

Very Mindful, Very Multimodal: Digital Texts Affordances for Emergent Readers

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ABSTRACT

The increasing presence of digital texts in early literacy education demands a deeper understanding of how they shape reading comprehension and vocabulary acquisition. This scoping review explores the most current research on digital literacy, emphasizing how early readers engage with digital texts and what this means for curriculum development. With the rise of one-to-one digital devices in classrooms, particularly following the COVID-19 pandemic, students are reading and interacting with texts in new ways, yet research on early literacy has often lagged behind these technological shifts. Digital texts are more than digitized print; they introduce multimodal features that require different cognitive processes and instructional approaches. Findings suggest that high-quality, narrative-driven digital texts with interactive affordances can enhance meaning-making, comprehension, and vocabulary learning, especially when paired with thoughtful instructional scaffolds. However, gaps remain in understanding how students transfer literacy skills between print and digital formats and how educators can best integrate digital literacy instruction into early reading curricula. This review underscores the need for continued research into the evolving role of digital texts in literacy development, ensuring that instructional practices keep pace with the realities of 21st-century reading environments.

KEYWORDS

digital literacy;
digital texts; early
literacy; reading
comprehension;
vocabulary
acquisition

While there is pivotal research in the areas of digital literacies, digital texts and storytelling, with adolescent literacy (Boffone & Jerasa, 2021; Curwood, 2011; Green, 2021; Jerasa & Boffone, 2021; McBride, 2023; McDaniel, 2024; Thomas & Stornaiuolo, 2016, 2019), there is a need for more understanding and research on these topics that can lead to pedagogical implications for early literacy. Specifically, how the rise of digital devices and digital texts, or their potential uses in early reading instruction, could shift reading instruction for emergent readers beyond print-dominant traditions. If contextualized by the COVID-19 pandemic that widely caused instructional shifts to e-learning with digital devices, tools, and texts (Yan et al., 2021), digital texts in the classroom since the pandemic shift may vary from simply once- printed or traditional texts that have been digitized, to an entirely new and developing category of text in its own right (Paran & Stadler-Heer, 2022). When looking at the current research, what defines digital texts, how the components of those texts influence early reading comprehension and vocabulary acquisition, it is necessary to understand what these studies offer as far as implications or recommendations for practice. Further analysis of research to practice is crucial when considering the magnitude these digital elements hold in modern life regarding reading and consuming information.

From infancy, children are much more likely to be in front of screens interacting with digital material than they were ten to twenty years ago (Konca, 2021; Mannell et al., 2024), which

would show a critical need to include digital literacy components that respond to the growing need for understanding and engagement with digital texts and screen reading (Coulanges et al., 2024). We must also consider the “digital native” fallacy that may posit young children as such but does not consider the layers of context that define a child’s familiarity with digital devices or tools (Bittman et al., 2011; Kirschner & Bruyckere, 2017). This paper argues that while some students may be comfortable, familiar, and adept with digital technology, this may not translate to reading and learning with digital texts, as these texts require specific skills to help students monitor and be strategic with the content they are engaging with. Exploring the most current research regarding digital texts and literacy components in early literacy, the goals here are to glean what affordances digital texts may have for early readers and what this means for early reading instruction.

Digital Literacy and Digital Texts in Literacy Theories

To frame these goals, digital literacy will refer to the skills and ways of thinking needed to read, write, and communicate with digital components, tools, and texts and in digital spaces (Gilster, 1997; Secker, 2018; Spires et al., 2019), and this definition is constantly developing as technology does and can encompass other literacy subsets (Nichols & Stornaiuolo, 2019). Here, digital literacy is both how young children engage with and use the technology, but also how to make meaning with the content with technology. Spires et al. (2019) view digital literacy through three buckets of locating and digesting content, creating content, and sharing content. These practices go beyond just skill-based learning with digital texts, but call for young readers to make complex, individualized decisions with texts that go beyond what may occur with print-based texts or in-school literacies (Marsh, 2016; Marsh et al., 2018; Neumann et al., 2017). With the continued rise and evolution of technology, the need for pedagogical decisions that support digital literacy components is momentous to address the growing number of ways that children interact with information on screens and online. With the ever-changing nature of what is digital, young readers need additional support to engage with technology, how to engage with it for different purposes, and how to make use of the tools that digital texts afford.

Digital literacy falls into the new mediums and new approaches called for by multiliteracies and new literacies (New London Group, 1996; Cope & Kalantzis, 2000; 2009; Gee, 2002). Multiliteracies asks educators to consider what the digital world will demand of students as they read, write, and communicate through multiple modes (Cope & Kalantzis, 2009; Kress, 2000b; Curiel, 2023) and across multimedia technologies that push traditional notions or definitions of literacy (Swift, 2023). New literacies build upon the multiliteracies by arguing that literacy is not just encapsulated by in-school practices as students are making meaning, sharing language, and communicating for many purposes (Alvermann & Moore, 2011; McCarthy et al., 2020); the name itself implies literacies are multiple and renewing (Lankshear & Knobel, 2011; Leu, 2017). As a facet of these theories, digital literacy calls for literacy education in the age of globalization, multimedia, and technology to equip students with literacy tools and skills to engage in digital spaces critically and pragmatically (Alvermann, 2002; Gainer, 2012; Flewitt et al., 2015; Harrison, 2017). Digital literacy also requires explicit instruction and pedagogical decisions that frame digital learning that does not equate prevalence of the technology with equal access or understanding as digital devices and tools are not equally accessible to all students (Ng, 2012; Rowsell et al., 2017; Hadad et al., 2023). In digital environments, where students would be engaging with texts, students will interact with an amazing amount of content. Content that is inherently multimodal and requires alternative approaches for reading, writing, and communicating (Kress & Jewitt, 2003; Yellend, 2016). Students have to be equipped to know

how to engage pragmatically and effectively for their own goals and to make meaning in those spaces. Beyond those technicalities of engaging with digital content, digital literacy encompasses students engaging with content and tools that allows them to take more ownership of their learning (Li, 2017), and the sociocultural aspects of digital literacy includes this authenticity and ownership versus what is afforded by printed or offline texts or ways of creating (New London Group, 1996; Lankshear & Knobel, 2011; Gee, 2012; Neumann et al., 2017; Meoded Karabanov & Aram, 2024). With these theoretical framings in mind, it is important to define digital texts in their current reiterations to better understand their potentialities in early literacy instruction.

What are Digital Texts Now

Digital literacy can encompass all the means of action with digital tools, devices, components, etc., but when considering the research of digital literacy and digital texts, early literacy may lack the depth of scholarship found with the lens of adolescent literacy. Also, what a digital text is continues to evolve. From CD-ROMs to educational media on television, then the dawn of accessible internet in schools, which brought ebooks, websites, video sites, and apps, digital texts shifted alongside their technology. Digital texts may also include texts that were once print and are static screen reading. The evolution of these texts is perpetual, and the following review of literature aims to look at what scholarship says about what digital texts are right *now* while also considering reading comprehension and vocabulary acquisition.

Digital Texts are Different

Digital literacy engages students in spaces that are inherently multimodal. This inherent nature of multimodal reading can be an opportunity for educators to reconfigure early reading instruction, one that acknowledges the growing presence of multimodal texts students engage with in the 21st century and also maintaining a strong focus on foundational print-based skills (Crane-Deklerk, 2020; McKee & Heydon, 2015; Yellend, 2016). While the teaching of reading with print texts is not behind us, there is still a great need for instruction of digital reading skills to interact with and make meaning of digital texts. For early readers, digital skills depend on the medium; just because young readers may be considered “digital natives” this does not mean that they automatically possess the digital skills necessary to comprehend digital texts (Bittman et al., 2011; Florit et al., 2022; Kirschner & Bruyckere, 2017). Many more texts are now available to children with the availability of tablets and phones, where there is text on websites, apps, videos, streaming services, and social media. Therefore, the need for early literacy to encompass the teaching of digital texts is pertinent. One perspective is that multimodal, digital texts in early literacy could be approached from a storytelling lens (Kim & Hachey, 2021) where young children can both engage with and create stories simultaneously as they read and retell stories (Kelly, 2017, 2018; Kim, 2019). Similarly to the approach educators may take with print-text, such as picturebooks or other literature, this perspective extends to include the multimodality that pulls young readers into the storytelling to include more opportunities for students to make meaning.

Digital texts, such as videos, storybook apps, and others pull in communication as an element of digital literacy. Multimodality in digital texts has the potential to deemphasize print text and language features for other modes of communication (Wang et al., 2019) which would expand opportunities for students to engage in storytelling that is important for emergent readers (Early et al., 2015). For example, while print picturebooks obviously are an integral part of early reading instruction, the affordances of multimodal texts, digital texts can extend imagery to video and even be malleable to the user so that young readers can make their own images to demonstrate

meaning (Marsh et al., 2018; Oakley et al., 2020; Undheim, 2023). Considering the digital affordances of digital texts such as automatic animations of illustration, hotspots, navigation options, animation hotspots, further research is needed to connect these affordances to literacy outcomes for emergent readers (Wang et al., 2019). The affordances of digital texts, even just through the lens of storytelling, give educators options to consider how digital texts can be included in early literacy instruction and for what purposes.

Focusing In on Reading Comprehension and Vocabulary Acquisition

Digital texts include visual, auditory, and action modes and have multiple pathways for reading, which means more decision making while reading (Wang et al., 2019). Possibly complicating instruction use of digital texts is an ongoing battle of what underpins reading comprehension, how best to teach reading, and with what tools or texts. In the Simple View of Reading (SVR), Gough and Tunmer (1986), as cited by Kim (2023), suggest “reading comprehension is the product of decoding and language comprehension, in which both skills are necessary and not alone sufficient for readers to understand what they read” (p. 196). When engaging with digital texts, educators may consider how the multimodality of those texts may require instruction that engages young readers beyond phonics and decoding, like that of print-based texts, therefore placing different purposes on these texts. With the Active View of Reading (AVR), Duke and Cartwright (2021) expand SVR and incorporate more evidence on the development of reading comprehension. The AVR approach emphasizes decoding and language comprehension, but gives more context with the difficulties relating to comprehension. AVR acknowledges that difficulties with reading comprehension can extend beyond the inability to decode, as content knowledge plays a key role in comprehension alongside vocabulary knowledge. Therefore, the AVR suggests that decoding and comprehension skills cannot be completely siloed; they often overlap. With this framing, the multimodal nature of digital texts may necessitate additional or specialized instruction as digital texts include multimedia components, intertextuality, and hypertextuality, which means students are reading beyond just what is on the page, top to bottom. To avoid a limiting perspective on how digital texts can be used in early reading instruction, it is worth exploring how digital texts may aid in the complexities facing educators as they guide students through language learning and reading comprehension.

With this in mind, because of the variance and complexity of digital texts, a perspective to approach reading comprehension with digital texts may align with Moje (2018): “[R]eading is a complex, multidimensional cognitive process in and mediated by social and cultural practices” (p. 2). Also, Compton-Lily et al. (2020) argue that reading comprehension is complex and, therefore, requires complex solutions. Scarborough (2001) suggests that the skills that underlie word recognition and language comprehension are a braided rope that tightens as young readers develop. Zooming in on each of those strands and elevating pedagogical decisions around texts that elevate meaning conversation and engagement with texts (Cabell & Zucker, 2024), opens the possibility that digital texts could aid in instructional decisions that help strengthen those strands for students as there can be more individualized instruction, text selection, and digital tools as aids.

Reading comprehension requires dynamic thinking and critical, active engagement in the text (Shanahan, 2005), which digital texts may afford with their multimodal features that can be leveraged for early readers. While reading difficulties for young readers goes beyond word recognition and comprehension, reading comprehension, being able to understand, retell, and make critical meaning of what is being read, is paramount as students progress through reading development with more and more complex texts. New Literacies (Lankshear & Knobel, 2011)

gives further perspective on the affordances of digital texts as digital tools allow for meaning-making pathways through interactivity, more choice with the text, and ways to transact between texts. All alluding to the hope that digital texts and reading comprehension can actually be a hopeful piece to the digital age, considering the breadth of choices, tools, and availability to students.

A Note About Vocabulary Acquisition

The more vocabulary students know and can recognize, the more complicated texts they can read and understand. Educators know, as research has found, explicit and implicit vocabulary instruction is important and that students need in-depth and repeated interactions with word lists or crucial words in order to cement them into meaning as vocabulary instruction should also be focused on engaging students with analytic thinking about word meaning and teaching an emphasis on the relationship between word means (Shanahan, 2005). In early literacy, as children are cognitively gathering and soaking up as many words as they are surrounded with, and building off the focus on comprehension, building sight vocabulary is an essential skill for recalling words and text-reading (Ehri, 2013). As students are engaged with, even playing with, digital texts or apps, they may be naturally exposed to more vocabulary (Masters et al., 2023), whereas many digital texts have vocabulary tools embedded in them.

However, vocabulary is not just learned by hearing it but also by reading it in print. With digital texts with additional tools for young readers, there needs to be a broader understanding if these tools aid in vocabulary acquisition. One consideration is the availability of digital texts or storybook apps that include narration, since read-alouds are important for vocabulary acquisition and pronunciation (Ehri, 2013). From an instructional perspective, vocabulary knowledge and reading comprehension should not be in isolation as teaching the meaning of words in text supports comprehension, but the most important thing is teaching students how to approach a word they do not know on their own. This could be an area where digital texts are superior to print text considering the tools that those texts may have to aid with students working to discover word meanings. With digital texts, students may be engaged in more active processing of vocabulary (Orcutt et al., 2023), and digital texts may have more affordability to aid students in working with unknown words. Considering that vocabulary acquisition and fluency are the bridge makers between word recognition and comprehension (Cartwright, 2021), there are exciting pedagogical possibilities regarding how digital texts could shift students' scope and breadth of textual availability.

Locating Current Research on Digital Texts, Early Literacy, and Practice

To locate the most relevant research and identify gaps in research regarding digital texts in early literacy, this paper draws on a synthesis of research collected through a scoping review. The purpose of the scoping review is to locate the most recent research on a topic, the key themes from a synthesis of that research, and what gaps in research remain on the topic (Peters et al., 2020). To guide the search, the following question grounded this review: *How are emergent readers' engagement with digital texts shaping or changing what we know about practice regarding reading comprehension and vocabulary acquisition?*

Scoping Review Searches and Results

To begin the search, an inclusion/exclusion criterion was determined to generate and narrow the most relevant research, and search terms were generated to conduct a thorough search of at least

one database (Peters et al., 2020) (see Tables 1 and 2). These results were then narrowed through screenings to ensure that each article met the review’s requirements and goals before a thematic analysis was conducted to extract data using inductive coding (Peters et al., 2020; Saldana, 2016) (see Figure 1).

Table 1: Inclusion Criterion for Scoping Review

Date of publication	January 2019 – May 2024
Language	English
Publication type	Peer-reviewed journal articles, empirical research articles, and practitioner articles
Location context	U.S. public schools
Grade level context	Early literacy education, preschool, elementary education
Digital literacy	Must contain research/data regarding digital texts in regards to reading comprehension and/or vocabulary acquisition
Quality	Must be a peer-reviewed publication in a reputable journal and provide recommendations for practice or curriculum implications

The inclusion criteria above helped guide the search during the review as these limited the selected studies to only include the most recent, relevant research regarding the topic. Articles were only selected if they fell within the outlined “date of publication” period above. This was important to the review as part of the purpose hinges on looking at how the COVID-19 pandemic digital shift may have influenced or been influenced by the increased use of digital devices, tools, and texts. Another important criteria was the selection of U.S.-only studies that further narrows possible instructional implications for educators. The results using these aforementioned criteria are outlined below.

Table 2: Search Terms and Results from Scoping Review

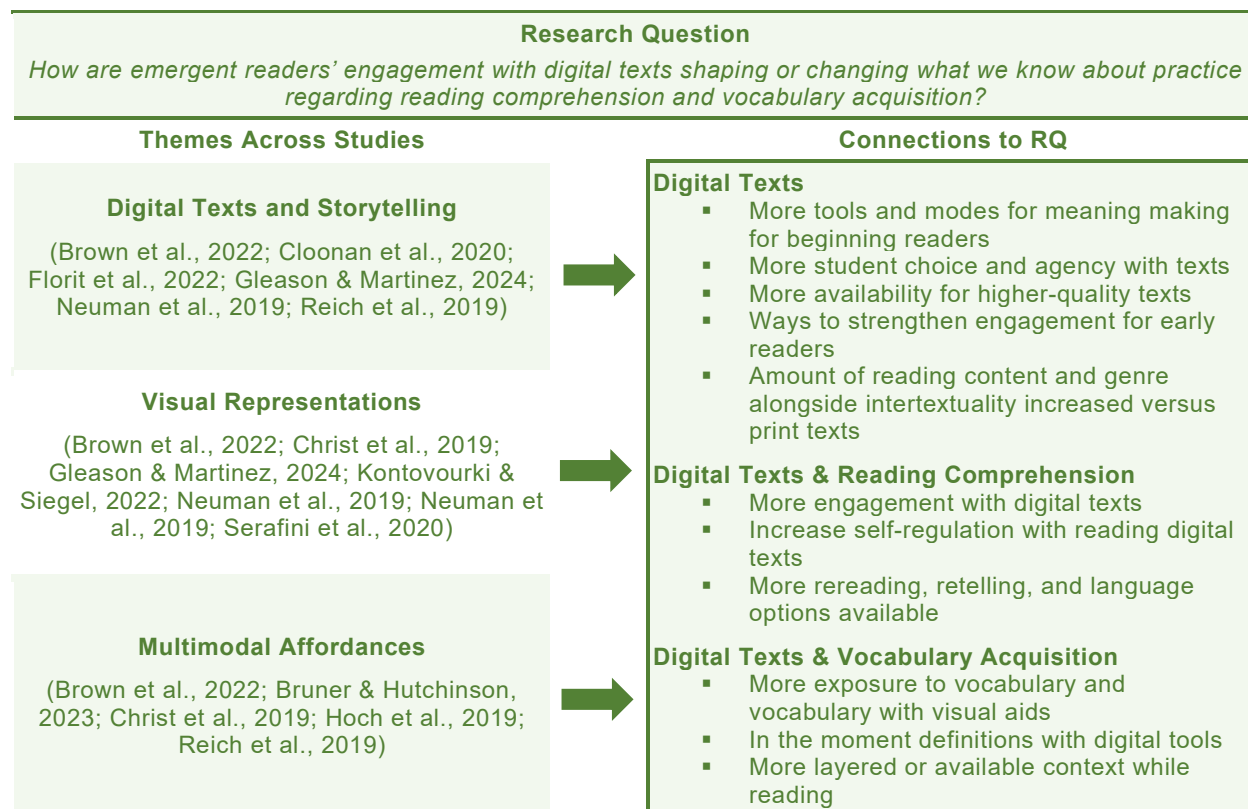
Searches	Total Results
By Search Term	96
▪ Digital texts + comprehension + early literacy	57
▪ Digital texts + vocabulary + early literacy	39
Screening Results	
Abstract Screening	45
Full Screening	11

The search terms above initially yielded 96 results. After further screening, utilizing the inclusion criteria, eleven studies were selected that gave insight on digital texts, reading comprehension, vocabulary acquisition in an early literacy context with curriculum implications. Most studies were excluded because of the publication date criteria and location context being set to only U.S. public, K–12 schools, outlined in Table 1.

Scoping Review Findings

From the literature reviewed, several themes emerged. These themes all strongly correlated to the importance of multimodality and transferring modalities across texts with digital texts in the early grades. As research studies were only included in this review if explicit recommendations or implications for practice grounded their work, outlined below are the major themes from the research and approaches for educators to consider with digital texts in the classroom (see Figure 1). These themes are expanded upon in the following section.

Figure 1: Results from Scoping Review



Digital Texts and the Affordances for Emergent Readers

To return to the purpose of this paper, below the studies are examined to see what their research indicates about how current forms of digital texts may shape or transform early literacy components such as reading comprehension and vocabulary acquisition. Provided below is that research, extracted from the scoping review, paired with some instructional approaches for educators to consider when incorporating digital texts into their classroom.

Storytelling Goes Digital

What was clear across the results was the connection between narrative structures, narratives, or storytelling aspects on digital apps. This paired with collaboration between peers either in buddy reading or creating their own retellings of a text using digital tools helped students make meaning through connections with others and by students becoming creative communicators (Gleason & Martinez, 2024). When using digital texts or tools to read or create

stories in the classroom, storytelling may take visual forms, through images created with digital tools, that is an important early literacy skill for emergent readers as they make meaning and examine context (Gleason & Martinez, 2024). This is also clear in Brown et al.'s (2022) work where they found students took up different digital tools, manipulating them, to show their understanding of the stories in deep contextual ways such as making connections to real-world experiences alongside emotion, language, and culture. Digital texts, because of their intertextuality and hypertextuality, may give students more opportunities to explore stories through more perspectives or build upon perspective through their own retellings. The tools present in digital texts can be used as scaffolds for meaning making, and this is especially important for emergent multilingual students who may need more support beyond print-text (Gleason & Martinex, 2024).

Narrative structure appears to be important for early literacy and digital texts. Narrative structure capitalizes aids in comprehension (Brown et al., 2019; Neuman et al., 2019) and as young readers recreate or retell stories as a means of storytelling, students may expand beyond the “traditional repertoires of print-based text to include visual media and popular digital images” (Gleason & Martinez, 2024, p. 58). These studies showed that with digital texts, when selected from options that are narrative in style and give students multiple ways to respond to the text, students are both reading and writing through retelling. As retelling is a seminal assessment of reading comprehension, it is important to consider how digital texts or tools can be used for students to retell what they read using different modalities, and as Brown et al. (2022) found, it could have positive benefits for students such as multilingual students. As educators are considering how to use digital texts around storytelling, narrative retelling with imagery could be a strategy that piques interest with young readers, gives them agency, and supports their reading comprehension through deeper contextual narration where young readers can infuse responses to text with their own identity and pull from various aspects of their language repertoire.

The types or genres of digital texts seem to differ regarding students' engagement with the text and this affects comprehension (Florit et al., 2022). As described here, narrative stories had the most positive correlation between reading the digital story and improved reading comprehension and vocabulary acquisition. Children may prefer reading narrative or descriptive texts on screen (visual; Florit et al., 2022). This may not be surprising considering how much digital content is consumed by young and old alike in our current digital age. But, it is important to remember that it is not just the visual as narration plays a vital role (Reich et al., 2019). Narration is a key component of digital texts and could be an important pedagogical tool in the classroom when considering how it may be used beyond the typical teacher-whole group read-aloud. Digital texts that are narrative in genre, and include narration options, could provide teachers with increased opportunities for small-group or individualized read-aloud time that is more tailored to students' needs. To approach small group instruction around a text, a renewed approach to literature circles could help educators approach literature with multimodal texts and multimodal responses to text (Cloonan et al., 2019). Combined with the multimodal features of quality digital texts, and the extended ways young readers can making meaning or show understanding, literature circles where students can discuss texts, collaborate to explore the text, and take on roles within their groups to create digital representations of their reading could further support students' comprehension and vocabulary acquisition with digital texts rather than just focusing on individual reading with the text.

The Importance of Visual Aids

Digital texts' affordances regarding visual aids and representations may help emergent readers' reading comprehension (Forritt et al., 2022; Neuman et al., 2019). As early readers are engaging with text, with listening, visual aids as part of the storytelling or options for visuals could lead to increased understanding of a text. It is important to note, however, that early readers may process digital texts superficially without teacher scaffolding or mediation and digital reading may require a higher cognitive load (Florit et al., 2022). Digital texts may also aid in listening comprehension and vocabulary learning: "when stories were accompanied by visual or other nonverbal information, the vocabulary words were retained better than if conveyed alone" (Neuman et al., 2019, p. 33). Neuman et al. (2019) refers to the process of dual coding as early readers process information in tandem but on different channels, one verbal and one nonverbal (such as images). Digital texts and media like in videos would be an example of this process and is important as more and more text is tied to video imagery. While picturebooks include visuals, Gleason and Martinez (2024) argue that digital texts can go beyond the static print-based text and visual text. Cloonan et al. (2020) suggest a step further for educators to have students also engage in responding to texts multimodally using the digital tools that may accompany the texts to pull in various modes of communication to represent meaning like language tools, digital imagery, and collaborative retellings.

As referenced, the amount of time that children are in front of screens has increased significantly (because of mobile devices and other digital devices), meaning that children are engaging with digital content and texts outside of school, and educators could lean into this new reality (Neuman et al., 2019). Looking at educational media on streaming services, Neuman et al. (2019) found that quality educational media could be important to promote oral vocabulary knowledge in the early stages of language growth, and a large majority of that education media includes vocabulary scenes to support students in-the-moment vocabulary work. The visual component of this educational media is part of the appeal and may be part of the way forward when thinking about how young children may gain vocabulary skills alongside other literacy skills. Connecting back to school settings, Neuman et al. (2019) found that in order for the educational media to be the most effective, it had to be engaging enough to hold the child's attention, which may inform educators in their selection of digital texts for the classroom. The higher quality of images or visuals paired with the more engaging story, could lead to higher reading comprehension results.

Also, considering how students may use digital tools, such as images and visuals, to make meaning and build vocabulary, Brown et al. (2022)'s work with visual-text composition relates to Bruner and Hutchinson's (2023) work with teaching the actual navigation of digital texts and tools alongside the comprehension of those texts. They echo the importance of engagement with digital texts and books. Eutsler and Trotter (2020) found that children who read the digital books were more likely to want to read another book and children showed slightly more attention while reading the digital text (more engaged and read for longer; Eutsler & Trotter, 2020) which may be attributed to the visual nature of digital text.

Digital texts include visual modes and auditory and action modes, and have multiple pathways for reading, which means more decision making while reading (Christ et al., 2019) which research from above indicates more engagement with the text. So, when considering how to select digital texts and digital books, high interactivity, affordances that transform children's meaning making as compared to paper books, intuitive developmental appropriateness, and good narrative/illustrative quality are all elements to consider (Christ et

al., 2019). Also, alongside the narrative/illustrative qualities, the digital tools or elements of digital texts or books can also aid in comprehension when pre-taught as word hotspots led to better inference/critical thinking outcomes which could lead to higher vocabulary acquisition (Christ et al., 2019).

Educators also need ways to assess early readers' use of the multimodal resources available with digital texts. While the research indicates that visual aids are an important aspect of digital texts in aiding with reading comprehension and vocabulary acquisition, understanding how individual students respond to those resources is important as students will be engaging with texts that go beyond language-dominant texts. In their work studying young learners' multimodal sign-making, Kontovourki and Siegel (2022) found that print-dominant, fixed concepts of understanding texts, and who or what guides that understanding, is complicated by the multimodal responses students can make around and with digital texts. As good, quality digital texts may go beyond the capacities of print-based texts, it is important to consider that emergent readers meaning making of those texts may not fit into text-centered or print-based meaning making (Kontovourki & Siegel, 2022), and that opens the door for more opportunities for young readers to express their understanding of a digital text through simultaneously engaging with and making texts.

Also, just as digital texts may be used and approached in different ways than print-texts, neither abandoned for the other, students' engagement with these texts deserves a different type of assessment. Serafini et al. (2020) provide such a protocol for assessment to assist educators in analyzing students' reading decisions with multimodal texts. This protocol includes specific categories of assessment that are specific to multimodal texts, such as digital texts, like whether students are focusing on written text, visual images, or design features (Serafini et al., 2020, p. 290). As previous studies have indicated the need for educators to shift their monitoring of students engaged with digital texts, this may give them a protocol to help guide students as they make decisions with digital tools embedded in digital texts.

Multimodality is Key

Multimodality really is the heartbeat of quality digital texts, and the multimodal affordances of digital texts must be harnessed for different purposes than how educators may approach instruction print texts. Reich et al. (2019) looked at how electronic reading compares to print reading and found that it depends on the text and with the students' understanding of using the digital device or app. As previously discussed, the multimodality of interactive digital texts may support emergent readers' comprehension outcomes (Christ et al., 2019). Finding that students had a layered use of modalities, each child had a different approach to which multimodal features they used or did not use (Reich et al., 2019). While print-text features may be pre-taught, this further suggests that educators should scaffold the learning of an app or a digital text with its modalities as without these scaffolds students' reading comprehension may actually be hindered (Christ et al., 2019). With so many more texts now available to children, text on websites, videos, and other apps, how to navigate those multimodal texts has to be part of the pedagogical approach with digital texts. Digital devices with storybook apps allow for books that can be read without a mediator, but that does not erase the need for a teacher mediator or scaffolding, and while the "Read-to-Me" feature or similar is important, and a great aspect of digital text, Reich et al. (2019) found that there needs to be a greater discussion about why teacher mediator is still key even for digital texts that include teaching elements. With such features, students can engage with apps or digital texts that may not be

relevant to the story without proper scaffolding with how to engage with the text and utilize its multimodal tools pragmatically (Reich et al., 2019). While digital texts may include more ways for early readers to engage with a text, with many great tools available, there is still the need for educators to scaffold the text and help students navigate it while they read. This may give educators an opportunity to consider when digital texts may be more appropriate or not for instruction. Educators can consider the need for individualized reading opportunities, and the affordances digital texts can have for students in this capacity, versus times of whole-group, direct instruction with print-texts.

Brown et al.'s (2022) work with emergent multilingual students and digital texts and tools shows, again, how digital texts can be used as part of good-accommodation practice in the classroom. As the U.S. has a growing multilingual population, Brown et al.'s (2022) suggest that educators consider how translanguaging as a multimodal practice could be relevant with digital texts. Multilingual students' reading comprehension is often assessed in ways that does not account for their full linguistic repertoire whereas digital texts and tools can allow for a wider breadth of multimodal reading and composition. Considering reading comprehension affordances of digital tools, multimodal interactions promoted stronger meaning-making experiences, and digital tools help with independent decision making. Tools such as text editor functions, speech bubbles, and even emojis as a semiotic resource all supported emergent bilingual students in the study (Brown et al., 2022). Again, educators can lean into what multimodality offers students through the use of digital texts and tools.

Being able to navigate a digital text, which may require a higher cognitive load, requires specific reading strategies (Florit et al., 2022). Shimizu (2024) looked beyond narrative texts at static reading passages like those used in standardized testing where static digital texts are presented digitally but do not include any or the quality of interactive or multimodal elements as discussed so far. While this type of text goes against what the other studies have found regarding what types of digital texts result in higher reading comprehension outcomes, Shimizu's (2024) findings are important for educators to consider as these are also the types/genres of digital texts students encounter, especially considering the reality of standardized testing in U.S. schools.

Digital reading is multifaceted, with greater need to be strategic and critical, needing the ability to synthesize over many multimodal sources, being an active reader is heightened with digital texts (Bruner & Hutchinson, 2023; Shimizu, 2024). With paper to screen reading, as many of the texts that were previously read on paper, such as those used in standardized testing, are now digital. When educators consider how to scaffold students with digital reading, reading on screens may factor into that even if that means students are engaged with high quality, multimodal texts (Florit et al., 2022). Navigating digital texts is as much a part of digital learning as knowing how to interact and create digitally (Bruner & Hutchinson, 2023). This is key because digital texts require different skills of engagement than print-based texts. According to Bruner and Hutchinson (2023), digital texts are "intertextual, multimodal, immediate, abbreviated, informal, multi-authored, creative, interactive, hyperlinked and involve a diverse array of participants and languages" (p. 748). Because of their multimodality, Bruner and Hutchinson (2023) see approaching digital texts through a disciplinary lens using specific disciplinary literacy practices common across academic disciplines and acknowledge how features of digital texts are different from printed texts. This would indicate that each digital text would need to be approached with a specific purpose

as each text has a different set of multimodal affordances and can be utilized for different learning goals (Hoch et al., 2019).

Another consideration for educators when using digital texts in the classroom, like the storybook apps or high-quality digital texts, is the link between paired or small group reading and higher comprehension outcomes with digital texts. Christ et al. (2019) compared individual and buddy reading of app books, looking for comprehension outcomes (unprompted retelling, prompted retelling, inference/critical thinking responses, vocabulary-meaning generation). They found app book affordances (or tools) linked directly to individual reading outcomes, appbooks with more hotspots on each page retelling outcomes were better, word hotspots led to higher inference/critical thinking scores. Using these tools connects back to what was suggested earlier about the multimodality of these texts and how that might influence reading comprehension or vocabulary acquisition (Brown et al., 2022). During buddy reading, emergent readers may have more tools to monitor their comprehension leading to better inference/critical thinking scores and showed promise for students' subsequent individual reading because of more possibilities in modeling and scaffolding from the texts themselves, peers, and teachers (Christ et al., 2019). All substantiating the importance of collaboration and mediation, whether by a teacher or peer, when using digital texts in the classroom (Florit et al., 2022). Another approach for student collaboration around multimodal, digital texts is through inquiry projects that are based on teacher-guided, and student-generated, multimodal text sets (Hoch et al., 2019). A text set would allow for planned different uses of texts, beyond whole group instruction, different levels of texts, and different genres of multimodal texts.

The Continued Reshaping of Digital Literacy and Digital Texts

These studies help show that digital texts, through digital storytelling, their capacity of visual aids, and multimodal resources, have the potential to shape reading comprehension and vocabulary acquisition for emergent readers due to their affordances. The multimodal affordances of digital texts gives early readers even more support while reading as students can use tools in the moment to help with understanding both the text and the context. This is especially important for individual reading time, small group or “buddy” reading, and supporting multilingual students (Christ et al., 2019; Gleason & Martinez, 2024). As technology continues to shape how people read, and how young people are learning to read, literacy education will have to continue to adjust what digital literacy looks like considering that the digital skills needed to interact with digital texts are constantly evolving alongside those texts (Florit et al., 2022). The prevalence of digital devices, and as young people are engaged on them even before schooling, will require continued research to understand how literacy education will have to respond to this reality. One reality made clear through this review is that early literacy instruction will have to adjust to engage young children in reading skills that equip them to approach multiple modes of information while engaging with digital texts (Cloonan et al., 2020; Serafini et al., 2020; Wang et al., 2019). Conversely, this points out a gap in the research as there are few current studies on the variety of digital books and what needs to be invested in classrooms as this may be a factor of the fast-paced nature of digital technology and tools. Research may not also account for the vast variability in school resources across the U.S. and the availability of such technology to teachers and classrooms. While it has been established here that digital book features may help comprehension like the digital tools that are available with the books, further research is needed to understand which

digital tools and what are the best quality digital texts to pull from (Eutsler & Trotter, 2020). Christ et al. (2019) questions how much research or classroom practice has looked at the difference between the use of older style digital texts and newer app books further arguing that research is behind the technology. Most studies regarding digital texts have been done with secondary or college students which does not reflect the reality that digital texts can be in every classroom at every grade level.

Digital Texts and the Changing of Early Reading

As the research reviewed for this paper is limited, the changing of early reading instruction because of increased use or availability of digital texts is still in need for further research but there are clear points of consideration for pedagogy. As a baseline, it is important for educators to remember that students will come into the classroom with varying levels of experience with technology (Brown et al., 2022) and with the breadth of digital text, content, and educational media that is available now, children may require more individualized instruction or support when engaging with digital texts (Christ et al., 2019; Neuman et al., 2019) and that engagement may require different pedagogical approaches than print-texts (Kontovourki & Siegel, 2022). Also, educators may need to monitor students' engagement with the actual devices for the digital texts as this novelty effect, where students are more engaged with the device than the text, could lead to an initial peak of engagement that wanes. However, Reich et al. (2019) maintain that sustained engagement with high-quality digital texts, just as with printed texts, is what will have the highest benefit for reading comprehension and vocabulary acquisition.

Comprehension monitoring and teacher mediation are important parts of potential success with digital texts (Christ et al., 2019). Even though digital texts, like storybook apps, have many tools that can engage students directly, the research reviewed shows that there is a need for simultaneous acquisition of basic digital skills with child-adult interactions together with digital texts. This need for adult guidance, adult mediation, helps level the playing field for digital text comprehension across mediums (Florit et al., 2022). As previously noted, educators will need to consider when to engage with moving from whole-class instruction to individual, group, or buddy reading of digital texts and that research suggests that teacher monitoring should continue from whole-group direct instruction with print texts to individualized or buddy reading with digital texts even if that means monitoring students across text choices and/or platforms (Christ et al., 2019; Cloonan et al., 2020). This monitoring can look like aiding in text selection, device usage, monitoring the use or non-use of multimodal tools, and engaging in talk about the text.

When educators are selecting digital texts for instruction, research suggests that narrative or story book digital texts are the best types of digital texts to work with reading comprehension and vocabulary acquisition (Eustler & Trotter, 2020; Reich et al., 2019). Having a dynamic app book selection with appropriately leveled texts, high-quality narrative and illustration options, and digital affordances that uplift interactivity with the text is the best way to consider what type of digital texts are best for reading instruction (Christ et al., 2019). Also, Reich et al. (2019) suggest that in considering the educational affordances of ebooks, it is possible that these verbal outputs during reading, even about the device, could benefit language development. Regarding digital texts, or static digital texts, like those used in standardized testing, Shimizu (2024) also supports monitoring young students' engagement with screen reading and for educators to consider that there are many paths to comprehension

success with digital texts. With static digital texts, linear reading and linear rereading, like with print texts, is most supportive for reading comprehension (Shimizu, 2024), and this is a sharp contrast to other digital texts that are multimodal where linear reading may not be beneficial or appropriate for the text. Again, this indicates that even in early reading instruction, educators need to balance print-reading instruction skills with digital reading skills with strategies that more align with digital literacy components.

The question of digital texts and early literacy will be ongoing and evolving. There is also the question of what young students prefer and how they are engaging with digital texts before schooling (Eutsler & Trotter, 2022). For educators, more research is needed to understand what specific reading strategies best support students while reading digital texts and how educators can work with parents to understand what students are interacting with at home digitally and what types of media may actually be beneficial to students regarding digital literacy outside of the classroom (Eutsler & Trotter, 2022). Also, there needs to be further research into how to balance print and digital texts in the classroom and what the best practices are for early literacy educators when scaffolding the reading of digital texts across the classroom.

As this review, with recommendations for practice, has looked broadly at digital texts and specific reading components reading comprehension and vocabulary of emergent readers to locate the most current research, it is important to acknowledge that there are limitations to this review and needs for future research that includes early childhood educators and their perspectives on incorporating digital texts in the classroom. While research may suggest ways for early childhood educators to approach digital texts, and how to select digital texts for instruction, teachers may be more limited in their ability to make such pedagogical decisions. Therefore, further perspective from educators, specifically early literacy educators, is imperative to research digital literacies.

What was found in this review is that digital texts require specific digital literacy skills to be pre-taught, scaffolded, and monitored simultaneously for students just as they would be with print-texts but differ from those print-based skills. With digital texts, students are engaging through a different medium, they have more choices, and they have more agency in their decision making with the text. As far as the best digital texts to use with early readers, high-quality, narrative digital texts with effective visuals may lead to the best reading comprehension and vocabulary acquisition outcomes.

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Digital literacy, and digital texts, will only continue to change, therefore, the research and pedagogical decisions made around them must also evolve and strive to keep up with the fast-paced nature of technology. What is exciting, however, is that there is clear evidence that digital texts, and however they evolve, may give more students engaged, individualized experiences with reading that may more closely mirror the reading choices they will make out of school. Educators looking to harness these reading opportunities for their emergent readers can look to digital texts to see what the future of reading may encompass.

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