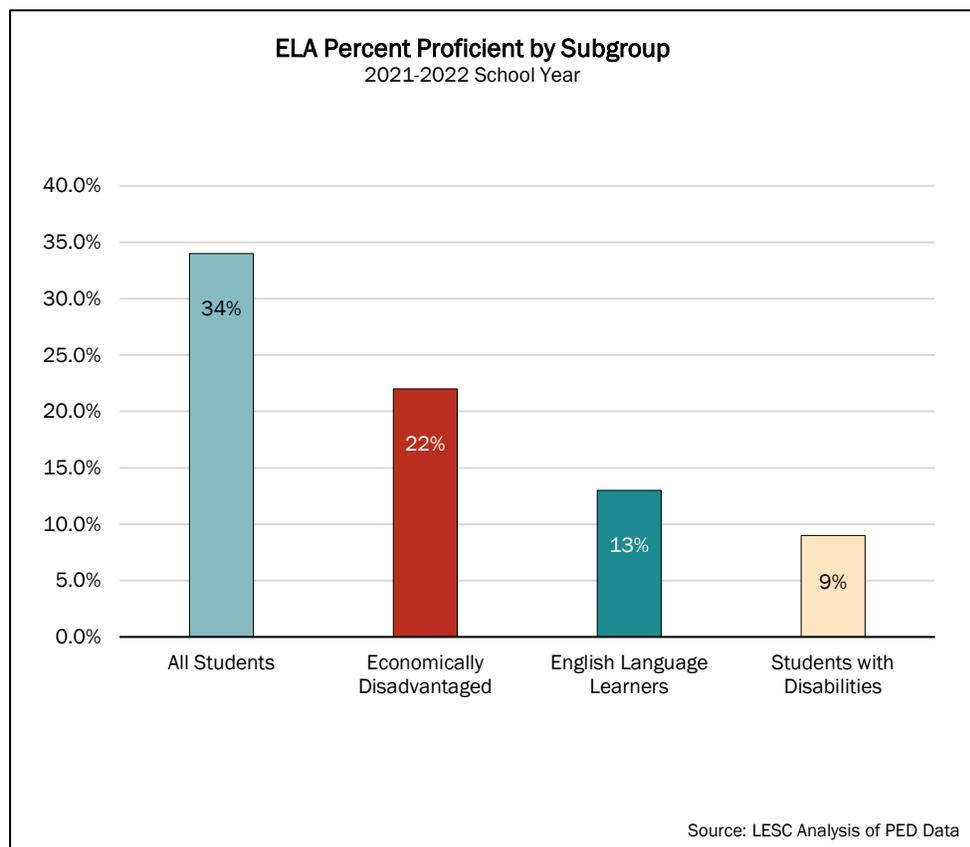
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Background

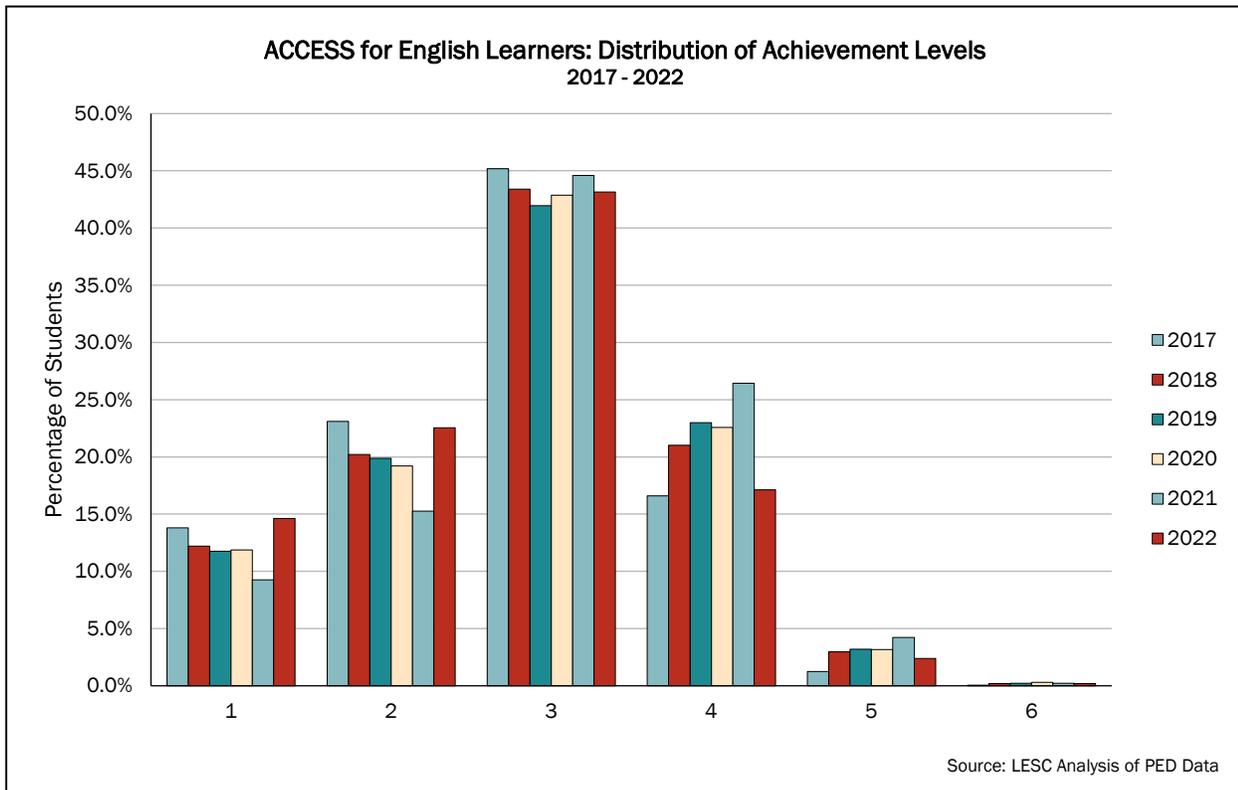
State Profile

In New Mexico, general literacy assessment scores are low. Results from the 2022 administration of the National Assessment of Educational Progress (NAEP) found 21 percent of children in grade four in New Mexico scored at or above proficiency in reading. This was a decline of 3 percentage points from 2019. For students in grade eight, this was at 18 percent, a decline of 5 percentage points from 2019. For the same year, the national proficiency level was 32 percent for grade four and 29 percent for grade eight, demonstrating New Mexico students continue to lag behind national scores by 11 percentage points.

The most recent data available to LESC staff show similar findings on state assessments. Assessment data from the statewide New Mexico Measures of Student Success and Achievement (NM-MSSA), first administered in school year 2021–2022, found just over a third (34 percent) of students achieved proficiency in English language arts (ELA) assessments across grades three through eight. These results also confirm the ongoing existence of achievement gaps for students who are economically disadvantaged, English language learners, or students with disabilities. Results from the NM-MSSA for the 2021–2022 school year show a 22 percent proficiency rate in ELA for economically disadvantaged students, a 13 percent proficiency rate in ELA for English learners, and a 9 percent proficiency rate in ELA for students with disabilities. However, PED has recently stated that preliminary statewide data shows a rise in English language arts proficiency by 4 percentage points (38 percent).



The WIDA ACCESS exam is used by the state to assess English learners' academic language proficiency in English. The test is annually given to students with six corresponding proficiency levels. Students must achieve an overall composite score greater than 4.7 out of 6 to exit EL status. From 2017 through 2022, each year, an average of 96 percent of the students scored at level 4 or below on the proficiency scale, indicating the majority of students are not reaching proficiency in the English language.



Structured Literacy and the Science of Reading

In 2019, New Mexico passed a state law requiring key changes in how the state approaches literacy instruction including expanding professional development, mandating a dyslexia screener for all first grade students, and ensuring the development of literacy plans at the school district and charter school level. In addition, beginning in the summer of 2020, the Public Education Department (PED) unveiled a new [statewide literacy framework](#) focused on helping students gain foundational reading skills. Importantly, this literacy framework and new state law were grounded in a structured literacy instructional model, also associated with the broader collective known as the science of reading. The legislature has heavily invested in this literacy initiative, funding a total of \$69.2 million from FY20 through FY24.

Structured literacy is a term used to describe an instructional model of evidence-based approaches in which educators teach students to read and write proficiently by carefully structuring important literacy skills and concepts using a defined sequence of instruction. The term emerged through the [International Dyslexia Association](#) in the 1990s as a structure for both how and what educators should teach to support struggling readers.

The science of reading is used to describe amassed knowledge concerning how students learn to read. Often, the science of reading is represented through a common graphic

known as *Scarborough's Reading Rope* (2001) which breaks reading down into the following components that are woven together:

- Language Comprehension including:
 - Background knowledge (content knowledge)
 - Vocabulary
 - Language Structure (syntax, semantics)
 - Verbal Reasoning (inference, metaphor)
 - Literacy Knowledge (genres, theme, print concepts)
- Word Recognition including:
 - Phonological Awareness (syllables, phonemes)
 - Decoding (spelling-sound correspondence or phonics, alphabetic knowledge, morphological awareness)
 - Sight recognition (familiar words)

In addition to this graphic, the science of reading is often reflected back for educators as five overarching components established in 1997 via the [National Reading Panel](#):

1. Phonemic awareness
2. Phonics
3. Oral Reading Fluency
4. Vocabulary
5. Reading Comprehension

It is generally understood that while the skills were listed in that order, the panel did not specify a definitive sequence or order for the purposes of instruction.

In 2006, the *National Literacy Panel for Language-Minority Children and Youth*, convened of 14 researchers with expertise across a variety of methods in literacy and bilingual education, produced a [report](#) that helped guide a more prismatic view of supporting English learners beyond the five components above, given that initial research did not consider these students. The panel was convened through the Institute of Education Sciences with funds from the United States Department of Education's Office of English Language Acquisition and the National Institute of Child Health and Human Development. The national panel identified five research topics to investigate: 1) development of literacy; 2) cross-linguistic relationships; 3) sociocultural contexts and literacy development; 4) instruction and professional development; and 5) student assessment.

Among their findings, were 1) the need for instruction to include a requisite focus on oral language; 2) that development of the student's primary language supports literacy in a second language; 3) home language experiences have a positive effect on *all* literacy achievement; and 4) proper assessments are needed to determine an English learner's areas for improvement or strengths and should be leveraged to design instruction.

Emergent Bilinguals/English Learners and Bilingual Programming

Emergent Bilinguals/English Learners. In the public school system in the United States, any student who enters the system with a home language other than English, or whose English is not proficient enough to access the English-taught curriculum, is considered an **English learner** (EL), also known as English language learner (ELL). A full definition can be found in the reauthorized version of the [Every Student Succeeds Act](#), Section 8101 [20]. Many researchers and practitioners have transitioned to use **emergent bilingual** as a term in

place of EL, replacing a deficit notion that the student is simply learning English and acknowledging the asset a primary language brings for the student. For the purposes of this report, these terms are synonymous.

Under Title VI of the Civil Rights Act of 1964 and subsequent education law, schools and school districts across the United States must screen, identify, and provide services to English learners. In New Mexico, the process for identifying these students includes a home language survey and the use of WIDA as a screener. The newly updated [New Mexico Language Usage Survey Guidance Handbook: Tools for Identifying Potential English Learners](#) provides comprehensive guidance on processes to identify and support English learners in the state’s public education system including graphics and a checklist that can be used at school sites.

According to the [National Center for Education Statistics](#), the total percentage of public school students identified as English learners in the nation has risen to 10.3 percent. New Mexico is among the three states with the highest percentage of English learners at 16 percent. PED offers a road map and technical guidance document to assist districts and schools through identification and service.



Source: Public Education Department

Students who are identified as emergent bilinguals must receive instruction not only in English language arts, but English language development (ELD). PED proposes effective ELD services by offering a [TESOL endorsement](#) for educators. However, not all emergent bilingual students are taught with educators who are endorsed. Legislative appropriations last year included \$5 million allocated for the Bilingual Multicultural Education Act in an effort to support educator endorsements and update the Spanish language proficiency exam for educators. Current reporting from PED shows all funds will be expended, but it is still unclear whether legislative intent was met, with half of the dollars supporting grants to districts and charter schools and the other half for contract services, one of which will support updating the proficiency exam for educators.

Bilingual Programming: Bilingual education is characterized as instruction that includes the development of both bilingual and biliterate students across prekindergarten through grade 12. Bilingual students are categorized into more distinct sets, such as the context surround the emergence of ability (simultaneous or sequential and circumstantial or elective). Biliterate students are distinguished by their ability to not just speak, but fluently read and write in two languages. For a comprehensive note on terminology, the National Committee for Effective Literacy (NCEL) provides an overview in a [white paper](#) published December 2022. It is important to recognize that not all English learners are in bilingual programs, and not all students in bilingual programs are English learners.

[Bilingual programs in New Mexico](#) are categorized by instructional time, ranging from one to three hours a day, as well as the specific model of instruction, including dual language immersion, heritage, transitional, and enrichment models. PED reviews applications to ensure programs meet statutory requirements outlined in Section 22-23-6 NMSA 1978, and programs are funded through the state equalization guarantee (SEG), the state’s public education funding formula. A recent [program evaluation](#) by Legislative Finance Committee staff found state funding has increased despite participation declining or remaining stagnant for the same number of school districts and charters participating, albeit general state funding has also increased, largely in response to the findings of the *Martinez-Yazzie* consolidated lawsuit. The LFC program evaluation included the following recommendations: 1) providing stronger technical assistance to districts and charter schools; 2) suggesting PED work with the Higher Education Department (HED) and institutions of higher education (IHEs) to include coursework as part of teacher preparation; and 3) increasing funding and supports for bilingual endorsements and updating the current proficiency exam (La Prueba), as well as continuing to evaluate program outcomes.

Dual language immersion has been documented over many years as the gold standard in bilingual programming. This is demonstrated via empirical, longitudinal studies of students enrolled in dual language programs that highlight [achievement scores](#) and cognitive advantages. However, other studies also document the critical nature of not losing home language to ensure cultural and familial bonds. In addition, [biliterate employees are also reported](#) to earn more than their monolingual peers. Finally, strengthening and maintaining primary literacy develops a multi-textured way of viewing, interacting, and moving within the world. [Dual language programs themselves vary](#), as part of the day is taught in English and the other part is taught in the primary, home language. Some international models include classroom composition that splits student enrollment evenly to represent equal distribution of the primary language, known as L1 (language one), and the secondary language, known as L2 (language two). Ratios that split the instruction vary from a 90:10 model, where 90 percent of the time students are taught in L1, and 10 percent of the time, students are taught in L2—in this case, English—to a 50:50 split in time. Other aspects of dual language programs include strong emphasis on language bridging and in some cases allowing fluid translanguaging. Translanguaging is the ability to move between languages and, within bilingual education, includes a pedagogical approach to teaching in which educators support students in leveraging their full linguistic repertoire. Students are able to think in both languages simultaneously and use their home language as a vehicle to learn academic English.

Legal Imperatives

National Requirements

Beyond the requirement for every state to identify and serve English learners adequately per the federal [Department of Education's Office of Civil Rights](#), ESSA also requires each state and school district or charter school that receives federal dollars notify parents of educator qualifications, academic achievement and growth, when assessments occur, the identification of EL status including how exit status is achieved, method of instruction given, and how the program is meeting the needs of these students. Two types of funding support English learners from the federal government: Title I funds and Title III funds. Title I funds are intended to help all students who are at risk of falling behind and are calculated using the most recent estimates of poverty through the Census Bureau. [Title III](#) funds are designed to support emergent bilinguals attain English proficiency and meet the same rigorous academic standards as all other students. Funding can be used to directly support activities and strategies that support effective instruction or professional learning for educators and administrators who support ELs. In New Mexico, Title III funding is subgranted to districts and schools using an average membership count of the previous school year's 80- and 120- day EL count. Federal requirements through ESSA also include annual tests of English language proficiency, mentioned above. Finally, the state includes an EL progress monitoring component as part of the NM Vistas accountability framework required through ESSA.

State of New Mexico

New Mexico state law also reflects three ways biliteracy has been prioritized by the Legislature. First, the Bilingual Multicultural Education Act (Chapter 22, Article 23 NMSA 1978), and the Indian Education Act (Chapter 22, Article 23A NMSA 1978) comprise two vital education acts that establish councils and prioritize biliteracy in English and a second language, including Spanish, maintenance of Native American languages, where a written form exists and there is tribal approval, or another language. Second, the legislature established a state seal for bilingual and biliterate graduates on a New Mexico diploma of excellence that reflects mastery of the language and includes consultation with stakeholders that represent language experts (see Section 22-1-9.1 NMSA 1978). Third, the legislature established the Native American language and culture certificate as a mechanism for reciprocal licensure for educators of native languages via a memorandum of agreement with a tribe, pueblo or nation and PED. In 2022, the legislature ensured these educators receive a minimum annual salary as a level one licensed teacher (see Section 22-10A-13 NMSA 1978).

Poignantly, the history of the New Mexico Constitution also reflects prioritized bilingual education, not just in requiring that all law be published in English and Spanish for twenty years after ratification, but in Article XII, Sections 8 and 10, by ensuring “the legislature shall provide for the training of educators in normal schools or otherwise so that they may become proficient in English and Spanish languages to qualify them to teach Spanish-speaking pupils in the public schools and educational institutions of the state,” and “children of Spanish descent in the state of New Mexico shall never be denied the right and privilege of admission and attendance in the public schools...and they shall never be classed in separate schools, but shall forever enjoy perfect equality with other children in all public schools...”

The *Martinez-Yazzie* Consolidated Lawsuit

Several [findings](#) of fact and conclusions from the *Martinez-Yazzie* consolidated lawsuit relate to biliteracy and quality reading instruction. First, the court found the state was not adequately funding or ensuring adequate services and programs in relation to supporting English learners. Second, the court found the state was similarly not funding or providing adequate services in support of research-based reading programs. The court noted “literacy programs and practices that are based on valid research are essential to ensure low-income students learn how to read at grade level.” Third, the court noted the state was failing to provide adequate funding for extended learning opportunities for at-risk students to close achievement gaps.

The court also noted the New Mexico Legislature had existing statutory provisions that in fact defined a sufficient educational system including both statements and educational goals in Section 22-1-1.2 NMSA 1978. Notably, these provisions support strong biliteracy instruction:

- A. *The Legislature* finds that no education system can be sufficient for the education of all children unless it is founded on the sound principle that every child can learn and succeed and that the system must meet the needs of all children by recognizing that student success for every child is the fundamental goal.
- B. *The Legislature* finds further that the key to student success in New Mexico is to have a **multicultural** education system that:
 1. Attracts and retains quality and diverse teachers to teach New Mexico's **multicultural student population**;
 2. Holds teachers, students, schools, school districts, and the state accountable;
 3. **Integrates the cultural strengths of its diverse student population into the curriculum with high expectations for all students**;
 4. Recognizes that **cultural diversity** in the state presents special challenges for policymakers, administrators, teachers, and students; and
 5. Provides students with a **rigorous and relevant high school curriculum** that **prepares them to succeed in college and the workplace**.

Opportunities for Progress

Overlap exists between the collective research that encompasses the science of reading and that of bilingual education. Dr. Patrick Proctor, a professor of bilingual education, language, and literacy at Boston College, explains three locations to build from at the nexus between the science of reading and bilingual education: decoding, metalinguistic strategies, and student talk.

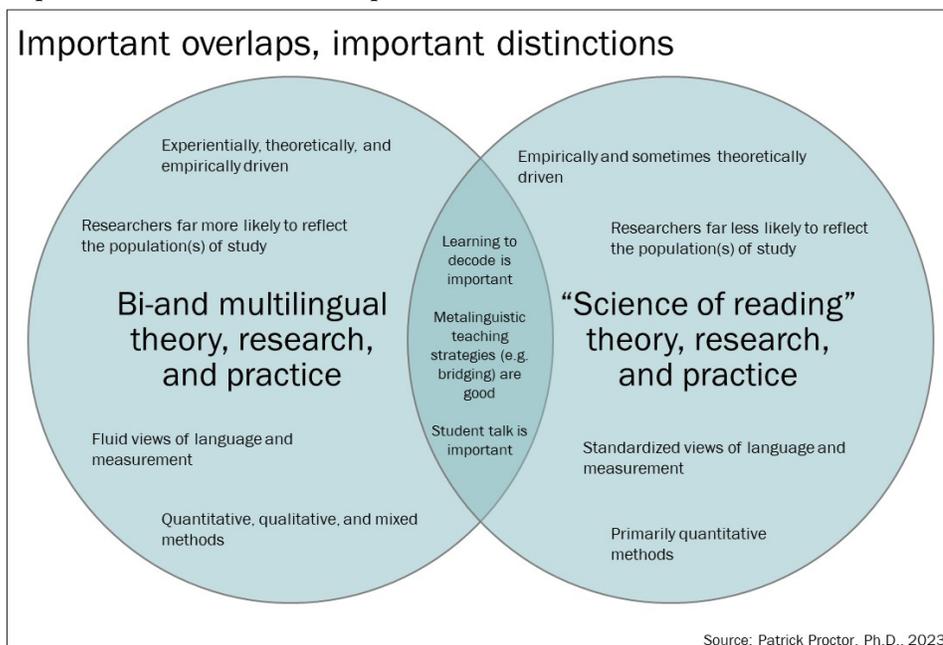
Decoding. First, all researchers generally agree **decoding** is vital to learning to read. However, some instructional models and curriculum struggle to capture the breadth of decoding represented. As noted above in Scarborough’s rope, decoding includes three components: spelling-sound correspondence (phonics), alphabetic knowledge, and morphological awareness. A structured literacy instructional model typically recognizes phonics solely as spelling-, letter- sound- correspondence, as noted in the PED Literacy Framework. In this case, phonics is different from syllable instruction and morphology.

To further complicate, a lack of clarity exists within the constructs of decoding and phonics or their definitions therein. While some researchers and instructional models recognize phonics as simply being sound-symbol association, according to Dr. Elsa Cardenas-Hagan, in *Literacy Foundations for English Learners*, phonics instruction should be understood more complexly, similar to the totality of decoding. She lists it as letter-

recognition (alphabetic knowledge), grapho-phonemic knowledge (letter-sound correspondences), identifying stable patterns in words, and morphological awareness, or the ability to understand smaller units in words like “un-break-able.” Both Dr. Proctor and Dr. Cardenas-Hagan note the critical nature of L1 phonemic awareness for decoding skills. Students can use L1 skills to learn to read more successfully in their second language. Broader and clearer conceptions of decoding and phonics can support the clarity needed around the various representations of components in the science of reading, and their interplay within bilingual education settings, supporting better research and driving better instructional models.

In Spanish, decoding is generally easier as words are more likely to be driven by syllabication rather than a phoneme. Further, Spanish consists of 23 phonemes or sounds, while English consists of 44. Dr. Proctor suggests deeper research with practitioners including mapping a crosslingual scope and sequence that can guide phonics instruction for bilingual programs, particularly given time on task is essential for educators and students. For instance, educators need only teach the letter Dd once within a dual language program in Spanish and English. Instead, current instructional models, curriculum, and research tend to mirror an antiquated understanding of students having one brain with two monolingual parts.

Metalinguistic Strategies. Another location for better understanding can be found in general agreement that **metalinguistic strategies** are critical for student achievement. These strategies include asking students to think about their languages or language skillset and play with language. From phonemic awareness skills that include rhyming words and manipulating sounds, to asking students about their own linguistic repertoire, the ability to understand language and monitor your own understanding is a well-documented contributor to academic achievement. Research in bilingual education demonstrates a burgeoning push to include not just controlled bridging practices between languages in the classroom, but more fluid translanguaging that is then leveraged as a metalinguistic skill. Dr. Ester de Jong, professor at the University of Colorado, notes metalinguistic awareness highly impacts learning in and through two languages. A lack of emphasis or understanding of this in the general science of reading space signals a place for partnership, shared research, and improvement.



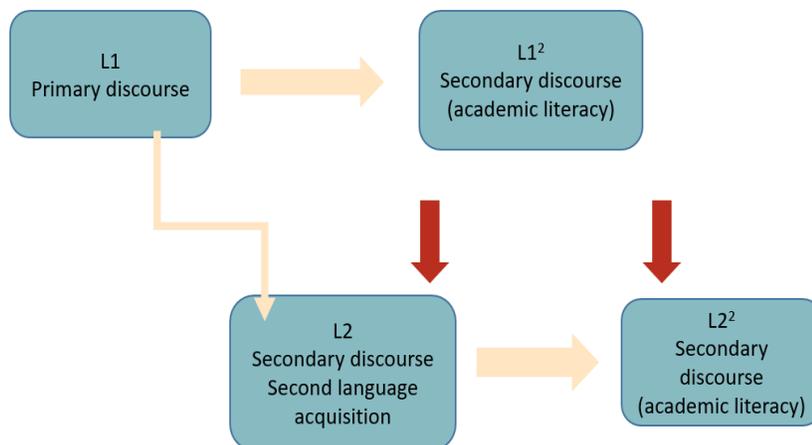
Student Talk Finally, all researchers and most practitioners recognize **student talk** is vital and highly predictive of reading outcomes. Curriculum should emphasize meaningful student talk, and educator professional learning should include developing talk and sentence structures, which is particularly critical for emergent bilinguals as sheltered English protocols, not just in reading, but all content areas. Similarly, educators need to ensure classroom culture supports safe and meaningful discussion. Student talk promotes bilingual transfer.

[A current study](#) conducted by Rachel Garratt, Ryan Williams, and Joshua Polanin from the American Institutes for Research (AIR) aimed to examine variation in outcomes for programs designed to serve English learners. The study leveraged 83 rigorous, large-scale studies and examined trends across them through a meta-analysis. The study coded for the five reading components, type of instructional model used, practices embedded in the instruction, and type of assessment used to measure impact. These researchers' preliminary findings are insightful for policymakers.

With regard to reading components, the smallest effect size is found within the phonics component while the largest effect size is found in explicit vocabulary and fluency practice. In terms of type, programs that emphasized primary language development were by far more impactful with the highest effect size, echoing what was found by the *National Literacy Panel for Language-Minority Children and Youth*. Differentiated classroom practices were also impactful, as well as student responsiveness to explicit writing instruction and translation activities. These findings support intersections among the science of reading and biliteracy instruction by underscoring the need to support L1, provide explicit and direct instruction in both languages, and hint at why metalinguistic transfer and word knowledge is vital. Importantly, students beyond grade four or five who continue to retain EL status and are still not proficient in English can benefit from these findings, as writing instruction is often the most difficult hurdle in demonstrating proficiency in either language.

Issues to Address

Literacy and biliteracy can be understood as multifaceted, including developing skills that allow for adept speaking, listening, reading, and writing, as well as the ability to make sense of the world and form identity through established discourses. It is helpful to diagram how individuals move from their primary language to both acquire new language and develop academic discourse through schooling. James Paul Gee (2001) wrote that after the ability



to speak a primary language, the ability to master a secondary discourse includes becoming literate in the primary language. In this way, secondary discourse, or literacy, is both second language acquisition and developing academic skills that include reading and writing language. This can be helpful to think through visually in the diagram to the left. Instructional models in structured literacy that

leverage the science of reading have strengthened the bridge between L1 primary discourse and L1² secondary discourse, which is essentially strong literacy.

Similarly, dual language programs have a vast body of research from which to glean second language acquisition. Research has repeatedly shown students benefit from bilingual instruction, though outcomes take longer than their monolingual peers. Given the above diagram, this makes sense. The relationships among L1², L2, and L2² are complex and point to a gap in understanding that some researchers indicate. Dr. Ester de Jong pointed to the need to reconsider tiered, sequential teaching, promoted through structured literacy and the science of reading, and asked for a horizontal approach of Scarborough's rope that emphasizes metalinguistic transfer. The complexity of how students acquire varying secondary discourses simultaneously, cyclically, or in sequence points to this. Again, more research and improved partnership can better support and drive instructional models that provide evidence-based strategies to promote effective and high quality biliteracy programming.

The most [rigorous and comprehensive study on Language Essentials for Teachers of Reading and Spelling \(LETRS\)](#) training comes from the Institute of Education Sciences and What Works Clearinghouse. While Mississippi has seen impressive statewide improvement in reading outcomes using these professional learning modules, and New Mexico has adopted them, a review of the data including 270 teachers and more than 5,000 second graders from 90 elementary schools in four states during the 2005–2006 school year found teachers with improved knowledge of reading instruction, but no impact on reading outcomes. In this way, aligned curriculum and assessment coupled with the space for educators to develop a scope and sequence that leverages biliteracy programming is also requisite. Furthermore, professional learning that includes effective strategies and instructional models for biliteracy are critical given English learners are found across most school districts and schools in New Mexico. If a strong L1 leads to a strong L2, and the goal of education in the state is to best support all students (including English learners), then a biliteracy model is essential.

A Note on Native American Students and Native Language

While much of the research is being done to explore metalinguistic transfer and cross linguistic patterns in Spanish, it is necessary to recognize that several bilingual programs in New Mexico public schools support Native language development including Tewa, Towa, Tiwa, Dine, and Keres. Expanding and providing the space for these students to become bilingual and biliterate is as much an inherent right as their ability to read in English, especially given the legacy of public schooling and its role in decimating language and culture. Native and Indigenous faculty and community elders are vital for their expertise to strengthen bilingual programming that values Native students and their families across the state.

Considerations for the Science of Reading Implementation Given Biliteracy

The screener selected by PED should be valid and reliable for the population across New Mexico, ensuring it was developed using EL students and is thusly sensitive to them. Potential *overdiagnosis* for dyslexia or other cognitive reading struggles is a legitimate concern if screeners misidentify emerging bilingualism and varying language acquisition levels as reading difficulty. Monitoring for possible over-identification is an important part of continuous improvement. Furthermore, improved and sustained training that ties

a multi-layered system of support instructional framework with educators' ability to differentiate instruction leads to actual outcomes for these students.

Policy Considerations

If literacy is a civil right, so is biliteracy, particularly given the science of how students learn to acquire all language and discourse and the legal imperatives described above. Biliteracy is also about expanded opportunity and should be recognized as a lever for improved economic stability for the state. Moreover, biliteracy honors the cultural and linguistic wealth found across New Mexico, and can be a powerful lever through which educational transformation can occur using an asset-based frame.

Policymakers may benefit from a more nuanced understanding of the intersections and opportunities for research among the science of reading and bilingual education to achieve biliteracy and should consider the following:

- Continue to fund and support professional learning for the science of reading and expand to include widespread, parallel professional development in biliteracy and sheltered English strategies.
- Track, and potentially fund to scale, professional learning that is being developed by the AIR following its study that focuses on writing for emergent bilinguals.
- Ensure opportunities for progress mentioned above are embedded in future programming, including focus on metalinguistic transfer, student talk, and an expansive catalogue for decoding instruction for emergent bilinguals.
- Recognize professional development is not a silver bullet and fund high quality instructional materials, proper assessments, screeners, and curriculum development for both English and other languages.
- Fund family engagement activities and outreach that support multi-generational literacy and biliteracy development towards cultivating a culture of literacy.
- Continue to support and require research and evaluation for the intersection of biliteracy and the science of reading, including a focus on middle and high school students and the impact of particular instructional models.
- Seek varied and intersectional experts to support a literacy institute that broadens a research agenda to support strong biliteracy education.
- Support and ask for connections among the Early Childhood Education and Care Department (ECECD) programming and that used in K-12 by PED to support a bilingual/biliterate brain.
- Support and ask for collaboration among the state's educator prep programs to embed biliteracy and the science of reading as fundamental aspects of programs of study.