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Montessori and the science of reading

How does Montessori align with what we know?

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Recent legislation in several states requires many school districts to select and implement English language arts (ELA) curriculum that meets the ESSA "Tier I" standards—"strong evidence supported by one or more well-designed and well-implemented randomized control experimental studies." ("Montessori as a reading intervention", *MontessoriPublic*, November 2021)

Although substantial and growing evidence supports Montessori's effectiveness, at this time no Tier 1 evidence to support the Montessori reading curriculum exists. Without this level of rigorous study of Montessori classrooms, some publicly funded Montessori schools in states with science of reading legislative mandates now face having to implement supplementary ELA curriculum.

To inform future Montessori research initiatives, and to help Montessori teacher educators, administrators, and teachers themselves better understand contemporary reading research, we have written *Powerful Literacy in the Montessori Classroom: Aligning Reading Research and Practice* (Teachers College Press, available December 2022).

Educators recognize that teaching reading successfully requires deep knowledge of the reading process and development, as well as the implementation of impactful reading instruction and differentiation to ensure all students' reading success.

Our research has aligned the Montessori didactic materials and pedagogy, developed over a century ago, with current research on reading development, showing that the "science of reading" and the Montessori language curriculum both follow a logical, systematic, and explicit progression of teaching and learning.

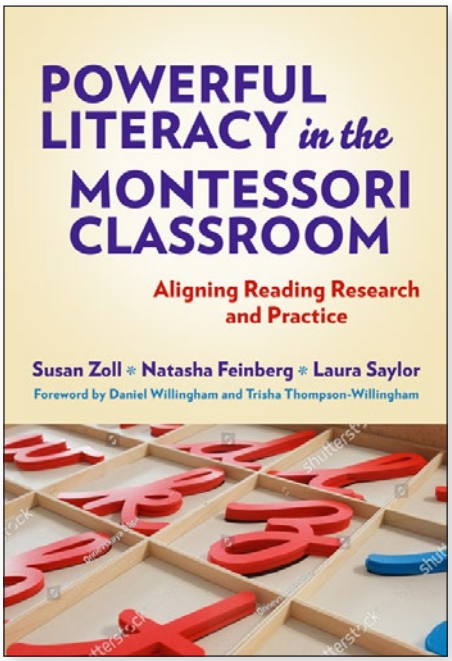
The phrase "science of reading" is now found in multiple settings including the media, policy, and curricula – and its interpretation varies. Essentially, the Science of Reading has conclusively shown that there is a well-understood path towards learning to read fluently, grounded in phonemic awareness and decoding, but recognizing the crucial importance of comprehension gained through knowledge about the world and about language.

To illustrate the skills needed to be a proficient reader, Yale University researcher Hollis Scarborough (2001) developed the Reading Rope based on her meta-analysis of reading research. The image consists of two braided cords labeled Language Comprehension and Word Recognition. These cords then consist of multiple literacy components referred to as "strands." Reading instruction must strengthen all strands of the Reading Rope to foster skilled reading.

We'll look at each of these strands and provide a brief synopsis using the lens of reading research and the Montessori Language curriculum.

Word recognition

Phonological awareness: Phono-logical awareness, "the appreciation of speech sounds without regard for their meaning" (NRC, 1998, p. 248), is foundational for building students' word recognition skills. Research points to sound as a scaffold or "bootstrap" for cognitive development.



With this in mind, pre-reading students greatly benefit from activities that develop their phonological sensitivity. By helping students to recognize and differentiate the sounds they hear we are scaffolding their later ability to read. Phonological awareness is so important that when students enter kindergarten without these skills, they often struggle with reading difficulties.

The Montessori Primary (ages three to six) activity known as The Sound Game or I Spy requires no special materials, yet can be implemented every day as part of a morning circle or small group to attune children's listening skills to the sounds of words. A simple phrase readies children to listen for sound clues, "I spy with my little eye something in the room that begins with the sound /m/." The children then look around the room and excitedly

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call out objects they observe that begin with the letter sound (mat, marker, mop, map).

Decoding: Decoding is the association of a particular letter ("grapheme") or group of letters with an individual speech sound ("phoneme")—in Montessori classrooms, using Sandpaper Letters to teach "this letter makes the sound mmmm." Recognizing one-to-one letter-sound correspondence is a pivotal moment in a child's early reading development. And it is not long before children begin to slide, or "blend", these individual letters together to read three- and four-letter phonetic words.

The Montessori Moveable Alphabet (a collection of wooden or plastic letter shapes, familiar to children from the Sandpaper Letters) allows children to focus on encoding or "making words" by listening to the individual sounds in a word and then selecting the correct letter symbols to create words on a mat or table. This activity also supports early writing through invented spelling opportunities. "Beginning writing with invented spelling can be helpful for developing understanding of phoneme identity, phoneme segmentation, and sound-spelling relationships." (NRC, 1998).

Sight word recognition: As beginning readers build decoding skills, they also develop the ability to connect and store letters and sounds with a word's spelling, its pronunciation, and its meaning through a process called "orthographic mapping." You can think of orthographic mapping as a permanent word storage that allows for the instantaneous recognition of words and word parts (such as "ing"). This expands the definition of "Sight Words" or "Puzzle Words" to any word that a reader instantly recognizes and identifies without conscious effort. A fluent reader recognizes most words in less than 1/20 of a second, including between 30,000 and 60,000 high frequency and less frequent words (Sedita, 2020).

Montessori also introduces multi-letter digraphs (what Montessori educators often refer to as "phonograms"). Digraphs combine two letters to create one new sound. Consonant digraphs, such as /sh/ and /th/ and vowel digraphs such as /ai/ and /ie/ are introduced using Phonogram Letters, Phonogram Cards, etc. As reading progresses, students use three-part nomenclature, definition and activity cards. These reading activities, while a part of the decoding strand, also lead to numerous exposures which then map words and word parts orthographically, so they can be instantaneously retrieved in future encounters

Language comprehension

Background knowledge: Knowledge of our world and facts and concepts related to the sciences, history, geography, the arts, and the humanities are essential to language comprehension. Readers bring background knowledge—their knowledge of the world—to the task of reading. As children have new experiences and learn new concepts or words, the information is initially stored as working memory, a component of executive function that supports learning. This temporary storage system then transfers the new knowledge to a child's long-term memory, cataloging their experiences with classroom instruction, media, or more direct types of lived experiences. Scarborough noted that even if a student is able to decode the words on a page, comprehension will be poor if a child lacks the background knowledge needed to understand the text.

Montessori classrooms are, of course, rich in background knowledge. Primary classrooms introduce knowledge and categories that can be directly experienced, including concepts and vocabulary for animals, plants, shapes, colors, geography, the arts, and much more.

The Elementary classroom extends this framework to anything that can be brought within the scope of the child's imagination, including human cultures, the natural world, and the structure of the universe. These studies provide students with abundant background knowledge supporting reading comprehension.

For example, the Fundamental Needs of Humans chart helps students visualize the basic needs shared by all humans: what varies is not the needs themselves, but the ways humans in various cultures meet them. This framework inspires young learners to study any culture in current contexts as well as at any time in history, providing them with relevant background knowledge that supports reading comprehension. The material also helps students develop an understanding that all people share fundamental needs, so that from a young age, they are developing a thoughtful, knowledgeable, and healthy respect for all people.

Vocabulary: As with background knowledge, a student's vocabulary—the breadth and depth of words they know—can support becoming a proficient reader. And over time, proficiency as a reader further enhances vocabulary development.

Students immersed in language rich environments (homes and schools filled with conversations, book reading, and novel experiences such as visiting the local zoo, park, or children's museum) grow in background knowledge and vocabulary (Walberg & Tsai, 1983). Unfortunately, the opposite also holds true: children with fewer language and literacy experiences have a reduced cumulative vocabulary that can influence later reading success.

In a Montessori classroom, vocabulary learning blends literacy and content in strategic integrated instruction: a classroom practice "in which literacy activities (reading and/or writing) serve

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as a tool to cultivate content knowledge (science and/or social studies) while, at the same time, content teaching serves as a lever to facilitate literacy skills (vocabulary and/or comprehension." (Hwang, Cabell & Joyner 2021)

For example, Classified Cards—collections of cards showing images in a category—help build vocabulary. These collections help children classify their world while simultaneously learning correct terminology. Categories can be drawn from objects found in one's own culture and setting—objects found in a kitchen (refrigerator, plate, sink), a living room (sofa, lamp, rug), or a classroom (clock, pencil, easel)—or curriculum areas such as zoology, botany, geography, and music, all serving to enrich students' vocabulary.

Language structures: Language structures include grammar, "a description of the rules for forming sentences, including an account of the meanings that these forms convey" (Thornbury 1999). Explicit teaching of grammar and language structures, while less common in modern conventional classrooms, thrives in Montessori environments, where children are introduced to grammar early, at a time when they are fascinated by the rules and patterns of language.

By the kindergarten year students have already been introduced to the basic parts of speech and the "jobs" they hold in our language. Concrete grammar materials symbolize those parts of speech, helping students better grasp the abstract underpinnings of their language. Grammar, word study, and sentence analysis continue in the elementary Montessori curriculum.

Verbal reasoning: Verbal reasoning —"the ability to infer or draw a conclusion from known or assumed facts" (Marcott et al., 2017)—allows students to comprehend information not explicitly stated in a text. This includes the ability to identify the details or "clues" given by the author that support a specific interpretation. Verbal reasoning is supported by other strands of Scarborough's rope such as background knowledge and vocabulary. It requires a synthesis of thought to produce a conclusion.

Montessori's emphasis on background knowledge and vocabulary development supports a student's ability to cognitively grasp the information provided by the author and "read between the lines" to fill in implied meanings. The Who Am I? cards offer practice with verbal reasoning skills. Children read a description card and match it to a picture and label, and then check their answers on a separate control card.

Literacy knowledge: Literacy knowledge is understanding that print carries meaning and that meaning is expressed through specific conventions, such as recognizing that print in English moves from left to right and top to bottom, that sentences are composed of individual words, and that written text follows specific rules such as the use of capitals and punctuation. As students mature, this understanding grows to include the accepted text structures. Non-fiction or informational texts may have headings, graphs, and various other text features that organize and clarify content, while works of fiction will generally follow a story arc.

The Montessori classroom offers authentic reading and writing experiences that build print concepts. Conversations around books being read and experiences being written provide opportunities for teachers to point out how an author (published or a child in the classroom) has organized text and adhered to certain conventions to be better understood. Even the youngest of students are a part of this learning as they create text with the moveable alphabet.

Overall, Montessorians concerned about the ascendancy of the "science of reading" will be wise to take a deep breath and look closely at Dr. Montessori's writings and lessons.

If we consider her scientific basis, her purpose of education, the context of her curriculum being developed in a highly phonetic language, and her framework for presenting lessons which include components of explicit instruction, we will see that again, Dr. Montessori has demonstrated that she was ahead of her time. For more information, please visit montessorisor.com

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