Department of Education

An overview of the literature

Effective teaching of reading

Literature review

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Important notices

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Overview

Background

The Australian Curriculum promotes excellence and equity in education for all students to achieve their full potential. The Queensland Department of Education is committed to implementing the Australian Curriculum with an approach to the teaching of reading that is inclusive, evidence-informed, and promotes equitable outcomes for every learner.

To implement effective reading instruction, teachers require strong knowledge of the constructs of oral language and the subskills involved in reading comprehension (Binks-Cantrell et al. 2012; Snow 2016). However, studies from Australia and the United States have found pre-service and in-service teachers often have limited knowledge of language and literacy, or the pedagogy that promotes reading development (Piasta et al. 2009; Stark et al. 2016). A systematic review by Meeks et al. (2017) showed that new graduate teachers in Australia and the United States are not confident to apply their knowledge to practice and do not perceive their own level of preparedness for teaching early-reading to be high. This perception is further supported by an Australian review of initial teacher education courses which found only 4% of the 116 literacy units reviewed had a specific focus on early reading instruction (Buckingham and Meeks 2019).

Gaps in knowledge have implications not only for teachers' ability to teach all children to read, but to also accurately identify difficulties in reading comprehension (Graham et al. 2020). It is critical that every student receives high-quality evidence-based reading instruction to develop the foundational skills in reading necessary to access all curriculum areas across both primary and secondary contexts. While building teacher knowledge is key, it is important to acknowledge that policy and school leadership influence teaching and learning in schools and classrooms (Levin 2013; Stockard 2020). A collaborative focus, therefore, on improving and sustaining school leadership and teacher knowledge in reading for effective instruction is essential (Goldfeld et al. 2021; Levin 2013; Stockard 2020).

Introduction

Being able to read and write is profoundly transformative, both for individuals and for population-level health and wellbeing more widely (Snow 2020). Reading is central to academic success, wellbeing, and employment outcomes (McGeown et al. 2015). Though cognitive science research indicates that 95% of children can learn to read when taught using explicit, evidence-informed practices, low literacy continues to be a critical and persistent challenge around the world (Hempenstall 2013). In Queensland, approximately 40% of 15-year-olds are estimated to read below National Proficient Standard (Organisation for Economic Cooperation and Development 2019). This is particularly concerning given that a basic level of reading competency is no longer sufficient for the demands of the workplace (Leone et al. 2005). It is, therefore, no surprise that the acquisition of reading is one of the most researched aspects of human developmental psychology (Amendum et al. 2018; Clarke et al. 2010; Snow 2020; Snowling and Hulme 2011).

This narrative literature review focuses on the teaching of reading. It aims to provide current and future classroom teachers, allied health professionals, and system and school leaders with the evidence base for the effective teaching of reading, particularly in the first three years of schooling.

In this review, reading and effective reading instruction are positioned within a rights-based approach and among the principles of inclusion. This paper summarises the findings from national and international research regarding reading acquisition and examines the research evidence that supports effective reading instruction so that all, not only most children, successfully transition to literacy (Snow 2016). A theoretical framework for understanding reading development and the skills that underpin reading comprehension is outlined. The importance of a collaborative and multi-disciplinary approach to promoting and accelerating reading competency for all students is highlighted.

Reading foundations

Unlike spoken language, written language is not a natural part of human development. The transition from a biologically natural code (talking and listening) to one that is biologically unnatural (reading and writing) builds on the language competencies a child brings to school, augmented with evidence-based, explicit instruction in the classroom (Snow 2020). A great deal of research has demonstrated strong links between early oral language skills and subsequent literacy achievements (Catts et al. 2001, 2002; Dickinson and Porche 2011; Murphy et al. 2016; National Early Literacy Panel [NELP] 2008; Pelatti et al. 2014; Powell 2018). Therefore, promoting children's spoken language, particularly in the early years, provides a natural bridge to support the development of reading and writing skills (Snow 2020).

The home literacy environment (Aaron et al. 2008) is positively associated with elevated early-literacy skills in the preschool years (Farver et al. 2013) and enhanced reading skills in the primary years (Sénéchal and LeFevre 2002). Features of the home environment, such as household stability and routines (Newbury et al. 2020), as well as literacy-related activities including interactive shared book reading; exposure to environmental print; access to writing utensils; and the sociocultural practice of oral storytelling (Buckingham et al. 2014; Puglisi et al. 2017) can influence the development of the foundational skills that underpin reading.

Oral language

Over 30 years of research has firmly established that oral language skills are the foundation for reading and writing development (Adlof and Hogan 2019; Hogan et al. 2012). Children who are surrounded by, and included in, rich and increasingly complex conversations have an overwhelming advantage in vocabulary development, understanding the structures of language, and tuning into the sounds of their language. As children engage in these early interactions, they are immersed in various aspects of language that will ultimately support their reading development (Catts et al. 2002; Dickinson and Tabor 2001; Snow et al. 1995; Wise et al. 2007).

Parental socio-economic status (SES) significantly impacts the quantity and quality of language to which children are exposed in the years prior to school (Hart and Risley 1995; Hoff 2006; Snow 2020). Parents with a lower SES often have a lower lexical diversity in comparison to the language of parents with a higher SES (Burchinal et al. 2008; Huttenlocher et al. 2010). For this reason, Roy and Chiat (2013) note that early years classrooms need to accelerate, not merely progress, the language skills of children.

Over 19 per cent of Queensland children start school with scores of 'developmentally at risk' or 'vulnerable' in the language and cognitive domain and 25 per cent are at risk or vulnerable in relation to their communication skills and general knowledge at school entry.

Australian Early Development Census National Report 2021

While limited oral language skills are considered a risk factor for children, strong oral language skills may act as a protective factor for reading proficiency (Colenbrander et al. 2018). Studies have shown that children with age-appropriate oral language skills are less likely to develop reading difficulties despite being in families whose circumstances might increase the risk of reading failure (Snowling 2008; Snowling et al. 2003). Oral language may be used as a relative strength to help compensate for other weaknesses underlying reading (Snowling 2008; Snowling et al. 2003).

Emergent literacy

Children's literacy learning starts at birth, long before they commence formal reading instruction at school. During this period, referred to as the emergent literacy stage (Justice 2006), a wide array of skills is acquired before conventional literacy is learned.

In 2008, the National Early Literacy Panel (NELP) found the skills of phonological awareness, print knowledge, vocabulary knowledge, and narrative knowledge to be among the most important in preparing young children for later success in reading. Developmentally, these skills progress simultaneously and typically within social environments (Saracho 2017). Just as being exposed to language-rich environments is important for the development of oral language abilities, literacy-rich environments provide children with opportunities to learn about, interact with, and experiment with print. The development of emergent literacy skills may be influenced by the home environment and by access to high quality early childhood education (Australian Early Development Census National Report 2021; Buckingham et al. 2014).

Emergent literacy skills of phonological awareness, print knowledge, print concepts, narrative awareness, vocabulary, and oral language play an integral role in preparing young children for later success in reading.

Justice and Kaderavek 2004; Justice and Pullen 2003; NELP 2008; Whitehurst and Lonigan 1998

One of the first concepts that children learn about literacy is the symbolic nature of print. **Print knowledge** is universally essential to early reading, irrespective of the language in which reading instruction occurs (Bialystok and Luk 2007). It refers to the way print is organised in various texts and the functions it serves (print concept knowledge), the names and distinctive features of individual alphabet letters (alphabet knowledge), and the expression of meaning through writing (emergent writing; Justice and Ezell 2002). Print knowledge is not influenced by the frequency, but by the quality of interactions during writing, reading, and playing (Bus et al. 1995; Roberts et al. 2008; Scarborough and Dobrich 1994; Sénéchal et al. 1998). Research shows children's early knowledge about print develops largely the same way across different writing systems and different cultures, and points to an important commonality in how typically developing children learn to read (Bialystok and Luk 2007).

Print knowledge skills generally emerge before formal schooling and are consistently related to children's later achievements in word recognition and spelling.

Lonigan and Shanahan 2009; Pratt et al. 2015; Storch and Whitehurst 2002

Phonological awareness involves the identification and manipulation of parts of spoken language, including words, syllables, onsets and rimes, and the individual speech sounds in words (Lonigan and Shanahan 2009). This skill begins to develop during the preschool years (Carroll et al. 2003) and follows a consistent developmental pattern with the ability to manipulate large units of sound developing prior to the ability to manipulate smaller units of sound (Anthony and Francis 2005; Carroll et al. 2003). Research has indicated that phonological awareness emerges as part of typical language

development, and in optimal circumstances, children's exposure to rhyme and song in the preschool years lay the foundation for phonemic awareness (Carroll et al. 2003; Ehri et al. 2001; Justice and Pullen 2003). Phonemic awareness is widely considered a critical precursor to early reading success; however, awareness of phonemes needs to be explicitly taught to children as they may not develop that skill on their own (Goswami 2001; Kilpatrick 2015).

Children's acquisition of a rich **vocabulary** is not based on age but on experiences (Beck et al. 2013). The number and variety of words that children hear is strongly correlated with later literacy achievement (Fernald et al. 2006; Hurtado et al. 2007, 2008). Pre-school children with strong receptive vocabularies tend to have better language comprehension, word recognition, and reading comprehension in the later primary years (Scarborough 2001). Given the vocabulary gap for students from differing backgrounds, a systematic and explicit approach to vocabulary expansion from a young age is crucial (Beck and McKeown 2007; Harris et al. 2011; Jalongo and Sobolak 2011; Neuman and Dwyer 2009; Torr and Scott 2006).

Vocabulary is a critical factor in school success; impacting on early reading and writing and in later years, and on composing and comprehending complex texts.

Biemiller and Boote 2006; Dymock and Nicholson 2010; Rupley and Nichols 2005

Across different cultures and languages, **narratives** are frequently used as a means to share real or imagined events (Schick and Melzi 2010). Being able to understand and tell narratives provides a bridge between oral and written language (National Institute of Child Health and Human Development 2005; Roth et al. 2002) and are an important component of emergent literacy (Gardner-Neblett and Iruka 2015), anchored in children's exposure to stories and early interactions with print (Sénéchal and LeFevre 2001, 2002). Research suggests that there are positive associations between spoken narrative skill and other emergent literacy skills including writing skills, letter knowledge, phonological awareness and print knowledge (Hipfner-Boucher et al. 2014; Snow et al. 1995; Tabors et al. 2001), as well as early word reading skills (Griffin et al. 2004; NELP 2008).

Shared reading

Research suggests shared book reading is an ideal context for teaching emergent literacy skills to preschool children (Boudreau 2008; Justice and Kaderavek 2002; Schuele and Boudreau 2008; van Kleeck 2008). Shared book reading describes the interaction that occurs between an adult and a child when reading or looking at a book. During interactive shared book reading, the adult and the child are active participants in constructing

dialogue or conversation about the book (Terrell and Watson 2018). Shared reading provides highly contextualised exposure to novel words in an interaction that is authentic, familiar and often motivating to young children (Roth et al. 2002). It is a language-based activity that is a unique learning context as it presents both oral and written language simultaneously.

Shared reading promotes code-related skills, such as print concepts, alphabet knowledge and phonological awareness and meaning-related skills, such as receptive and expressive vocabulary, narratives and inferences.

Arnold et al. 1994; Dale et al. 1996; Justice et al. 2005; Peterson et al. 1999; van Kleeck et al. 2006; Wasik et al. 2006; Whitehurst et al. 1994

A meta-analysis of shared reading with children aged one to five years noted that parent-child book reading improves receptive vocabulary, expressive vocabulary, and emergent literacy skills (Law et al. 2018). Brown et al. (2022) further found that infants whose parents read with them for eleven minutes or more per day had stronger reading, spelling, and grammar skills in Years 3 and 5. Accordingly, increased shared reading has been shown to be associated with enhanced kindergarten readiness and foundational reading skills (Justice et al. 2016; Sawyer et al. 2014).

Reciprocity of language and literacy

Across the lifespan, language and literacy have a cyclical and reciprocal relationship, with gains in one domain being of direct benefit to the other (Nippold 2007). There are fundamental and intrinsic links between early oral language proficiency and the transition to written language and subsequent

academic achievement (Nation and Snowling 2004; Snow 2016). In turn, access to written print facilitates ongoing growth in oral language competency through exposure to higher-order vocabulary, idiomatic language and more complex syntactic structures (Adlof 2019; Beck et al. 2013).

Effective teaching and early intervention can lead to high levels of oral language and literacy achievement for all children

Buckingham et al. 2013

Research shows that exemplary effective teaching and early intervention can lead to high levels of oral language and literacy achievement for all children, including those at-risk or vulnerable for later reading challenges (Buckingham et al. 2013).

Theoretical framework

The simple view of reading

A clearly defined theoretical framework assists educators in acquiring the competencies needed to better understand the development of reading comprehension in all students. A number of theories for understanding reading comprehension have been proposed, such as the Simple View of Reading (SVR) (Gough and Tunmer 1986), four-part processing model of word recognition (Seidenberg and McClelland 1989), dual route model (Coltheart 2006), and the Cognitive Foundations Framework (Tunmer and Hoover 2019). While these models have all contributed to the growth in understanding of reading over the last three decades, the SVR provides the most substantial body of research for understanding the broad landscape of reading — that the combined abilities to understand a language (language comprehension) and quickly and accurately identify its printed words (word reading) accounts almost completely for the ability to read that language. (Language and Reading Research Consortium (LAARC) and Chiu 2018; Lervag et al. 2018; Lonigan et al. 2018; Nation 2019).

At the core of the SVR is the premise that reading comprehension — the ability to understand and gain meaning from text — is the ultimate goal of reading (Gough and Tunmer 1986). The SVR posits that reading comprehension is the product of two key components; word reading (decoding printed text) and language comprehension (understanding language accessed through text without the cognitive demands of having to decode) (Hogan et al. 2014).

Word reading includes knowledge of the alphabetic principle, concepts about print, phonemic awareness, and orthographic knowledge. Language comprehension (sometimes termed listening comprehension) includes background knowledge, inferencing, and linguistic knowledge across the phonological, syntactic, and semantic domains (Tunmer and Hoover 2019). The skills required for word reading can be described as constrained as they are a finite set of skills (Paris 2005).

Conversely, language comprehension skills are considered to be unconstrained as there is no limit to the amount of language an individual can learn in their lifetime (Paris 2005).

Both word reading and language comprehension are necessary, but neither is sufficient alone, for reading comprehension to occur (Nation 2019). The Cognitive Foundations Framework (Tunmer and Hoover 2019) is derived from the SVR and further recognises these two complementary skill sets, the acquisition of which require high levels of teacher knowledge and explicit classroom instruction. Much of the variance in reading comprehension can be accounted for by individual differences in word reading and language comprehension (Catts et al. 2005; Hjetland et al. 2019; Hoover and Gough 1990; Lervag et al. 2018). This has been shown in individuals ranging from primary school through adulthood, and includes English readers, readers of other languages such as Greek (Protopapas et al. 2013) and Chinese (Ho et al. 2012), and readers learning a second language (Hoover and Gough 1990; Verhoeven and van Leeuwe 2012).

The relative relationship of word reading and language comprehension to reading comprehension further varies across the year levels (Catts et al. 2005; LARRC 2015; Tilstra et al. 2009). In the early years of reading development, word reading explains a majority of the variance in reading comprehension, whereas in the later years, it is language comprehension that accounts for most of the variability (Catts 2018). This shift occurs around the third or fourth year of schooling for typically developing readers in English, once decoding becomes more automatic, and the language demands of reading materials increase (Catts et al. 2005; LARRC 2015). Accordingly, explicit, systematic, and evidence-based reading instruction is particularly crucial in the first three years of schooling (Buckingham et al. 2013; Snow 2016). Continued effective teaching of reading during the upper primary and secondary school years is also essential to ensure that all students continue to make progress throughout their education.

The SVR has further been shown to be valuable for classifying reading difficulties, and to promote the relationship between oral language and reading development (Catts 2018; Nation 2019).

The model suggests that if certain foundational skills, such as phonological awareness and vocabulary are weak, more sophisticated skills that ultimately lead to reading comprehension cannot be mastered (Tunmer and Hoover 2019). Children with language comprehension difficulties, for example, may not be identified until the later years as they move to more linguistically challenging texts. These students may also go unnoticed as they may mask their difficulties and compensate with other skills (Snowling et al. 2019). Furthermore, longitudinal studies have shown that measures of word reading and language comprehension can be used to predict later reading comprehension abilities (Adlof et al. 2006; Storch and Whitehurst 2002).

The SVR does not deny the complexity of reading (Catts et al. 2015; Hoover and Gough 1990; Hoover and Tunmer 2021). As Hoover and Tunmer (2018, 2020) note, the SVR represents only the

proximal capacities that underpin reading comprehension: that is, word reading and language comprehension. It does not consider the distal factors that indirectly impact reading comprehension, such as attention, motivation to learn to read, and the quality of classroom instruction (Hoover and Tunmer 2020). Despite this, the SVR, through the weight of the evidence supporting it, is a valid framework for understanding reading and its development in both beginning and skilled readers (Hoover and Tunmer 2021; LARRC and Chiu 2018; Lonigan et al. 2018). The SVR can be used to help 'support effective and differentiated reading instruction and practice for readers around the globe' (Savage 2020:44) and address the varying literacy learning needs of all students (Arrow et al. 2015).

The framework also shows how the skills that underpin word reading and language comprehension can be optimised in the classroom by evidence-informed reading instruction (Hoover and Tunmer 2021; Nation 2019; Tunmer and Hoover 2019).

Reading comprehension

Reading is multidimensional and draws on a range of cognitive and linguistic skills, with both the ability to identify individual words (word reading) and to construct meaning from text (language comprehension) required (Catts and Kamhi 2017; Nation 2019; Hoover and Tunmer 2021). As students read, they build a mental representation of the situation being described by the text, linking information from the text with relevant background knowledge. The product of reading comprehension emerges from the formation of this rich mental model that builds cumulatively as individuals read (Castles et al. 2018). This further reinforces that reading comprehension is an outcome (not a strategy) that teachers create by explicitly teaching the skills that underpin both word reading and language comprehension (Catts 2018).

In this narrative review, the components of reading comprehension are presented in an order which best matches their development. However, it is important to understand that all aspects of reading comprehension are being acquired at the same time, and that certain aspects will require greater emphasis at key points (such as fluency practice as decoding begins to develop) (Tunmer and Hoover 2019). All children can benefit from the teaching of reading that emphasises these interconnections in an explicit and systematic way (Adlof et al. 2011).

Word reading

Word reading (recognition) is the foundation of reading, and comprehension is dependent on the ability to decode (Snowling and Hulme 2011). When words are recognised accurately and instantaneously, readers can focus their cognitive resourcing on constructing the meaning of the text.

Word reading involves the representation of speech sounds with visual symbols. In English, an alphabetic language, there are approximately 44 unique speech sounds called phonemes, the smallest units forming spoken words. English phonemes are represented by the 26 letters of the alphabet, either individually or in combination. These alphabetic representations are called graphemes (Such 2021).

Children are not born with specialised centres in the brain to connect graphemes (letters) to phonemes (sounds), and as a result, the brain repurposes some of its neural circuitry (Dehaene 2019). The neural networks responsible for word reading take several years to become well developed (Seidenberg 2017) and must be built through successful reading instruction (Hruby and Goswami 2011; Shaywitz and Shaywitz 2004; Shaywitz and Shaywitz 2008). Skilled and effortless word reading, where the printed word provides immediate access to word meaning, is a multifaceted skill that is gradually learned with instruction and practice (Heggie and Wade-Woolley 2017).

The alphabetic principle

The process of converting print to speech requires beginning readers to map individual letters and letter combinations onto individual speech sounds. The insight of realising that phonemes are represented by graphemes is known as the alphabetic principle. This fundamental principle does not typically occur naturally, and therefore requires explicit instruction (Castles et al. 2018).

The foundational knowledge required to grasp the alphabetic principle is not extensive but is a critical step to a deeper understanding of the English writing system. Once acquired, children can focus on the specifics of the relationships between graphemes and phonemes and apply this knowledge in their word reading and spelling (Castles et al. 2018). In order to apply this grapheme-phoneme knowledge to word reading, phonemic awareness is critical.

Phonemic awareness

Phonemic awareness involves attending to, thinking about and intentionally manipulating the individual phonemes within spoken words and syllables. Spoken words are continuous, often overlapping, streams of speech that are not easily abstracted into individual sounds or phonemes. Children need to develop phoneme sensitivity to the discrete phonemic unit in order to successfully map the graphemes to phonemes during word reading (Konza 2014). Phoneme sensitivity and the appreciation of phonemic structure develops later than the more general appreciation of larger phonological units such as syllables, onsets, and rimes (i.e. phonological awareness). Phonemic skills include the ability to blend phonemes together to read words, segment words into individual phonemes to spell words and manipulate individual phonemes within words.

Phonemic awareness plays an important role in all orthographies, but the correlation between phonemic awareness and successful reading acquisition is especially high in deep orthographies, such as English, in which the correspondence of letters to sounds is less transparent. The phonemic awareness of preschool children is the single best predictor of their future reading ability, better than either socio-economic status or intelligence (Adams 1990; Bowey 2005; Ehri et al. 2001; Hulme et al. 2012; Melby-Lervåg et al. 2012; Snow et al. 1998; Stanovich and Stanovich 2003; Wasik and Bond 2001).

> **Phonemic awareness is a necessary precursor to fluent decoding and conventional reading.**
>
> Anthony et al. 2007

Learning to read itself stimulates the development of phonemic awareness, such that a reciprocal relationship exists between these skills (Konza 2014). Alphabetic letters and their sounds have long been seen as providing a concrete realisation of the phonemes in speech, which may help to stimulate the development of sensitivity to phonemes, especially word initial phonemes. The phonemic skills of blending and segmenting are taught in association with phoneme-grapheme correspondences and this is more productive than teaching either skill alone (Castles et al. 2009; Hulme et al. 2012).

Grapheme-phoneme correspondences

Once children understand the alphabetic principle, the specifics of the relationship between graphemes (letters) and phonemes (sounds), referred to as grapheme-phoneme correspondences (GPCs), need to be taught in a systematic order for children to apply this knowledge in their reading and spelling (Castles et al. 2018).

Systematic instruction of GPCs requires explicit teaching of code moving from simple to complex. The initial code includes simple GPCs and the extended code includes more complex sound-spelling relationships (Such 2021). While many alphabetic languages have close to one-to-one correspondence between letters and sounds, written English has a complex and deep orthography. As a consequence, the English writing system requires direct instruction in a logical and sequential order to ensure all grapheme-phoneme correspondences are learned. Novice readers use their growing knowledge of GPCs to methodically segment the graphemes, convert them into phonemes and blend the phonemes together to read the word (Brady 2020; Buckingham et al. 2013).

Sight word vocabulary

A primary goal for beginning readers is to recognise words immediately by securing the spellings of the words to both their pronunciations and meanings in memory (Ehri 2014). These words may be referred to as sight words or a sight word vocabulary. A sight word vocabulary is the ever-expanding bank of words that are automatically and effortlessly recognised. While readers use their eyes to read, cognitive neuroscientists have confirmed that the brain cannot distinguish words based on their visual properties or global word shapes. Skilled readers process every letter of the printed word from left to right, in parallel and so quickly that it is imperceptible to the reader. However, beginning readers use slow, serial, grapheme-by-grapheme decoding until they gradually get faster and more automatic (Dehaene et al. 2010).

Orthographic mapping process

Repeated decoding of a word commits it to memory in which the words' spellings, pronunciations and meanings have been linked and stored in long-term memory for effortless and rapid retrieval. This mental process is known as orthographic mapping (Ehri 2014) and is critical for fluent word reading.

Through listening and speaking, children first acquire the knowledge of a word's meaning and pronunciation. When learning to read, new information is added to this knowledge — the word's letter sequence or orthography that is attached to each phoneme in the word. To map the orthography of the word to the pronunciation and meaning, the reader must use automatic GPCs and proficient phonemic awareness, particularly blending and segmenting. Students are taught to integrate phonological (sounds), orthographic (spelling), and semantic (meaning) knowledge about words through repeated encoding and decoding practice. Through connecting the word's spelling, pronunciation and meaning, mental graphemic representations are developed, stored and retrieved instantaneously during reading (see Figure 1; Ehri 2014, 2015; Miles et al. 2019).

While it is clear that phonological decoding is an essential foundation of early reading acquisition, by Year 3, typically developing children will no longer read familiar words through the phonological route (i.e. phonological recoding) but instead via a direct letter to meaning route (Schmalz et al. 2013).

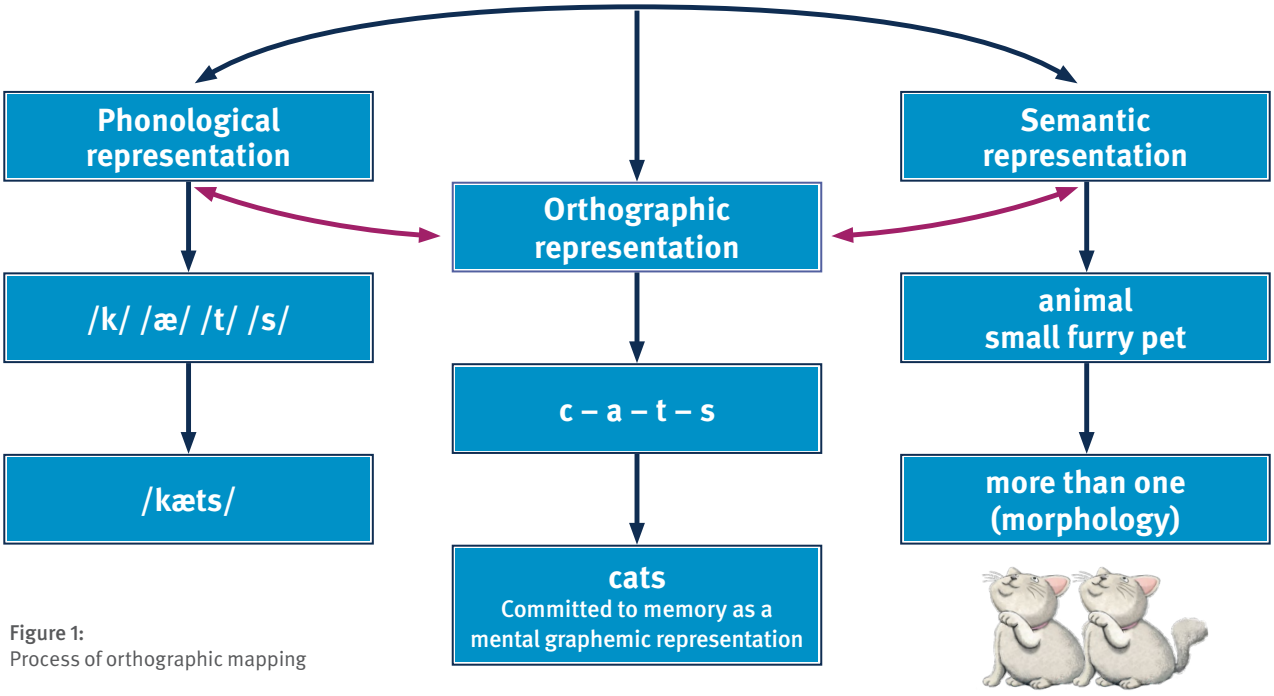


Figure 1:
Process of orthographic mapping

Once children develop a reasonable store of words that are effortlessly retrieved, they begin to transfer this knowledge of known words and spelling-sound relationships to help decode unknown words; this is referred to as the self-teaching hypothesis (Share 1995). According to the self-teaching hypothesis, each successful decoding encounter with an unfamiliar word provides an opportunity to acquire the word-specific orthographic information that is the foundation of skilled word recognition. Self-teaching enables independent reading of increasingly more complex words and texts.

Research shows that children receiving synthetic phonics instruction learn a self-teaching technique that increases their word reading attainment over time.

Johnston et al. 2012

Systematic synthetic phonics

Firm evidence has accumulated for the critical role of small unit instruction in reading acquisition for all students learning alphabetic orthographies. The evidence for the effectiveness of phonics instruction is extensive, with phonics instruction showing improved decoding, spelling and text comprehension in addition to being an effective intervention for poor readers (Ehri et al. 2001; Galuschka et al. 2014; McArthur et al. 2012). These instructional methods focus on phonemic awareness, systematic phonics instruction, and phonological recoding; applying knowledge of GPCs to read and spell (de Almeida Sargiani et al. 2021; Hulme and Snowling 2013). While phonics instruction is effective, studies have shown the superiority of systematic synthetic phonics instruction for developing more advanced reading and spelling skills in all children (de Graff et al. 2009; Johnston and Watson 2005; Johnston et al. 2012).

Consistent with the principles of learning, phonics instruction that is systematic explicitly teaches children the relationship between graphemes and phonemes in an alphabetic writing system, and in a highly structured and sequential way (Castles et al. 2018; Hempenstall 2016). Systematic phonics instruction should be viewed as a natural and logical consequence of the manner in which the alphabetic writing systems represent spoken language (Castles et al. 2018). Findings suggest that novice and intermediate students learning new information (for example, phoneme-grapheme relationships) require direct, unambiguous teaching to avoid cognitive overload (Kirschner et al. 2006).

Conversely, an embedded, incidental or literature-based approach to teaching phonics involves incidentally pointing out letter-sound relationships in a text, and thus does not provide students with adequate exposure to the vast and complex letter-sound patterns needed for consolidation. Research has shown that in order for all students to learn to read, implicit, incidental or embedded teaching of phonics is ineffective (Ryder et al. 2008; Buckingham et al. 2013) and fails to meet the needs of the majority of children who do not intuit phoneme-grapheme relationships (NICHD 2005; Rose 2006).

In systematic synthetic phonics, 'synthetic' emphasises the process of synthesising or blending the individual sounds together to make a word, and is known as a part-to-whole approach (Konza 2014).

GPCs are taught individually and in a specific sequence, usually beginning with a selection of vowels and consonants that can be combined to make numerous simple words. Children are also taught that segmenting and blending are reversible processes so they can segment a spoken word into its constituent phonemes in order to spell it (Rose 2006). Synthetic phonics instruction has been found to be beneficial to all students, including English-language learners,and children and adolescents with reading difficulties (Galuschka et al. 2014; Hempenstall 2016; Machin et al. 2018). Stronger effects for students from low socioeconomic backgrounds, and children who begin school with low levels of phonological awareness and emergent literacy skills have also been reported (Sonnenschein et al. 2010).

Synthetic phonics most closely aligns with the definition of decoding provided in the SVR — the overt sounding-out of a word, sometimes termed phonological decoding or alphabetic decoding (Tunmer and Hoover 2019). Children who do not make use of alphabetic decoding skills and letter-sound relationships during word reading tasks remain relatively weak in their recognition of words, and experience progressive deterioration in their reading comprehension as a result (Tunmer and Nicholson 2011). Eye-tracking studies and research on the effect of letter position on reading rate shows that both novice and skilled readers attend to all of the letters in a word when reading, rather than memorising whole words by their shape (Grainger 2008). The synthetic phonics approach supports students to apply the highly important skill of blending (or synthesising) phonemes in order, all through a word to read it.

In contrast, analytic phonics instruction involves students analysing letter-sound relationships once the word is identified, taking clues from the recognition of the whole word, the initial sound and the context. While there is some conflicting evidence in the research around synthetic and analytical approaches to phonics instruction (Castles et al. 2018), inaccurate or incomplete reading of words may result from an analytical approach, and impact students' ability to store the spellings of words in memory (Ehri 2020). Research shows systematic synthetic phonics is more effective in helping students learn to read than other methods lacking this instruction, such as whole language approaches or analytic phonics (Johnston et al. 2012; NELP 2008; Wanzek et al. 2018). Taught using synthetic phonics, students waste no time on word-guessing from semantic (meaning) or syntactic (sentence structure) cues (Torgerson et al. 2018), on rote-memorisation of sight words, on phonemic awareness training without letters, or on discovery learning (Ehri 2020). A comprehensive, systematic synthetic phonics program, as a part of the reading curriculum, has a major and long-lasting effect on children's reading and spelling attainment (Johnston et al. 2012).

High frequency words

Sight word learning refers to acquiring both high frequency words and mental graphemic representations. While mental graphemic representations are learnt through the orthographic mapping process, high frequency words are learned through a second pathway known as paired associative learning. This requires the learner to memorise individual printed words and connect them to their meanings through a rote-learning task (Castles et al. 2018). In beginning reading instruction, where readers have been exposed to minimal phonic code, a small number of carefully selected high frequency words is taught (Dixon et al. 2002; Shapiro and Solity 2016).

High frequency words, words that occur often in spoken and written language, support a child's accessibility to decodable texts for meaningful rehearsal of learnt code. Instruction of high frequency words should include the study of the parts of the words that are familiar, whilst also noting any difficult or unknown parts and linking these to the pronunciation of the word. This is to avoid blind memorisation and word guessing and is consistent with the research on word recognition (Castles et al. 2018; Frost 1998; Katz and Frost 2001; Share 1995).

> **Research indicates that using whole word memorisation of sight words is an inefficient and ineffective way to teach reading for both beginning and struggling readers.**
>
> Catts et al. 2017

The role of decodable texts

The process of decoding is critical if children are to become independent readers (Hulme et al. 2012). Decoding, or phonological recoding, is the full sounding out of a word that is accomplished through matching the correct sound to each of a word's letters and then blending those sounds, left to right, to read the word. Rehearsal opportunities are provided in the form of phonically-controlled texts, known as 'decodable readers', where the text contains the specific GPCs that students have learnt.

Decodable texts provide readers with practice in applying their phonics knowledge and skills in connected text and increases the likelihood that students will use a decoding strategy (Cheatham and Allor 2012; Ehri 2020). This repeated practice, within a controlled context, builds automaticity, fluency and confidence allowing students to eventually direct all their cognitive energy to determining meaning (Konza 2014).

> **The evidence is very clear that decodable text positively impacts early reading progress.**
>
> Cheatham and Allor 2012:2242

In contrast, the use of highly predictable texts when children are learning letter-sound relationships can be counterproductive. Predictable texts can deny students the opportunity of gaining mastery over the blending process, a critical step on the path to meaningful reading of an alphabetic language (Konza 2014). The role of decodable texts is to support beginning and struggling readers to master the code before they transition to independently reading curriculum texts and high-quality literature known as authentic texts. Throughout this beginning reading process, it is essential that students are continually exposed to authentic texts, rich in language and content, through shared reading experiences (Konza 2014).

Orthographic depth

Systematic synthetic phonics instruction is not limited to the teaching of the initial code of simple grapheme-phoneme correspondences. Across alphabetic writing systems, there is a continuum of transparency known as orthographic depth (Broc et al. 2021). A transparent or shallow orthography has a simple one-to-one grapheme-phoneme correspondence while less transparent or opaque orthographies have more complex grapheme-phoneme relationships (Milankov et al. 2021). English has a deep orthography and the opacity and complexity of grapheme-phoneme relationships necessitates longer periods of explicit instruction compared to more transparent languages such as Spanish (Broc et al. 2021).

As students advance beyond the initial code, systematic synthetic phonics instruction emphasises structural analysis of multisyllabic words. This incorporates orthographic knowledge (understanding of the writing system) and morphological knowledge (understanding word parts and their meanings) (Beck et al. 2021; Ehri 2020). As a morphophonemic language, English spelling patterns are governed by morphological as well as phonological structures, and reflect the historical origins (especially Saxon, Latin, and Greek) of English words and morphemes (Scarborough and Brady 2002). By Year 3 or 4, students are exposed to an estimated 20 000 new multisyllabic words in print per year (Hiebert et al. 2005; Kearns et al. 2016). As children encounter these longer, more complex words,

the spelling patterns governed by morphology become critical for developing good literacy skills (Carlisle 2003). Morphological knowledge has been found to facilitate word recognition skills in both children and adults with and without reading difficulties (Apel et al. 2013; Carlisle et al. 2001; Deacon and Kirby 2004; Elbro and Arnbak 1996; Nagy et al. 1989; Nunes et al. 2006).

Research suggests that by 10 years of age, knowledge about the structure of words is a better predictor of decoding ability than phonological awareness.

Mann and Singson 2003

Fluency for comprehension

Accuracy and automaticity of word reading rely on systematic, synthetic phonics combined with repeated rehearsal of the decoding process in order to build a sight vocabulary for fluent reading. While explicit phonics and phonemic awareness instruction will lead to efficient word reading, text reading fluency does not always spontaneously follow (Hudson et al. 2005). Reading fluency is generally defined as having three components: accuracy, the sounding out of words with minimal errors; rate, the effortless and automatic recognition and production of a word; and prosody, which refers to the way readers use appropriate rhythm, tone, pitch, pauses and stresses while reading (Álvarez-Cañizo et al. 2015; Elhassan et al. 2015; Kuhn and Stahl 2003).

The importance of reading fluency surfaces when considering the cognitive demand of comprehension of written text. When students are first learning how to read, many of their cognitive resources are utilised in decoding individual words. As they become skilled readers and recognise words automatically, word reading becomes more fluent, allowing more cognitive resources to be applied to the task of comprehending connected text

(Adlof et al. 2006; Fuchs et al. 2001; LaBerge and Samuels 1974). Converging empirical evidence shows the important relationship between reading fluency and reading comprehension (Chard et al. 2002; Fuchs et al. 2001; Jenkins et al. 2003; Kim et al. 2011; Riedel 2007; Silverman et al. 2013).

Fluent readers are able to decode words quickly and accurately, freeing up cognitive resources to focus their attention on the meaning of the text.

Hudson et al. 2005; National Research Council 1998

Well-researched and effective instructional practices include modelled fluent reading by the teacher or another fluent reader (Rasinski 2003), repeated reading of texts with assistance and coaching (National Reading Panel 2000; Padeliadu and Giatzidou 2018; Rasinski et al. 2009) and paired reading (Rasinski and Hoffman 2003).

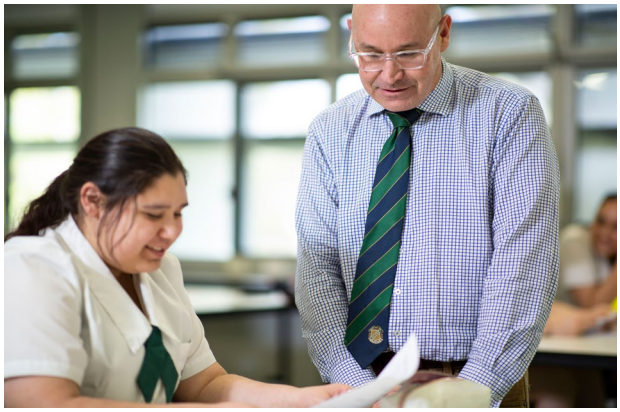
Language comprehension

Texts that younger readers encounter in the early years of reading development depend more on word reading than understanding individual word meanings or higher-level language skills (Shiel et al. 2012). As word reading becomes automatic however, language skills serve as a more critical determinant of reading comprehension (Adlof et al. 2006; LARRC and Logan 2017). Therefore, it may not be until Year 4 or later that the impacts of vocabulary and text structure knowledge on reading comprehension become apparent (Shiel et al. 2012).

Constructing mental models

The oral language skills that contribute to language comprehension can be referred to as lower and higher-level language skills (Hogan et al. 2011). The lower-level language skills of vocabulary and syntax are used to construct the literal meaning of a text and provide the foundation for the higher-level skills of text structure, inferencing, and comprehension monitoring (Hogan et al. 2014). The different aspects of vocabulary, syntax, text structure, inference, comprehension monitoring, and background knowledge, support language comprehension through the development of a mental (situation) model (Kintsch and Kintsch 2005; Such 2021).

A student's ongoing understanding of a text depends on their knowledge of the world, particularly that which is related to the situation being described in the text, and their vocabulary knowledge (Castles et al. 2018). Higher-level language skills are required to construct a more accurate and deeper understanding of what the author has written (Hogan et al. 2011). As students progress through a text, it becomes equally important that they can update their mental model by suppressing information that is irrelevant while maintaining information that is essential (Castles et al. 2018). Thus, when students read or listen to a text, they actively build and constantly update their mental model in real time, integrating new information and relevant background knowledge with their existing mental model as the text unfolds (Hogan et al. 2014; Kintsch 2009). This mental model culminates in a rich interpretation of the text that goes beyond what is explicitly stated, and that changes through growth, reorganisation and error correction (Hogan et al. 2014; Kintsch 2009; Nation 2019).



Background knowledge

Chief among the factors influencing reading comprehension is background knowledge. Background knowledge includes all of the world knowledge that the reader brings to the task of reading (Smith et al. 2021). Research clearly shows that how much readers know about a text's topic has a major impact on how much they understand the text (Catts 2021). For many years, the primary way background knowledge has been addressed has been through activating knowledge using strategies such as prereading discussions, concept maps, and anticipation guides. These strategies can be effective, but only if the appropriate knowledge is available. If a student's background knowledge is inaccurate, this activation can in fact be detrimental to comprehension (Catts 2021).

Many children lack the basic background knowledge required for comprehending academic text even if they 'know' all the vocabulary words contained in them.

Hirsch 2003; Smith et al. 2021

Higher levels of background knowledge have a range of effects that are influenced by the nature of the text, the quality of the mental model required, and the presence of reader misconceptions about the text (Smith et al. 2021). Background knowledge impacts differentially on stronger and weaker readers, and affects the quality of the mental model formed during reading (Smith et al. 2021). The stronger and more detailed the background knowledge, the stronger the mental model of the text will be. Accordingly, readers with lower background knowledge appear to benefit from texts with high cohesion, while weaker readers are able to compensate for less skilled reading in the context of a higher degree of background knowledge (Smith et al. 2021).

It is important to understand that background knowledge cannot fully compensate for less skilled reading, particularly in the later years of school (Hirsch 2016). This reinforces the importance of explicitly teaching background knowledge as the foundation to increasing the reading proficiency of all students, rather than relying on the development of a stronger knowledge base (Catts and Kamhi 2017; Smith et al. 2021). As Smith et al. (2021) state, it is clear that background knowledge is not just an incidental aspect of effective reading instruction. Instead, all children can benefit from the teaching of background knowledge in a systematic, explicit, and sequential way (Connor et al. 2017; Kim et al. 2021). The differential impacts of background knowledge on reading comprehension also highlight the importance of selecting valuable texts that considers text type, text complexity, and opportunities to learn from the text (Smith et al. 2021).

Vocabulary knowledge

To understand a text, students must understand the words it contains (Hogan et al. 2014). Vocabulary knowledge and reading comprehension are strongly related (Duff 2019; Muter et al. 2004; Peng et al. 2018; Perfetti 2007; Spencer et al. 2019). Research has shown that vocabulary knowledge is a strong predictor of future reading success (NELP 2008), and of broader academic and

vocational achievement (Beck et al. 2013; Clarke et al. 2014). Vocabulary knowledge during the school years has also been found to have strong links with both word recognition and reading comprehension (Hiebert and Kami 2005).

Lower-level language skills, particularly vocabulary, are primary predictors of later language and reading comprehension.

Hulme and Snowling 2011; Justice et al. 2013

Vocabulary has a bidirectional influence on reading comprehension (Castles et al. 2018; Cunningham 2005; Duff 2019). Vocabulary includes not just the number of individual words known, but how well they are known and how flexibly they can be used in a given context (Castles et al. 2018). Students who lack adequate vocabulary knowledge may have difficulty understanding what is read, and as a result, may read less. Poor word recognition skills (including phonemic awareness, phonics, and fluency) have also been found to contribute to

the gap between how much skilled readers and weaker readers will read, and subsequently, the new vocabulary that they will encounter. Thus, students with reading difficulties may read less and subsequently not develop the vocabulary knowledge needed to gain meaning from what is read (Beck et al. 2021).

The National Reading Panel (2000) recommends both incidental and intentional or explicit vocabulary instruction to improve reading comprehension. While some students will acquire new vocabulary incidentally, explicit instruction of vocabulary increases reading comprehension for all students, with the largest effect for students at risk of, or experiencing reading difficulties (Clarke et al. 2010; Elleman et al. 2009). Explicit vocabulary instruction is a high impact strategy in which students are provided with definitional and contextual information about words; multiple encounters and interactions with words; and opportunities to generate contexts for words (Beck et al. 2021; National Reading Panel 2000; Wright and Cervetti 2017). In an Australian study, explicit instruction of words drawn from the Australian Curriculum was shown to provide increased gains in vocabulary knowledge, relative to control classrooms where vocabulary instruction was incidental (Westerveld et al. 2020). The ability to acquire and express vocabulary is key to improved and sustained reading comprehension. All students, even those with advanced language and reading skills, can benefit from explicit vocabulary instruction (Adlof 2019; McKeown 2019).

Syntactic knowledge

Understanding the basic structure of a sentence is the foundation for understanding grammar and syntax (Eberhardt 2019). Sentences are one of the structural properties used to predict text difficulty and provide the linguistic environment in which readers make decisions about word meaning, punctuation, and the impact of morphology (Eberhardt 2019). Several studies have shown syntactic and grammatical knowledge are predictive of later reading comprehension (Logan 2017). As students progress through the school years, learning increasingly takes place in the context of language that is content-specific, written not spoken, and expository rather than narrative. Children with weaknesses in syntactical knowledge have difficulty understanding written sentences, particularly in the later stages of reading development when they are exposed to more linguistically complex texts (Tunmer and Hoover 2019).

Research suggests teaching syntax and grammar rules in the context of students' own writing, rather than through rote memorisation, can improve reading performance (Andrews et al. 2006). Sentence combining has been found to be an effective technique for helping students to create more complex sentences. Effective sentence-combining tasks involve presenting short sentences that are combined into one longer sentence by deleting, inserting, or switching parts of sentences (Andrews et al. 2006).

Text structure knowledge

Texts differ in terms of purpose, linguistic features, text cohesion, and text coherence (Halliday and Hasan 2014). Cohesion (microstructure) is the link between phrases and sentences. Coherence (macrostructure) is the extent to which a text provides information to help the reader relate information across different parts of the text (Graesser et al. 2003). To be able to form an accurate mental model and understand written text, readers must be able to recognise relationships across both sentences and larger units of text (Smith et al. 2021). Research suggests that increasing students' knowledge of text structure facilitates their ability to attend to the most salient details in a text, thereby increasing reading comprehension (Gersten et al. 2001; Hogan et al. 2011).

> **Narrative macrostructure predicted reading comprehension skills beyond what would be expected by decoding skills and linguistic components of narrative microstructure such as syntax and morphology.**
>
> Barton-Hulsey et al. 2017

Text structure is typically described according to two types of written work: narrative texts and expository texts. Although some characteristics between them overlap, the structural patterns are quite different (Hebert et al. 2016). In reading narrative texts, readers rely on the presence of conventional features and familiar structures, including setting, characters, actions, feelings, and resolution (Hebert et al. 2016). Conversely, comprehending expository texts requires students to make inferences, solve problems, reason, and to use complex and varied text structures in ways that are not commonly needed in narrative texts (Snow 2002).

Reading expository texts enables students to build the background knowledge necessary to understand content information in Year 4 and beyond (Saenz and Fuchs 2002). Research with younger and older students has shown that explicit instruction in expository text structure can improve reading comprehension, as it supports the reader to organise facts and ideas in ways that assist retention and recall (Duke and Pearson 2002; Williams 2005; Williams and Pao 2011). Explicit instruction in different text structures with visual representations has also been found to result in larger effect sizes for comprehension (Hebert et al. 2016). Text structure knowledge reduces the demands on working memory capacities, allowing the reader to comprehend texts more efficiently (Kieras 1978; Pentimonti and Justice 2010).

Comprehension monitoring

Comprehension monitoring is the ability to reflect on one's own understanding of a text. Skilled readers are typically aware of how well they are comprehending as they read or listen to texts. When good readers experience difficulty, they automatically use a variety of strategies such as rereading to increase their comprehension (Hogan et al. 2011; Pressley and Afflerbach 1995). It is important to note however, that a failure to comprehend or to identify inconsistencies may in fact stem from a lack of background knowledge, rather than a failure to monitor comprehension (Smith et al. 2021).

Because of the importance of comprehension monitoring to reading, this strategy requires explicit instruction. Comprehension monitoring can be taught in a relatively short period of time or in a content-focused approach to reading (such as Questioning the Author), with positive impacts on reading comprehension outcomes (Oakhill et al. 2014). Questioning the Author (Beck et al. 2021) is where the teacher reads the text little by little, pausing at predetermined points to facilitate active student engagement and discussion. Students' comprehension is also monitored to ensure they understand the content and the author's intent (Beck et al. 2021; Beck and McKeown 2006).

Inferential comprehension

Inference is a critical skill for effective reading comprehension (Bishop 2014; Cain et al. 2001; van Kleeck 2008). The ability to infer meaning from text has been found to be a predictor of reading comprehension at various developmental stages and is one of the drivers of sophisticated reading ability (Cain and Oakhill 1999; Oakhill and Cain 2007; Smith et al. 2021). Inference is also linked to the other skills that underpin language comprehension, where each inference is the result of a student's knowledge of words and syntax, knowledge of the world, and knowledge of text structures (Such 2021). The lower-level language skills of vocabulary and grammar are suggested to be a precursor to developing inferential comprehension (Hogan et al. 2011). The ability to make inferences also relies heavily on having the appropriate background knowledge (McNamara and Magliano 2009). Inferencing requires readers to go beyond what is explicitly stated and 'fill in the gaps' to construct a rich mental model (Bowyer-Crane and Snowling 2005). In comparison with weaker readers, skilled readers make a greater number of inferences while creating mental models of a text. The inability to accurately draw inferences results in constructing mental models that are incomplete or inadequate, which in turn, affects reading comprehension (Cain et al. 2001).

Research on how to support the ability to make and understand inferential language has drawn on a large research base, which shows that shared reading presents a salient opportunity to systematically and explicitly develop children's skills in a variety of language domains (Hogan et al. 2011). Even young children are able to generate inferences (van Kleeck et al. 2006; Zucker et al. 2010) and it is the teacher's use of inferential language during shared book reading that directly elicits inferencing from students (Justice and Ezell 2002; Penno et al. 2002). Teaching children about the need to make inferences is also a key aspect of comprehension monitoring and supports all children's understanding of text (Francey and Cain 2015).

Reciprocity of reading and writing

Reading and writing share a close and reciprocal relationship and while they are not identical skills, they draw on many of the same knowledges and skills at various linguistic levels (phonemic, orthographic, semantic, syntactic and pragmatic) (Fitzgerald and Shanahan 2000; Langer and Flihan 2000). Consequently, reading instruction improves overall writing performance, writing quality, amount written and spelling (Graham et al. 2018). Similarly, when students write about the content that they have read across genres, subjects, and year levels, their understanding of the material improves and their learning enhances (Graham et al. 2020).

Word-level skills such as word reading and spelling draw on essentially the same component skills of phonological awareness, orthographic knowledge and awareness, and morphological awareness (Carlisle and Katz 2006; Kim 2010; Kim et al. 2013; Schatschneider et al. 2004; Treiman 1993) Graham and Santangelo (2014) reported that spelling instruction enhanced students' reading skills (i.e. word reading and reading comprehension). Similarly, the explicit decoding of words enhanced orthographic facilitation to better secure spellings to pronunciations along with meanings in memory (Chambrè et al. 2020).

Reading comprehension and written composition also share a similar set of skills. Language comprehension and oral expression rely on lower-level oral language skills (vocabulary and grammatical knowledge), higher-level language skills (reasoning, inference, perspective taking, monitoring), text structure, background knowledge and cognitive processes (working memory, attention) (Ahmed et al. 2014; Berninger and Abbott 2010; Cain et al. 2004; Cromley and Azevedo 2007; Kim et al. 2011, 2014, 2015; Kim and Schatschneider 2017). Several meta-analyses have found that students writing about content they have read can facilitate comprehension of the material (Bangert-Drowns et al. 2004; Graham and Perin 2007; Graham and Hebert 2011) as writing is a tool for permanently and visibly recording, analysing, evaluating, and modifying the content or ideas in the text.

While writing and writing instruction should not replace reading instruction, the positive impact of writing about material read; increased time spent writing; and explicit instruction in writing is evident (Graham and Hebert 2011). The effects of writing and writing instruction on reading are likely to be minimised if students write infrequently or receive little instruction in how to write (Brindle et al. 2016; Graham 2019). Therefore, bi-directional, evidence-based instructional practices in both reading and writing instruction should be used consistently and frequently to support reading-writing connections (Graham et al. 2018). The reciprocity between spoken and written language in the school years is an area of instruction in which speech language pathologists and educators can intentionally collaborate to optimise outcomes (Snow 2020).

A rights-based approach

Inclusive education

Inclusive education is a human right under Article 24 of the United Nations *Convention on the Rights of Persons with Disability* and has been ratified by the Australian government (Graham 2020). Children experience inclusive education when they can access and fully participate in learning with their similar-aged peers, supported by reasonable adjustments and teaching strategies that meet the individual's needs (Department of Education 2021; Graham 2020; United Nations Committee on the Rights of Persons with Disabilities 2016). Reading is a right, implicit to the right to education, and is a mechanism for the pursuit of other human rights. (Graham 2020). Effective reading instruction draws on the key principles of universal design, using the most equitable and efficient teaching practices to ensure all children in a class become literate, including the most disadvantaged (Snow et al. 2021).

The literacy learning needs of beginning readers necessarily vary because they differ in the amount of reading-related knowledge, skills, and experiences they bring to the classroom; in the explicitness and intensity of instruction they need to acquire the knowledge and skills for identifying words and comprehending text; and in their location along the developmental progression from pre-reader to skilled reader (Tunmer and Hoover 2019). These considerations underscore the importance of quality teaching and differentiated instruction that meets the learning needs of all students (Arrow et al. 2015). Differentiation involves 'proactively planning varied approaches to what and how students learn, in order to be inclusive of the full range of student diversity' (Graham 2020:185). Differentiation and inclusion are highly interdependent. Inclusion cannot succeed without quality differentiation (Graham 2020).

Inclusive education produces superior academic and social outcomes for all students (de Bruin 2019). However, it has long been recognised that curriculum, pedagogy, and assessment can present barriers for children with disability to participate in, and benefit from education (Norwich 2013).

Existing pedagogical frameworks and measures are based on what has been shown to work with most, rather than all students (Graham et al. 2022). Understanding evidence-based practices in the teaching of reading, therefore, is essential to reducing educational inequities (Gillon et al. 2019, 2022). As Graham (2020) asserts, strategies that make schools inclusive for students with disability benefit every student.

Multi-tiered systems of support

Multi-tiered systems of support (MTSS) is a systematic improvement framework in which continuous data-based problem-solving and decision-making is practised across all levels of the school system (Brown-Chidsey and Bickford 2016; Clark and Dockweiler 2019). MTSS targets the 'whole child' and is designed to provide three tiers of instructional intensity to meet the academic, socioemotional, and behavioural aspects of all students (McKenna et al. 2021; Sailor et al. 2020). This includes improving the reading outcomes of every student (Gillon et al. 2022).

MTSS is a way of thinking that utilises high impact, evidence-based pedagogical practices to ensure every student receives the appropriate level of support, instructional intervention and adjustments to be successful (Snow et al. 2021). Across all tiers, the need for reduced or increased levels of adjustment is identified through the consistent collection of data using progress monitoring tools that assess targeted reading skills (Hughes and Dexter 2011).

Research has highlighted several key aspects to quality differentiated first teaching of reading, including the explicit and systematic teaching of skills and knowledge such as letter-sound correspondences (Denton 2008). Such approaches that are proactive and preventative build in high-quality teaching of reading for diverse learners from the outset, rather than waiting for challenges to emerge that then require intervention (Clark and Dockweiler 2019; Gillon et al. 2022; Graham 2020).

It takes four times as many resources to resolve a literacy problem by Year 4 than it does in Year 1.

Pfeiffer et al. 2001

Research shows evidence-informed teaching and early intervention can lead to high levels of oral language and reading achievement for all students, including at-risk or vulnerable students (Buckingham et al. 2013; Gillon et al. 2022). MTSS is an effective way for schools to provide differentiation, accurate identification, and increased reading instruction for all students on an equitable and efficient basis (Bridges 2011; Gillon et al. 2022; Graham 2020).

Factors impacting on reading

A complex multidimensional process

Reading comprehension itself is a complex multidimensional process (Catts 2018; Catts and Kamhi 2014). The SVR deals directly with factors that have a causal relationship with reading comprehension (Tunmer and Hoover 2019). However, a number of protective factors indirectly impact reading acquisition and contribute to the overall learning profile of a student (Tunmer and Hoover 2019).

Reading difficulties can co-occur with other neurodevelopmental disorders. For example, research shows high rates of co-occurrence between dyslexia and mathematics disorder, attention deficit hyperactivity disorder, developmental language disorder, speech sound disorder, developmental coordination disorder, and with disorders of mental health such as anxiety and depression (Snowling and Hulme 2021).

Linguistic factors

Language difficulties play a critical role in reading disorders, with difficulty at one or more levels of the language system often at the core of reading, spelling, and writing difficulty (Catts et al. 2005; Nation and Snowling 2004; Serry et al. 2015). The SVR can be used as a framework to distinguish between different types of reading difficulties and where reading difficulties stem from: problems with word reading, difficulty comprehending, or both (Gough and Tunmer 1986). All three varieties of reading disorder result in poor reading comprehension but for different reasons.

Children with difficulties in decoding but intact language comprehension skills are described as having dyslexia. Dyslexia is a language-based reading disorder, stemming from an impairment in the phonological component of language (Snowling and Hulme 2021). Students may have difficulties with

accurate and fluent word reading and spelling, but can learn to read given intensive, evidence-based intervention over time (Lyon et al. 2003). Conversely, children with adequate decoding skills but poor language comprehension may have difficulty understanding what is read, despite appearing to read accurately and at an appropriate rate (Landi and Ryherd 2017; Nation 2019; Nippold 2017). While students with poor language comprehension typically make a strong start when learning to read in the early years, comprehension difficulties become more evident as students move into the middle and upper primary years, particularly as the complexity of texts increases. These students may also show language comprehension difficulties across vocabulary, grammar, and narrative skills (Catts et al. 2006; Woolley 2011). A third group of children, including many with developmental language disorders, present with both decoding and language comprehension difficulties (Bishop and Snowling 2004).

Cognitive factors

Reading is a complex process that is affected by several cognitive factors (Yildiz and Çetinkaya 2017). Cognitive factors such as working memory, phonological processing skills — including rapid automatic naming, executive functions and attention — are strong predictors of reading abilities and as such are important considerations for a student learning to read (Gathercole et al. 2006; St Clair-Thompson and Gathercole 2006; Yildiz and Çetinkaya 2017).

The process of learning to read is highly integrated with working memory — the capacity to temporarily retain and manipulate information (Gathercole and Alloway 2008). For comprehension to occur, the working memory must not be too heavily burdened (Smith et al. 2021). While there is no causal relationship between working memory and reading comprehension (Gray et al. 2019), working memory may explain some of the variance in reading and writing performance in primary school children (Berninger et al. 2010; Swanson and Berninger 1996).

Executive function is a term used to describe a collection of higher order abilities that enable goal-directed behaviour, including initiating, planning, organising, and self-monitoring (Fisher et al 2019). There are many reasons students may experience executive function weaknesses, with executive functioning difficulties having been reported in a variety of developmental and neurological disorders (Ozonoff 1997) and among children from unpredictable home environments (Snow 2020). Compromised executive functioning may impede a child's ability to attend to, and engage with the teacher's instructions.

Emotional self-regulation is a critical executive functioning skill for social and academic success (Perry et al. 1995; Snow 2020) that relies on early infant attachment and adult-child bonding established in stable home environments (Newman et al. 2015; Perry et al. 1995; Snow 2009). Evidence suggests that behaviour regulation, including the child's ability to focus attention and engage in inhibitory control mechanisms (Cain and Oakhill 2006; Morrison et al. 2010), influences young children's language and reading progress (Duncan et al. 2007; Schmitt et al. 2012).

Attention can act as a protective factor in early word reading. An individual's ability to sustain attention facilitates the improvement of cognitive text comprehension (Smallwood et al. 2008) and is required to analyse sentences in reading material (Alloway et al. 2014; Sesma et al. 2009).

Genetic and medical factors

Genetic factors can contribute important evidence to a child's reading profile (Sanfilippo et al. 2020). There is a strong heritability of dyslexia: 50% of individuals with a first-degree relative with dyslexia also have the disorder (Snowling and Melby-Lervag 2016). Hearing is a key protective factor in developing reading proficiency (Colenbrander et al. 2018). Children with mild to moderate or unilateral deafness as well as those with a history of fluctuating hearing loss due to glue ear (repeated middle ear infections also known as otitis media with effusion) are also at greater risk of language and reading difficulties (Carroll and Breadmore 2018). Age-appropriate language and speech production skills are both protective factors for reading development with a diagnosis of developmental language disorder (Snowling et al. 2019) or speech sound disorder (Burgoyne et al. 2019; McLeod et al. 2017) heightening the risk of reading difficulties.

Psychological factors

Comprehension entails three elements: the reader who is doing the comprehending; the text that is to be comprehended; and the activity in which comprehension is a part. Psychological factors that the reader brings to the process include motivation to learn to read, interest in reading and self-perception (Aaron et al. 2008). Engaged reading is highly associated with reading achievement (Morgan and Fuchs 2007; Retelsdorf et al. 2011). Therefore, understanding the role motivation plays in reading is essential for planning effective instruction (Wigfield and Guthrie 2000). Students who are motivated to read are more likely to process what they are reading more actively and deeply than unmotivated students (Wigfield and Guthrie 2000). Motivation for reading often develops early in life during the emergent literacy stage. Studies have shown that parents' identification of pleasure as a reason for reading, predicts motivation for reading in young, school-aged children (Katzir et al. 2009).

Research indicates that self-concept positively relates to reading comprehension in primary-school-aged students (Chapman and Tunmer 1995; Chapman and Tunmer 2003), even after controlling for the children's verbal ability and word-reading ability (Katzir et al. 2009). Early success or difficulty in learning to read is linked to reading self-concept so if children experience success in reading, they will be motivated to attempt more difficult tasks.

It is important that children are aware of not only the benefit of learning to read in relation to academic success but that reading can be a 'delightful' and 'desirable' endeavour (Cremin 2007; Cremin et al. 2014). Much research points to the importance of developing positive classroom environments with effective communities of readers (Cremin et al. 2014). The social aspect of reading, when supported, results in stronger engagement and consequently higher achievement across all aspects of schooling (Ivey 2014).

If children have challenges in learning to read, their reading self-concept may weaken and these children may lose motivation in reading-related tasks.

Katzir et al. 2009

Instructional environment

Systematic and explicit instruction

Three national inquiries (NELP 2008; Rose 2006; Rowe 2005) into reading instruction in the last two decades have affirmed the linguistic basis of learning to read, together with the need for all children to be explicitly taught the alphabetic principle, and how phonemes and graphemes map to each other (Snow 2021). In the school years, explicit attention to morphology (and etymology) is critical because English is a morphophonemic language and the ability to grasp the intricacies of the English writing system hinges on a child's ability to segment words into phonemes and morphemes for both reading and spelling (Moats 2010).

Explicit or direct instruction is characterised by planned and sequenced lessons; clear and detailed instructions and modelling; and frequent, systematic monitoring and feedback (Rupley et al. 2009). This approach acknowledges that learning is a cumulative and systematic process, and that students need to master foundational skills before moving onto more complex tasks (National Reading Panel 2000). These key elements of effective instruction are designed to maximise student understanding, retention, and transfer of skills and knowledge (Archer and Hughes 2011). During the first years of schooling, emphasis is placed on the explicit instruction of the knowledge and skills required for reading development for all students, which should at the very least include systematic phonics instruction (Fuchs et al. 2008; Hempenstall 2016). Despite explicit instruction being the superior method of instruction, fewer than half of all teachers are using it in their classrooms (Australian Education Research Organisation 2021).

Explicit teaching practices involve teachers clearly showing students what to do and how to do it, rather than having students discover or construct information for themselves.

Clark et al. 2012

Cognitive load theory

Cognitive load theory provides theoretical and empirical support for explicit models of instruction (Centre for Education Statistics and Evaluation 2017). It incorporates a model of how working memory functions during learning tasks, including reading (Sweller 1994; Sweller et al. 2019). During any learning event, the limited capacity of working memory acts to constrain the transfer of information to long-term memory. The number of units being processed in working memory at any one time is known as the cognitive load, with a greater number and/or complexity of information units resulting in a higher load (Smith et al. 2021; Sweller et al. 2019).

Unlike spoken language, which has evolved over millions of years, learning to read is a relatively recent advance in human development (Snow 2016). The human brain has not had the time to develop specialised pathways for learning to read, and instead, has repurposed parts of the brain (Dehaene-Lambertz et al. 2018). Put simply, reading is a learned secondary behaviour, a taught skill. Different from primary knowledge, secondary knowledge such as reading is acquired with conscious effort by students and explicit teaching by teachers (Geary 2008; Sweller et al. 2019). Cognitive load theory suggests that in order to facilitate transfer of information to long-term memory, instruction provided by teachers should be explicit and detailed (Sweller et al. 2019). The importance of cognitive load is critical when planning for systematic reading instruction and enables teachers to control the demands of the instructional environment.

Professional collaboration

Collaborative relationships across all three instructional tiers of MTSS is key to improving children's reading abilities (Snow 2016). Professional collaboration in schools may take many forms and involve various stakeholders, including students, parents/carers, teachers, and speech pathologists. Research shows that collaborative approaches benefit both students and the professionals involved (McKean et al. 2017).

Leveraging the skills available within, and between, schools can also contribute significantly to student learning success within inclusive school contexts (Graham 2020).

Within the educational team, speech pathologists are positioned to understand the developmental significance of language and reading acquisition in childhood and adolescence (Snow and Powell 2004; Bridges 2011). By working within MTSS and understanding the development of reading, teachers and speech pathologists are able to accurately identify and appropriately support students at risk of, or experiencing reading difficulties (Bridges 2011).

Using a differential diagnostic process, educational teams are able to profile an individual student's strengths and challenges in word reading and language comprehension, and the skills that underpin both components (Tunmer and Hoover 2019). Such profiling of what the student knows and what they need to learn next to become a skilled reader informs the provision of evidence-based reading instruction, intervention, and accommodations that meets the needs of the student (Hoover and Tunmer 2021).

Sharing responsibility and engaging in collective problem-solving and joint action, ensures the varying literacy learning needs of all students are addressed from the outset (Graham 2020).

Conclusion

Reading comprehension is central to academic success as it underpins content-area learning in all subjects (Smith et al. 2021) and is associated with better further education and employment outcomes (Castles et al. 2018). Access to effective reading instruction is important for students of all ages, but is particularly crucial in the first three years of schooling to ensure that every student becomes a proficient reader (Fuchs et al. 2008; Partanen and Seigel 2014). This literature review provides current and future teachers, allied health professionals, and system and school leaders with the basis through which informed decisions for effective reading instruction can be made. While there is substantial progress in understanding reading acquisition, further research findings continue to emerge. Accordingly, this review provides the foundation for future collaborative work in defining the scope and application of research to support the effective teaching of reading within an inclusive education context. Reading instruction that aligns with the best available research evidence is the most efficient and equitable way to teach all children to read and succeed at school.

Recommendations

1. Use the Simple View of Reading (SVR) (Gough and Tunmer 1986) as an empirically-grounded framework to guide the effective teaching of reading in Queensland State Schools and for supporting teachers' decision-making about evidence-based instruction that addresses every student's literacy learning needs.

2. Embed the effective teaching of reading, using evidence-based and inclusive pedagogical practices within a whole-school approach.

3. Build the capability of Queensland Department of Education system and school leaders and educators to implement, with precision and rigour, an approach to the teaching of reading that is inclusive and evidence-informed, and that realises the potential of every student.

Glossary

Academic text

A specialised text from a given field using formal language.

Alphabetic principle

The understanding that the written code is based on alphabet letters or graphemes mapping onto phonemes in words.

Analytic phonics

A method of reading instruction that relies on children analysing whole words to find patterns of sounds between them and memorising sight words to decode other words.

Authentic text

Authentic texts are an essential component for growth in language and content knowledge. They are: not predictable; written to be read aloud, with support or independently; read for any purpose; and used across childhood and into adolescence.

Background knowledge

The knowledge gained from the sum of a reader's worldly experiences and that relates to the text being read.

Blending

The process of combining individual sounds to form a word.

Cognitive load

The number of units being processed in working memory at any one time.

Comprehension monitoring

The process of becoming aware of one's own understanding while reading and detecting inconsistencies in a text.

Decodable text

Books used for beginning reading instruction in which the majority of the sound-spelling correspondences are ones that a student has already been explicitly taught.

Decode

To assign a phoneme (sound) to each grapheme (spelling) in a written word and blend those phonemes to read the word.

Developmental language disorder

A neurodevelopmental condition, characterised by persistent difficulties in the ability to learn and use language that cannot be attributed to a biomedical condition.

Dyslexia

A reading disability characterised by word reading difficulties, stemming from an impairment in the phonological component of language.

Encode

To segment (separate) a word into all its individual phonemes (sounds) and assign a grapheme to each of those phonemes.

Etymology

The study of words, their roots, and how the meaning of words have evolved over time.

Explicit instruction

A systematic method of teaching which emphasises proceeding in small steps, checking for student understanding, and achieving active and successful participation by every student.

Extended/advanced code

The sound-spelling correspondences that are taught after the most common spellings for each sound (initial/basic code) have been taught.

Fluency

The ability to read with accuracy, automaticity, and appropriate prosody.

Grammar

The rules of a language that govern the forms of words used in context (morphology) and how words can be combined in sentences (syntax).

Grapheme

A letter or group of letters that represent a single phoneme in a word.

Grapheme-phoneme correspondence

The systematic relationship between a phoneme and its corresponding grapheme/s.

High frequency words

Words that most frequently appear in spoken and written English. They can contain simple or more complex phonic code.

Incidental instruction

A method of teaching that highlights elements of language as they appear in a text and does not make use of a predetermined teaching sequence.

Inclusive education

Student experience inclusive education when they can access and fully participate in learning, alongside their similar-aged peers, supported by reasonable adjustments and teaching strategies tailored to meet their individual needs.

Inferential comprehension

The ability to integrate text information with background knowledge to work out something that is not explicitly stated.

Initial/basic code

The sound-spelling correspondences that are taught first in systematic phonics instruction, including the most common spellings for each phoneme (sound).

Linguistic system

The understanding that the units used in aparticular language are structured according to pre-established rules.

Language comprehension

Refers to the ability to derive meaning from spoken words when they are part of sentences or text. In the context of the Simple View of Reading, language comprehension is called by several other names in various studies including listening comprehension, linguistic comprehension and comprehension.

Literacy

A broad set of skills, including reading, writing, spelling, and the ability to produce and engage with a variety of texts across the curriculum in all year levels.

Literal comprehension

The ability to understand information that is explicitly stated in a text.

Mental graphemic representations

Stored mental forms of a written word that are made by connecting the orthographic (spellings), phonological (pronunciations), and semantic (meanings) knowledge of the word.

Mental model

A mentally constructed view of the situation being described by the text in which meaning is created and updated through a process of personalisation, prioritisation, and integration.

Morpheme

The smallest unit of meaning in language.

Morphology

The study of the structure of words and word parts.

Morphophonemic language

Describes a language, such as English, where written words or spellings are constructed through mappings of sounds (phonemes) and meaningful word parts (morphemes).

Multi-tiered systems of support

A systematic, continuous improvement framework that is designed to provide three tiers of instructional intensity to meet the academic, socioemotional, and behavioural aspects of each student.

Narrative

The ability to understand and produce extended discourse that describes real or fictional events.

Oral language

Also known as spoken language, includes speaking (expressive) and listening (receptive). Oral language consists of phonology, semantics, syntax, morphology, and pragmatics.

Orthographic depth

The extent to which there is a simple, one-to-one correspondence between sounds and spellings in a language. Languages with a deep (or opaque) orthography, such as English, have multiple spellings that can represent a given sound and multiple sounds that can be represented by a given spelling.

Orthographic mapping

The process through which the spellings of words are mapped to the meaning and pronunciation of words already stored in a reader's long-term memory. It is facilitated through repeated decoding and is used to store words for immediate, effortless retrieval.

Orthography

The spelling system of a language.

Phoneme

The smallest unit of sound in speech.

Phonemic awareness

The ability to identify and manipulate individual sounds (phonemes) within words; it is one aspect of phonological awareness. Blending and segmenting are the key phonemic awareness skills.

Phonics

The relationship between sounds and their spellings in an alphabetic writing system.
Students use knowledge of sound-spelling correspondences to decode words in reading and encode words in spelling.

Phonological awareness

The ability to identify and manipulate parts of spoken language, such as the individual sounds in words (phonemes), syllables, and whole words.

Phonological processing

The ability to use the sounds in one's language to process spoken and written language. Phonological processing includes phonological awareness, phonological memory, and rapid automatic naming.

Phonological working memory

The ability to encode, hold, and retrieve sound-based information in short-term memory.

Rapid automatised naming

The ability to quickly access information from long-term memory, such as numbers, letters, colours, or objects.

Reading

The ability to decode, recognise, and draw meaning from the printed word.

Reading accuracy

One of the three elements of reading fluency; it refers to the ability to correctly match the spelling of a word to the sounds it represents.

Reading automaticity

One of the three elements of reading fluency; it refers to the rate at which students read, and the ability to read words quickly and effortlessly.

Reading comprehension

The ability to understand what is read. It is the product of decoding printed text (word reading) and understanding language accessed through the process of decoding (language comprehension).

Reading prosody

One of the three elements of reading fluency; it is the ability to read with expression with the appropriate rhythm, tone, pitch, pauses and stresses for the text.

Segmenting

The process of separating and identifying all the individual sounds within a word.

Sight word

A written word that is recognised without conscious decoding using learned sound-spelling correspondences. A word becomes a sight word through repeated decoding in a process called orthographic mapping.

Sight word vocabulary

A bank of words that are able to be read automatically without decoding.

Syntax

The rule system that governs sentence formation, including how phrases and clauses are combined to form sentences.

Synthetic phonics

An explicit method of instruction using a part-to-whole approach where children are taught to convert graphemes (letters) into phonemes (sounds).

Systematic instruction

Instruction that has a clearly planned sequence, with new content introduced methodically and cumulatively, and that is based on an analysis of the complexity of the knowledge and skills to be learned to ensure student understanding.

Systematic synthetic phonics

An explicit, systematic method of reading instruction that teaches children to convert graphemes into phonemes using a part-to-whole approach. Children are explicitly taught to synthesise or blend the individual sounds together to read a word and segment a word into its individual phonemes to spell it.

Text coherence

The extent to which a text provides information to help the reader relate information across various parts of the text.

Text cohesion

The linking between phrases and sentences that holds a text together.

Text structure

The internal organisation of ideas and/or the overarching framework, made cohesive and coherent by connecting parts of a text or parts and the whole text.

Word reading

The ability to translate printed text into pronounceable words.

Written language

Written language consists of receptive (reading) and expressive (writing) components, and is typically more formal than spoken language including more grammatically, semantically, and conceptually denser.

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