Children and Adolescents' Reading in Print and Digitally

A review for the Curriculum Planning and Development Division, Ministry of Education (CPDD, MOE), Singapore

by
Associate Professor Loh Chin Ee
National Institute of Education, Nanyang Technological University, Singapore
17 July 2020

About the Review
This review was commissioned by the Curriculum Planning and Development Division at the Singapore Ministry of Education (CPDD, MOE) and provides an overview of the current research on children and adolescents' reading in print and digitally, with a view towards informing ecological and evidence-based policies and practices of reading and technology.

About the Author
Loh Chin Ee is Associate Professor and Deputy Director (Research) in the English Language and Literature Academic Group at the National Institute of Education. She recently completed the *Building a Reading Culture* study which examined the reading habits and school library uses of Singapore adolescents in six secondary schools. She is author of *The Space and Practice of Reading: A Case Study of Reading and Social Class in Singapore* (Routledge, 2017).

Table of Contents

Executive Summary

Overview

In the last five years, there has been increasing concern with Singaporeans' reading habits, as reading is necessary for independent and self-directed lifelong learning. Rapid technological advancements have made access to reading resources online easier and more convenient in developed countries such as Singapore. However, access to technology and resources for learning may be uneven. With the acceleration of full home-based learning (HBL) during the COVID-19 pandemic, it is crucial to examine the role of technology in supporting reading and learning. Only by understanding how it works and where it inadequately addresses certain needs can educators design evidence-based policies and practices for localised contexts.

This review examines the attitudes of children and adolescents towards print and e-books, their use of these resources, as well as research on the use of e-books. The general rush to adopt technology should not stop us from exploring how reading and learning are best supported through the use of different technologies, whether traditional or modern. Rather than thinking about print and e-books with an "*either/or*" mindset, policymakers and educators need to consider the functionalities afforded by the individual tool and its application to particular school profiles and contexts.

This review focuses on engaged reading (otherwise known as leisure, independent reading), often a prerequisite for motivated and self-directed reading. It tends to be neglected in Singapore classrooms, where there is a tendency to prioritise high-stakes reading comprehension instruction at the expense of reading practices that encourage students to engage in pleasurable and purposeful reading. Given the emphases of the education system on reading, learning for joy and differentiation, there should be a better understanding of how to motivate students towards self-directed and independent reading for pleasure and learning.

The Findings

The findings are briefly summarised here.
- Children and adolescents prefer to read print to digital texts, although they use more technology and multiple devices for reading as they get older
- Adolescents read more online than children
- Whatever the reading device, children and adolescents want access to good quality reading material and choice in reading
- Children and adolescents who read more in print are more likely to read more digitally. Conversely, children and adolescents who do not read in print may not read more digitally
- Children and adolescents may not be aware of affordances for online reading and often underutilise devices for reading
- Use of e-technology for children's reading can be beneficial when facilitated by a knowledgeable other such as a parent or teacher
- Adolescent preference for print or digital reading is often dependent on the task and nature of the reading activity
- Building an ecology that supports reading, including providing access to a wide range of interesting books, putting aside time for independent reading and having teacher support, is required for reading both print and e-books

- Children and adolescents tend to do better at reading comprehension when reading print than digitally
- Less proficient readers' reading comprehension might be worse when reading digitally compared to more advanced readers
- Early reading skills are associated with greater skill in adolescent and adult digital reading proficiency.

Recommendations

Both print and digital reading mediums can be used to cultivate children and adolescents' engaged reading, though the context of use and student profile needs must be accounted for to determine the appropriateness of particular strategies and mediums. Across different countries, children from advantaged backgrounds where parents are better educated and resourced tend to have more opportunities to access books at home and cultivate reading proficiency and engagement at an earlier age. Children and adolescents who pick up the habit of reading from an early age are likely to read more and use both print and digital mediums to read extensively. Policies that aim to encourage students' independent out-of-school reading should ensure that students have books, devices and resources in the form of programmes and manpower to support their reading, whether in print or online.

An attractive and well-advertised book collection in the school library is essential to motivate student reading. Studies from early childhood to secondary school demonstrate that the content of books is key to attracting students' interest. Whether reading in print or digitally, research suggests that having time set aside in school, having teachers and librarians who support the reading by helping students with text selection, book recommendations and having a school-wide emphasis on reading are vital to encouraging extensive reading. School libraries with professional librarians can mediate student access to books by curating the library collection, assisting teachers and students with book selection and designing programmes to encourage reading.

During the COVID-19 period when schools were closed, many children and adolescents had reduced access to books and reading-related programmes, exacerbating gaps in reading practice, proficiency and engagement. With long stretches of out-of-school learning as a result of HBL, schools should integrate reading for pleasure into online curriculum, teaching and learning, and find ways to motivate children and adolescents to continue reading. Strategies such as curated booklists, book recommendations, read alouds and interesting reading tasks (e.g., reading bingo, online book talks) are strategies that can be utilised to encourage continued reading during HBL. Teacher professional development in the areas of technologies for reading and children's and Young Adult literature are essential to improve teachers' knowledge to support student reading.

Policymakers, schools and teachers need to recognise that reading has to be encouraged through the dedication of time and attention to it in the classroom and through programmes outside the classroom. While best practices of reading may provide useful examples for schools and educators, there is a greater need for customisation of reading programmes that are suitable for individual school profiles. Furthermore, future-ready students should be equipped to become critical readers of information, a skill which encompasses digital and research literacy. Schools and educators should be provided with the tools, skills and manpower that will enable them to purposefully design equitable and effective reading approaches to support children and adolescents' pleasurable and purposeful reading, whether in print or digitally.

1. Introduction

The Context

In an age of ever-increasing technological advances, people movement and multimodal exposure (Alexander & The Disciplined Reading and Learning Research Laboratory, 2012), reading as a core literacy skill with the potential to improve students' learning and life chances (Cunningham & Stanovich, 1998) is no longer something to be acquired during early childhood and the primary schooling years, but is "viewed as an expanding set of knowledge, skills and strategies which individuals build on throughout life in various situations and through interaction with their peers and with the larger communities in which they participate" (Kirsch et al., 2002, p. 24). Students need to be engaged readers who are motivated to purposefully and independently read for learning and leisure.

At the same time, the increase of access to digital technologies and full HBL during the COVID-19 Circuit Breaker has highlighted the need to better understand how to support students' engaged reading through different technologies. In recent years, the sharp increase in availability and affordability of digital devices over time means that children and adolescents today have more access to various non-computer devices for reading (Singer & Alexander, 2017), though access may be uneven across different income groups. Within Singapore, the National Library Board (NLB) has made e-books easily available with the launch of the NLB Mobile app as part of its Reading on the Move initiative in 2016 to increase public access to books. During the COVID-19 pandemic, when public libraries had to be shut down as part of the country's social distancing measures, NLB provided even more resources in the form of e-books, e-magazines and audio books for public borrowing (Lam, 2020).

Given these technological initiatives and the continuing need to encourage our students to develop engaged reading habits, it is vital to examine the trends in technology and reading for children and adolescents. Understanding pros and cons of print and digital reading within specific contexts will allow for the design of evidence-driven, ecologically oriented approaches to the provision of books and design of reading curriculum and programmes for children and adolescents.

As such, this review examines children and adolescents' habits and preferences, as well as trends regarding reading in print and digitally, in order to better understand how to support children and adolescents' engaged reading practices.

Research Questions

This review seeks to examine the following research questions:

(1) What are the trends regarding children and adolescents' reading in print and digitally, in relation to leisure reading and reading comprehension?
(2) What implications does this have for the design of reading curriculum and instruction, as well as school libraries?

Definitions.

For this review, **reading** is defined as the meaningful decoding and comprehension of texts in print and digital formats. **Reading in print** refers to reading on paper whereas **reading digitally** refers to the reading of textual material online, whether on a reading device, smartphone, tablet or computer (Loh & Sun, 2019)[1]. Reading digitally can include reading e-books in digital formats that are similar to the linearity of print books, as well as texts with hyper-links and articles online.

We have limited our focus to the reading of **continuously linear texts**, whether fiction or non-fiction, as the reading of long-form texts has been found to correlate to reading proficiency and academic achievement (Duncan et al., 2016; Jerrim & Moss, 2019; Moje et al., 2008; Zebroff & Kaufman, 2017). Where a study's scope includes reading of short texts such as online articles and social messaging, it has been flagged.

Engaged reading is self-directed and independent reading. Engaged readers gain pleasure from their reading, are confident in their reading and strive to understand through their reading (Afflerbach & Harrison, 2017).

Leisure reading, extensive reading, recreational reading, and independent reading are some terms often used interchangeably to describe students' self-directed out-of-school reading, whether for pleasure or learning (Gambrell et al., 2011). The report uses the term engaged reading as the broad umbrella term to capture students' autonomous and self-selected reading.

Children in this review generally refers to those aged 5 to 12, and **adolescents** refers to those aged 13 to 17.

2.   Trends in Reading in Print and Digitally

Print and Digital Reading Preferences of Children and Adolescents

Overall, the research data shows that children, adolescents and adults **prefer reading print** to digital texts, though older adolescents and adults do use technology for reading more than younger children (Clark & Picton, 2019; Loh & Sun, 2019; Merga, 2014; Rainie et al., 2012).

The data across countries generally shows that older children were more likely to engage with digital texts than younger children. In a study of 791 children aged 8 to 11 in Scotland, McGeown et al. (2016) found that older children were more likely to engage with digital texts. Adolescent preference for print or digital is often dependent on the task, with print usually preferred for reading for pleasure or recreational reading, and digital for informational reading or search tasks (McKenna et al., 2012)[2]. In the *Building a Reading Culture* (BRC) study, Singapore adolescents reported that they preferred to read in print, though they read online more as they get older (Loh & Sun, 2019). Other than preference, issues of concerns about

---

[1] For a more complex and encompassing exploration of the definition of "digital reading", refer to Julie Coiro's (2020) commentary in *Reading Research Quarterly* and Singer and Alexander's (2017) literature review on reading in print and digitally.

[2] This is in contrast to students' reading for academic purposes at tertiary level where the research shows that students may prefer to read print for study purposes, though there are shifts with time and changes in technology, but this is not the subject of this current review.

excessive digital exposure for younger children and the need for adult socialisation may be other reasons that younger children are less likely to be exposed to e-books (Etta, 2019; Kurcirkova et al., 2017; Strouse & Ganea, 2017).

Studies have found that boys have a greater tendency to read digitally, with the caveat that digital reading here includes reading for information and of shorter texts (McElvany & Schwabe, 2019; McKenna et al., 2012; Soek & DaCosta, 2017). In a group of studies in the U.S., McKenna and colleagues examined adolescents' reading attitudes towards (1) recreational print; (2) recreational digital texts; (3) academic print; and (4) academic digital texts. Recreational digital texts were defined in the study to include reading articles, social websites, texting and emailing. While students, especially boys, showed the most positive attitudes towards reading recreational digital print texts, there was no correlation between the reading of digital texts and academic achievement. At the same time, there is a strong relationship between recreational print, academic print and digital academic reading (Lupo et al., 2017; McKenna et al., 2012). Thus, while students may be reading more digitally, whether their out-of-school reading has an impact on reading proficiency and academic achievement may depend largely on the kinds of texts read (Jerrim & Moss, 2019; Moje et al., 2008; Zebroff & Kaufman, 2017).

Reasons for Print and Digital Preferences

Although more children and adolescents reported reading digitally in 2019 than before (Clark & Picton, 2019), adolescents still report preferring print to digital devices in the U.K, Singapore and Australia (Clark & Picton, 2019; Loh & Sun, 2019; Merga, 2014; Merga & Roni, 2017). Avid or devoted readers are more likely to prefer print (Clark & Picton, 2019; Loh & Sun, 2019 Merga, 2014; Merga & Roni, 2017; Miranda et al., 2011; Tveit & Mangen, 2014). The majority of children and adolescents would read both print and e-books, echoing the findings of the U.S. Pew report of adolescent and adult reading that there are very few digital-only readers. Avid readers, who tend to come from better educated and higher-income backgrounds, are more likely to read both print and e-books, likely because their backgrounds allow access to more reading resources through various means (Zhang & Kudva, 2014).

Table 1 lists the reasons for preference for reading in print or digital mediums. The key **functionalities of e-books** are their convenience, portability and technical affordances such as dictionary and font adjustment. On the other hand, **print books** contribute to a sense of ownership, are easier to navigate, support comprehension and are easier to share with others. The choice to use either medium for independent reading depends on the purpose of the reading and the location of the reading. For example, e-books are often preferred for reading while travelling whereas print books are preferred for leisure reading at home (Evans, 2017). Thus, when deciding on whether to invest in print or digital mediums for leisure or class reading, the affordances of each medium as well as the preferences of individual readers should be considered.

Table 1. Pros and Cons for Print and Digital Reading (Hess, 2014; Jones & Brown, 2011; Ketron & Naletelich, 2016; Mangen et al., 2013; McGeown et al., 2016; Tveit & Mangen, 2014).

	Pros	Cons
Print	• Better for eyes • Physical feel of the book • Familiarity or emotional attachment to physical books • Serendipitous discovery while browsing • Easy to navigate • Sense of ownership • Supports comprehension by improving recall of text layout • Easily shared with others	• Physical storage • Available only from physical libraries and bookstores • Cost of books
Digital	• Convenience (portability, quick accessibility through multiple platforms) • Ease of search • Affordance functionality such as backlighting, pop-up dictionary, adjusting font and font size and various features such as automatic page turning and audio narration • Online recommendations • Access to more current material • Potential to access a wider variety of materials online • eBooks may be cheaper	• Distractions • Haptic dissonance of technology • Limited sharing with others • Formatting issues • Multiple platforms • Difficult to navigate • Technical problems • Cost of investing in devices, technology, access rights and hardware maintenance • Electricity for devices • Device features (e.g., light emission) may affect cognitive processing of text • Cybersecurity and privacy issues

Content Matters

Whatever the medium for reading, the **quality of the content** is the most important factor to interest children and adolescents in reading (Ketron & Naletelich, 2016; Wong & Neuman, 2019). In Wong & Neuman's (2019) two case studies of low-income children who read both print and digital media, they found that the content of the storybook had a stronger influence on comprehension than the medium itself, suggesting that children's interest in the reading material is crucial for early literacy. Furthermore, in a comparison of third-grade children's reading engagement using e-books and print books, Jones and Brown (2011) concluded that format was not as important as students' identification with setting, characters and themes of the book. However, the children in the study appreciated the option of having a wide selection of titles and freedom to choose their own books if they were available in the e-book format.

Children and adolescents **desire choice** in reading material (Jones & Brown, 2011; Love & Hamston, 2003; Manuel & Carter, 2015). Access to a wide variety of texts, whether in print or through digital means, is thus important to help facilitate students' free choice and voluntary reading (Ciampa, 2016; Manuel & Carter, 2015; Miranda et al., 2011). Thus, schools considering the adoption of e-books should examine if their students have access to devices for reading as well as a wide range of books via the e-book platform. Physical books in a library may provide equal or greater access to a larger number of students, and facilitate browsing and exchange among different students, especially if students have limited access to devices and e-resources.

3.   The Role of E-Books in Reading

Displacement theory suggests that new media will outrival reading of books as a leisure activity; however, the effect of new media on old media is often more complex than that. Analysing the reading habits of 11- to 12-year-olds and 15- to 16-year-olds in Sweden using cohort data between 1976 to 2002, Johnsson-Smargdi and Jönsson (2006) found that habitual reading, particularly among pre-adolescents, increased over time and remained stable. Increased reading time was more pronounced for high-SES teenagers and least for low-SES teenagers. The sub-group of low-income boys was more likely to report that they *never* read, with the percentages increasing over the years. Overall, pre-adolescents and adolescents spend as much or even more time reading than previous generations, even though they also spend even more time on other media such as TV and VCR viewing (Johnsson-Smaragdi & Jönsson, 2006; Katz et al., 2014; Rideout et al., 2010).

Thus, **technology amplifies existing habits**, with readers utilising devices to read more and non-readers less likely to do the same (Biancarosa & Griffiths, 2012; Johnsson-Smaragdi & Jönsson, 2006). Reflecting print practices, girls read e-books more frequently (Duncan et al., 2016; McElvany & Schwabe, 2019), and more proficient and avid readers read more, both in print and digitally (Loh & Sun, 2019; Merga, 2014). In the BRC study of adolescents in six Singapore secondary schools, it was found that readers who read print were more likely to use digital resources for reading whereas non-readers were less likely to use digital resources for reading (Loh & Sun, 2019).

As such, it should not be assumed that all children and teenagers are "digital natives" (Prensky, 2001) who will naturally gravitate to reading digitally. Children and adolescents may be divided in their knowledge and usage of devices for reading (McVicker, 2019; Miller & Warshauer, 2014). In a Canadian study where children were introduced to the use of iPads and e-readers for reading in school, they continued to associate the use of iPads and tablets at home with game-playing and did not use it for reading (Ciampa, 2016). In studies of children and adolescents in Western Australia, it was found that students generally underutilised devices for reading purposes, even when they were daily book readers. Furthermore, access to mobile phones and a greater range of devices was associated with greater reading infrequency in Australian studies (Merga, 2014; Merga & Roni, 2017). Thus, **the presence of a device does not correlate with the habit of reading digitally**, and educators need greater clarity on how devices are utilised by different profiles for reading, learning or other functions.

Early Childhood Practices of Reading

Children can be receptive to the use of e-book readers (Maynard, 2010). However, it should be noted that while technology can enhance children's literacy skills, its usefulness is dependent on the software and cannot replace traditional print and socialisation with adults while reading (Miller & Warshauer, 2014). For example, while interactive e-books can support vocabulary development, engagement and comprehension of the story, they can also offer distracting features including animations and sounds unrelated to the story (Moody, 2010). In a meta-analysis of multimedia and interactive features in e-books, Takacs et al. (2015) noted that while multimedia features contributed to story comprehension and vocabulary, interactive features that distracted children were negatively associated with story comprehension and vocabulary gain. Thus, choice of type of e-book or app is particularly important for children.

In a study of children's use of digital media and e-books in the U.K., Kurcirkova et al. (2017) found that even highly digitised households use print books for reading. Caregivers of younger children report that young children prefer to use print books and that print books encourage higher-quality interactions between the caregiver and child compared to e-books (Kurcirkova et al., 2017; Strouse & Ganea, 2017). Etta (2019) noted that print books tend to be used for **social purposes** with younger children, and e-books for **babysitting purposes**. This means that adults were more likely to spend time reading with young children, providing them with valuable modelling when using print compared to a device for reading.

Ultimately, the vital aspect for reading with young children is the **socialising aspect**, often provided by a parent, teacher or significant adult in the act of joint-reading. While well-designed e-books can be improved to mimic the scaffolding of an adult in a joint-reading experience (Courage, 2019), this may not be the case for most e-resources marketed. Policy regarding the use of e-books should consider the ecology in which it is used, the age of the child and the provision of human resources to scaffold the use of these resources.

Reading Motivation and E-Books

Much of the research on e-books has been conducted in laboratories (for younger readers) (Revelle et al., 2019; Wong & Neuman, 2019) or in the classroom (Brueck et al., 2019; Ciampa, 2016; Hutchinson et al., 2012; Moody & Swafford, 2019; Tveit & Mangen, 2014). When considering the research on reading digitally, it is crucial to determine whether the e-books are to be used at home or in the classroom. This is because access, as well as the teacher and peer support present in school, is not necessarily present in home contexts. Thus, the context of use affects whether the medium is used for reading at all, and if so, how it is used.

In one Canadian study, Ciampa (2016) found that low-proficiency Grade 1 students could be motivated to read e-books during literacy hours. Reasons given for their enjoyment of e-books included the e-book text features, user interactivity, independence, choice and control. Though not all students liked the embedded comprehension questions, they made efforts to attempt the questions. The study noted that while students were receptive to using devices for reading in class, they continued to use devices at home for non-educational purposes such as games, rather than reading. The **novelty effect of new technology** which motivates some students to read may wear out with time. With extensive screen use during HBL, the novelty of using technology for reading may not be a key consideration for children and adolescents. Rather, **task interest and engagement** might be more relevant when planning to integrate e-books into students' learning (Biancarosa & Griffiths, 2012; Brueck et al., 2019).

Using digital devices for reading may motivate particular profiles of students (Hess, 2014). Low-proficiency students and reluctant boy readers may be encouraged to engage with reading through the digital medium (McKenna et al., 2012; Miranda et al., 2011; Tveit & Mangen, 2014). In a study of tenth-graders' self-reported experiences towards literary reading in print and an e-book on a Sony PRS T2, Tveit and Mangen (2014) found that although 65% of the students had a tablet at home, the majority had not experienced reading e-books on their devices. Reading in print or digitally did not influence the subjective experiences of the students; however, reluctant boy readers did value reading more after reading with the e-reader.

Considering **students' profiles** as avid or reluctant print and/or digital readers may also provide insight for designing strategies to engage reluctant and disengaged adolescent readers through use of different media and strategies (Jang & Henretty, 2019). Studies on digital reading suggest that some non-readers may be encouraged to read using digital resources, including interactive fiction apps (Hall, 2019) or fanfiction on mobile phone apps (Kuzmicova et al., 2018). The availability of alternative resources and the access to instant reading material may appeal to some adolescent readers, and can be used purposefully by teachers to encourage student interest in reading.

Promoting Reading Using Print and E-books

It may be that reading digitally works best when harnessed in the classroom with time set aside for reading. Online materials can also be used to support self-paced monitored reading for developing readers.

Evans (2017) studied the lived experiences of 100 ninth-graders reading John Steinbeck's *Of Mice and Men* in print and digitally on iPads, and noted that students' affective responses to the medium should be considered in deciding whether to use print or e-books. Evans observed that while students had varied stances on the use of print and e-books, classroom conversations seemed more difficult for students who were using the digital version. The students complained of technical difficulty, problems with comprehension, losing their place in the text and eye tiredness. Considering that her students were familiar with the use of the iPad for learning (being in a one-for-one laptop school), the difficulties of using e-books were surprising. This suggests policymakers and educators should consider when and how print and e-books are used, rather than assuming that the selected medium will work for all situations and students.

In a survey and interview study of K-5 teachers in the United States, Moody and Swafford (2019) found that teachers felt that e-books were particularly relevant for less proficient developing students (such as English Language Learners for whom English is not a first language and some special needs students) and for highly advanced readers. E-books can provide **scaffolded practice** for developing students by promoting repeated practice and increasing student exposure to books. E-books can also reduce the cognitive demands of reading through various supports such as the read aloud function and vocabulary supports. On the other hand, highly advanced readers with **access to a wide range of books** through platforms such as EPIC! are allowed to explore varied topics of interest.

Studies have shown that children and adolescents lack expertise for using e-books (Brueck et al., 2019; Moody & Swafford, 2019). A study by McVicker (2019) found that fourth-grade students were not aware that they could use the iPad for reading until they were introduced to it during the study. Once introduced to the affordance for reading, some students still preferred traditional print formats while others preferred e-reading. Similarly, studies of e-book readings

suggest that children (Ciampa, 2016; Maynard, 2010; Merga & Roni, 2017) and adolescents (Merga, 2014; Tveit & Mangen, 2014) are unaware of the iPad, tablets or mobile phones as reading devices. They may also prefer to use the devices for other purposes such as listening to music, gaming or interacting on social media (Loh & Sun, 2019).

Furthermore, the **physical conditions** in which e-books are read are important, with children preferring to "snuggle up" with an iPad or tablet (mimicking the experience of reading a print book), rather than reading on the computer (Brueck et al., 2019; Larson, 2010). Thus, educators can consider how to improve space and choose devices to facilitate children and adolescents' experience of reading.

In Brueck et al.'s (2019) article, the authors highlighted two best practices of use of digital reading mediums in classrooms and noted that the cultivation of engaged reading on digital devices is similar to reading in print. Time has to be set aside for independent reading of self-selected books, a wide range of quality titles should be provided and active teacher support should be provided in the form of supporting students' text selection, creating opportunities for talk around texts and supporting struggling readers personally. Children and adolescents from schools where reading is actively promoted, whether through print or digital reading, were more likely to have read more books and enjoyed reading (Francois, 2015; Laurenson et al., 2015; Loh et al., 2017). Ultimately, **human involvement** in planning, modelling and scaffolding the environment for the cultivation of reading engagement is essential. It is vital to plan tasks and programmes to encourage both print and e-book reading.

Finally, it is also relevant to consider the **purpose** for which the print or digital text is to be used. The research suggests that print books might be more relevant for intensive study in the language and literature classroom, where comprehension and deep reading are important (Evans, 2017; also refer Section 2.3. on reading comprehension). Moreover, policymakers and educators should account for problems that have to do with **implementation** of e-books, including student distraction, lack of access to a wide variety of digital books (which would require funding) and management of devices and related technical issues (Biancarosa & Griffiths, 2012; Evans, 2017; Miranda et al., 2011).

4. Reading Comprehension in Relation Reading in Print and E-Books

A large number of meta-analyses has been conducted on the effects of reading linear texts in print versus digitally. Overall, the conclusion from meta-analyses as recent as 2020 is that most individuals still tend to do better on reading comprehension when they read in print, although adults and children have more exposure to digital devices from an early age nowadays (Delgado et al., 2018; Halamish & Elbaz, 2020; Kong, Seo, & Zhai, 2018; Singer & Alexander, 2017). In a study of Norwegian tenth-graders reading the same texts in print and on a PDF file on a computer screen, Mangen et al. (2013) found that students who read in print scored significantly better on comprehension than those who read the texts digitally.

Interestingly, recent studies showed that **children read better on print than on screen** and tended to be overconfident in estimating their comprehension ability when they read on screens compared to in print (Dahan Golan et al., 2018; Halamish & Elbaz, 2020). Even older undergraduate students who preferred and predicted reading better with digital texts tended to recall key points and relevant ideas better when reading in print (Singer & Alexander, 2017). The length of texts may also affect comprehension - reading comprehension of texts of 500

words or less are not affected by medium, whereas lengthier texts are better comprehended in print (Singer & Alexander, 2017). In another study controlling for reading proficiency, it was found that text format makes no difference for advanced readers' reading comprehension but may affect the reading comprehension of less proficient students (Roberts & Barber, 2013). Students are also more likely to multitask when reading on screens compared to reading in print, and thus be distracted (Baron, 2017; Evans, 2017). The studies suggest the merit of providing paper reading materials when students are expected to exert more effort or pay close attention (Evans, 2017).

Individuals may adopt a shallower processing style in digital environments (Ackerman & Lauterman, 2012; Liu, 2005; Mangen, 2008; Wolf & Barzillai, 2009). As such, Wolf and Barzillai (2009) argue that while the skim-and-scan, multitasking skills of online reading may be suitable for developing skills of finding and evaluating online information, care must be taken to teach children and adolescents the complementary skill of deep reading. Deep reading is "the array of sophisticated processes that propel comprehension and that include inferential and deductive reasoning, analogical skills, critical analysis, reflection, and insight" (p. 33). Development of deep reading skills requires attention, perseverance and careful reading and re-reading. Whether using print or digital texts, educators should provide opportunities for deep reading.

5.   Digital Reading in a Hyper-connected Age

For the purposes of this review, reading digitally is distinguished from digital reading. Reading digitally refers to the reading of texts similar to print texts, but in online format. **Digital reading**, on the other hand, refers to the incorporation of reading in digital environments

> with different tasks and challenges to those in print-based reading (e.g., navigating; finding, selecting, and understanding information out of a choice of multiple websites, comprehending animated graphics)…   (McElvany & Schwabe, 2019, p. 147).

While not the same as reading digitally, digital reading is important in that it is necessary for future-readiness. The skills required for digital reading, such as navigation skills, inferential reasoning skills and critical self-regulated reading, have also been shown to be important predictors of digital reading achievement (Coiro & Dobler, 2007; Lim & Jung, 2019). Early home literacy practices have impact on adolescent and adult online reading behaviour (Notten & Becker, 2017; Sikora et al., 2019), which is why emphasis on engaged reading is vital for lifelong literacy.

This thread of research on digital reading may be tied with the research on information literacy skills, which has been found wanting among Singapore students (Foo et al., 2017). In a survey completed by 2,399 Primary 5 students, it was found that they had difficulty in identifying key information from an information task narrative, understanding the use of reference sources and the role of librarians, distinguishing between a fact and opinion, and adopting the best strategy for searching. While not the main focus of this review, further research on the digital reading skills of Singapore children and adolescents is warranted.

Given the current educational emphasis on digital information literacies and the inevitability of digital reading for our children and adolescents, it is important to ensure that students are taught to manage digital reading, from search processes to deep engagement with digital texts, from evaluation of online content to sharing of online content. Students need to be taught how to interact with and evaluate print and digital texts as daily practice (Turner & Hicks, 2015).

Teachers should be familiar with methods such as **creating environments for collaborative sense-making** of print and digital texts (Davis & Neitzel, 2012) and using **digital tools** to support reading (Biancarosa & Griffiths, 2012; Larson, 2010; Simpson & Walsh, 2015). Professional development for teachers and librarians in this area is necessary to prepare teachers to effectively integrate technology resources with the use of print resources for literacy learning (Biancarosa & Griffiths, 2012; Larson, 2012).

6. Recommendations

Research generally shows a strong relationship between reading attitudes and achievement, especially at primary school (Petscher, 2010). It is more difficult to influence student reading at older levels (Lupo et al., 2017) but there is a need to promote reading for pleasure, even in post-primary years (Laurenson et al., 2015; Merga et al., 2018). The literature across the U.S., U.K., Australia and Singapore suggests that continuing encouragement to read at school can motivate children and adolescents to read more and to continue reading throughout adolescence (Cremin et al., 2014; Francois, 2015; Laurenson et al., 2015; Loh, 2015). Both print and digital mediums should be utilised to support children and adolescents' reading engagement (Evans, 2017; Jones & Brown, 2011; Loh & Sun, 2019).

Reading Support for Low-SES Students

Low-SES students may not have literacy-rich home environments to support their development of engaged reading, and need more support in terms of access to reading resources and role models compared to children and adolescents from high- or mid-SES homes (Loh & Sun, 2020). As the reading achievement gap of children from developed countries widens (Leu et al., 2015; Ng, 2013; Reardon, 2013), education systems need to ensure that low-SES students have access to resources for reading, both in print and digitally, in schools.

Access to reading does not just include physical access to books but also cultural resources such as learning habits towards reading, much of which is learnt at home from an early age (Loh & Sun, 2020; Neuman & Celano, 2012). These habits include knowing how to search for books and turning to books as sources for information. Rather than a skills-only approach that focuses solely on decoding and comprehension, schools need to emphasise reading for pleasure in addition to the current emphasis on reading proficiency. Skills such as book selection (whether in print or online), how to locate suitable books and talk about books are reading skills that often fall under the radar when it comes to thinking about supporting children and adolescents' reading development. These same skills need to be the emphasis of schools and educators seeking to integrate e-books into school practices that encourage engaged reading (Brueck et al., 2019).

School Support for Reading

Teresa Cremin (2011) makes a useful distinction between reading instruction and reading for pleasure, noting in the U.K. context that much of school practice prioritises reading instruction, which is skills- and standards-oriented, stressing decoding, comprehension and teacher-directed learning. On the other hand, reading for pleasure highlights that students need to develop the desire to read, attends to motivation and engagement to read for life. Similarly, in Singapore, there is a tendency at school level to over-emphasise decoding and reading comprehension, to the neglect of reading strategies that encourage extensive and self-

directed engaged reading. The tendency may be more prevalent in secondary schools, where there is less direction for schools in terms of how to motivate student reading (Kramer-Dahl & Kwek, 2011; Wolf & Bokhorst-Heng, 2008). However, a strong emphasis on reading for pleasure alongside proficiency can encourage motivated reading (Cremin et al., 2014; Francois, 2013; Laurenson et al., 2015) and better prepare students to read for life.

Focusing on adolescents, Manuel & Carter (2015) point out that text selection and pedagogy have a powerful impact on students' reading practices and preferences. For text selection, they suggest a combination of teacher-selected materials, teacher-student negotiated materials, student-student negotiated materials and student self-selected reading materials. Schools or classrooms using digital texts should ensure students have access to a wide range of texts for free choice reading (Brueck et al., 2019).

Currently, many Singapore primary schools and some secondary schools provide time for daily independent reading prior to morning assembly, typically between 10 to 20 minutes. Although setting aside time for individual reading supports students' independent reading, more active reading programming (e.g., read aloud, storytelling, book clubs) works better to build a culture of reading and motivate student reading. These strategies also have the additional benefit of helping less proficient students find books and motivate them to read books shared. Manuel & Carter (2015) recommend creating social experiences in the form of whole-class reading, small-group or pair reading and individual reading experiences. Building community around varied reading practices creates opportunities for children and adolescents to participate in engaged reading practices through socialisation in peer, class and school communities (Brueck et al., 2019; Ivey, 2014; Lupo et al., 2017).

These same practices need to be integrated when utilising e-books to encourage student reading (Brueck et al., 2019; Miranda et al., 2011). Schools looking to integrate e-books into the collection should consider if students have access to devices and a wide range of quality books. They also need to consider setting aside time for students to read, whether in print or digitally. Teachers, who are themselves often unfamiliar with technology and children and/or YA books, need to be trained in these areas so they are better equipped to support students' print and digital reading (Brueck et al., 2019; Garces-Bacsal et al., 2018; Larson, 2012). Finally, principal support for building a reading culture and improving the school library is essential for a school-wide focus on reading, whether through programming or school libraries (Alexander et al., 2003; Francois, 2015; Henri et al., 2002; Loh et al., 2017; Prezyna et al., 2017)

The Role of School Libraries and Librarians

School libraries can support children and adolescent reading by stocking up a quality collection, designing programmes to motivate reading and learning to read, and providing a space for reading. A case study of a redesigned secondary school library that supported school reading through an improved book collection and active programming demonstrated that improving the school library can result in more engagement with reading (Loh et al., 2017). School libraries are particularly important for disadvantaged students from low-income homes because of the proximity of high-interest books in school. In context of school, curriculum and instructional practices can support the development of engaged reading alongside the school library (Choo & Loh, 2018; Merga, 2019; Pribesh et al., 2011; Wejrowski & McRae, 2013).

Professional teacher-librarians can support struggling readers by identifying them, providing them with age-appropriate materials, scaffolding student reading by helping them find the right books, providing one-to-one matching, promoting access to books, designing reading programmes, and so on (Merga, 2019). They can serve as extracurricular reading leaders and

offering expert advice to other teachers interested in integrating reading into their classes (Cremin & Swann, 2017). Beyond reading for pleasure, librarians can also facilitate the development of digital or information literacy skills (Kapitzke, 2001; Kuhlthau, 2010; O' Connor, 2019), as well as research skills (DelGuidice, 2015). The teaching of digital information literacy can begin as early as kindergarten (Neuman et al., 2015).

Within Singapore, only a few independent schools are supported by professional librarians or teacher-librarians (with Masters degrees in Information Studies and Library Science). These schools have greater support for reading, research and collaboration, compared to other schools without the same manpower support (Loh & Sundaray, 2019). More professional development can support school library coordinators and technical staff, but ultimately, more time and funding for dedicated manpower is required to lead, design and organise more coherent reading programmes using both print and e-books, as well as support the development of a digital information literacy programme within schools.

Use of Technology for Reading

The research demonstrates that most children and adolescents still prefer print. Avid readers are likely to read across print and various digital devices, whereas outside of the classroom, non-avid readers are unlikely to use technology to read. However, there is research showing that e-books, with their various affordances such as the dictionary and read-aloud functions, have potential to encourage classroom reading and response when integrated into classroom learning (Larson, 2010). Technology tools are particularly useful for developing readers and students with special needs and can extend students' out-of-curriculum learning (Biancarosa & Griffiths, 2012).

In terms of technology, teachers tend to incorporate technology in ways that are similar to implementation of print texts, thus limiting the use of technology for supporting reading (McKenna et al., 2012). Teachers may need to consider how best to integrate technology with understanding of their affordances and pedagogical possibilities. Reading policies regarding use of print and e-books should be profile- and context- conscious, using evidence-based design as the premise for contextualised decision-making. For example, given the preference for print books and the visibility of print books for students, schools should maintain a vibrant and relevant print collection that is attractive and visible to students (Loh et al., 2017).

At the same time, schools can create more opportunities for reading by building student awareness of different opportunities for accessing books online (McVicker, 2019). Children and adolescents can be introduced to various ways to access e-resources, whether through NLB or other online sources. Time can be set aside in class to introduce students to these resources and help them to learn how to access them. As with physical books, teachers should help students with book selection and encourage conversations around books by providing time for book talks and conversations (Brueck et al., 2019; Ivey, 2014). These routines are particularly important for students who may not come from literacy-rich home environments.

The research on summer reading loss in the U.S. where kids do not attend school during summer suggests that much of their reading gain in school is lost during summer (Allington & McGill-Franzen, 2017). Matching students with books and providing them with books, as well as implementing reading programmes over summer, can facilitate learning during this period (Kim & White, 2011).

During the COVID-19 period when schools were closed, many children and adolescents had reduced access to books and reading-related programmes, exacerbating gaps in reading practice, proficiency and engagement. With long stretches of out-of-school learning as a result of HBL, schools should integrate reading for pleasure into online curriculum, teaching and learning, and find ways to motivate children and adolescents to continue reading. Strategies such as curated booklists, book recommendations, read-alouds and interesting reading tasks (e.g., reading bingo, online book talks) are strategies that can be utilised to encourage continued reading during HBL.

Finally, teachers and librarians need to be trained to support students' reading for pleasure, by designing curriculum, instruction and programmes to support students of different learning profiles. This includes having good knowledge of children and Young Adult literature and having a range of strategies for supporting reading for pleasure (Cremin et al., 2014; Garces-Bacsal et al., 2018).

Conclusion

With the increased need to rely on technology for learning, policymakers and educators need to have a better understanding of the complexities and challenges of using technology to encourage engaged reading. Learning to like reading and doing it as everyday practice depends on **the intersection of text content, medium and teacher or peer mediator** within the spaces of homes, schools and libraries. Educators who are able to connect these different factors can create environments for children and adolescents to become engaged and future-ready readers and learners.

Given the inevitability of online learning in the future and unequal home access to books and role models for reading, **gaps in reading practice, proficiency and engagement will be exacerbated unless there is deliberate effort to explore how to plug the gaps in access to reading resources**, whether in print or online. The research demonstrates clearly that practices such as having a wide range of books, supportive adults and time for reading are vital for supporting children and adolescents' development of engaged reading habits, and perhaps even more so for disadvantaged and low-proficient readers. The allocation of devices such as laptops and tablets, while helpful, is insufficient to encourage student reading without school structures that support and scaffold their development of the sort of engaged reading and independent reading necessary for future-ready learning.

While best practices of reading may provide useful examples for schools and educators, there is a greater **need for customisation of reading programmes** that are suitable to individual school profiles. Furthermore, future-ready students should be equipped to become critical readers of information, which is a skill that encompasses digital and research literacy, and is a need which is still not sufficiently met in our schools. Our schools and educators are in need of the tools, skills and manpower that will enable them to purposefully design equitable and effective reading approaches to support children and adolescents' pleasurable and purposeful reading, whether in print or digitally.

Professional development should support **teachers' knowledge of texts outside of the curriculum**, which is a tall order given the multiple demands on teachers during regular school days (Loh & Liew, 2016). Integrating development of teachers' book knowledge into school-wide professional development or pre-service education can help teachers (across subject areas) develop skills and dispositions necessary to help students develop an attitude of reading for lifelong learning. To upskill and support teachers and students within schools,

professionally trained librarians should be mandated (Cremin & Swann, 2017; Loh & Sundaray, 2018; Merga, 2019). This increased manpower would be particularly powerful in schools attended by a greater number of disadvantaged students who lack sufficient home literacy resources and support for developing reading proficiency and engagement. Finally, evaluation of the effectiveness of school reading curriculum, instruction and programmes should examine the integration of reading programmes, curriculum and instruction that promote *both* reading proficiency and pleasure.

References

Ackerman, R., & Lauterman, T. (2012). Taking reading comprehension exams on screen or on paper? A metacognitive analysis of learning texts under time pressure. *Computers in Human Behavior, 28*(5), 1816-1828. https://doi.org/10.1016/j.chb.2012.04.023

Afflerbach, P., & Harrison, C. (2017). What is engagement, how is it different from motivation, and how can I promote it? *Journal of Adolescent & Adult Literacy, 61*(2), 217-220. https://doi.org/10.1002/jaal.679

Alexander, L. B., Smith, R. C., & Carey, J. O. (2003). Education reform and the school library media specialist: Perceptions of principals. *Knowledge Quest, 32*(2), 10-13.

Alexander, P. A., & The Disciplined Reading and Learning Research Laboratory. (2012). Reading into the future: Competence for the 21st century. *Educational Psychologist, 47*(4), 259-280. https://doi.org/10.1080/00461520.2012.722511

Allington, R. L., & McGill-Franzen, A. (2017). Summer reading loss is the basis of almost all the rich/poor reading gap. In R. Horowitz & S. J. Samuels (Eds.), *The achievement gap in reading: Complex causes, persistent issues, possible solutions* (pp. 170-184). Routledge. https://doi.org/10.4324/9781315779522-13

Baron, N. (2017). Reading in a digital age. *Kappan, 99*(2), 15-20. https://doi.org/10.1177%2F0031721717734184

Biancarosa, G., & Griffiths, G. C. (2012). Technology tools to support reading in the digital age. *The Future of Children, 22*(2), 139-160. https://doi.org/10.1353/foc.2012.0014

Brueck, J., Lenhart, L. A., & Roskos, K. A. (2019). Digital reading programs: Definitions, analytic tools and practice examples. In J. E. Kim & B. Hassinger-Das (Eds.), *Reading in the digital age: Young children's experiences with e-books (International studies with e-books in diverse contexts)* (pp. 135-156). Springer. https://doi.org/10.1007/978-3-030-20077-0_8

Choo, M. F., & Loh, C. E. (2018). *Optimising the school library for reading: An exploratory case study of students in one Singapore primary school library (Educational Research).* National Institute of Education, Nanyang Technological University, Singapore.

Ciampa, K. (2016). Motivating Grade 1 children to read: Exploring the role of choice, curiosity, and challenge in mobile ebooks. *Reading Psychology, 37*(5), 665-705. https://doi.org/10.1080/02702711.2015.1105337

Clark, C., & Picton, I. (2019). *Children, young people and digital reading.* National Literacy Trust.

Coiro, J. (2020). Invited commentary: Toward a multifaceted heuristic of digital reading to inform assessment, research, practice and policy. *Reading Research Quarterly, online first.* https://doi.org/10.1002/rrq.302

Coiro, J., & Dobler, E. (2007). Exploring the online reading comprehension strategies used by sixth-grade skilled readers to search and locate information on the Internet. *Reading Research Quarterly, 42*(2), 214-257. https://doi.org/10.1598/RRQ.42.2.2

Courage, M. L. (2019). From print to digital: The medium is only part of the message. In J. E. Kim & B. Hassinger-Das (Eds.), *Reading in the digital age: Young children's experiences with e-books (International studies with e-books in diverse contexts)* (pp. 23-44). Springer. https://doi.org/10.1007/978-3-030-20077-0_3

Cremin, T. (2011). *Reading for pleasure and wider reading.* UKLA Resources.

Cremin, T., Mottram, M., Collins, F. M., Powell, S., & Safford, K. (2014). *Building communities of engaged readers: Reading for pleasure.* Routledge. https://doi.org/10.4324/9781315772585

Cremin, T. & Swann, J. (2017). School librarians as leaders of extracurricular reading groups. In J. Pihl, K. Skinstad van der Kooij & T. C. Carlsten (Eds.), *Teacher and librarian partnerships in literacy education in the 21st century* (pp. 118-137). Sense Publishers. https://doi.org/10.1007/978-94-6300-899-0_9

Cunningham, A. E., & Stanovich, K. E. (1998). What reading does for the mind. *American Educator*, 1-8.

Dahan Golan, D., Barzillai, M., & Katzir, T. (2018). The effect of presentation mode on children's reading preferences, performance and self-evaluations. *Computers and Education, 126*, 346-358. https://doi.org/10.1016/j.compedu.2018.08.001

Davis, D. S., & Neitzel, C. (2012). Collaborative sense-making in print and digital text environments. *Reading & Writing Quarterly, 25*, 831-856. https://doi.org/10.1007/s11145-011-9302-2

Delgado, P., Vargas, C., Ackerman, R., & Salmeron, L. (2018). Don't throw away your printed books: A meta-analysis on the effects of reading media on reading comprehension. *Educational Research Review, 25*, 23-38. https://doi.org/10.1016/j.edurev.2018.09.003

DelGuidice, M. (2015). The role of the library in fostering research skills. *Computers in Libraries, 35*(7), 20-23.

Duncan, L. G., McGeown, S. P., Griffiths, Y. M., Stothard, S. E., & Dobai, A. (2016). Adolescent reading skill and engagement with digital and traditional literacies as predictors of reading comprehension. *British Journal of Psychology, 107*(2), 209-238. https://doi.org/10.1111/bjop.12134

Etta, R. (2019). Parent preferences: E-books versus print books. In J. E. Kim & B. Hassinger-Das (Eds.), *Reading in the digital age: Young children's experiences with e-books (International studies with e-books in diverse contexts)* (pp. 89-102). Springer. https://doi.org/10.1007/978-3-030-20077-0_6

Evans, E. (2017). Learning from high school students' experiences of reading e-books and printed books. *Journal of Adolescent and Adult Literacy, 61*(3), 311-318. https://doi.org/10.1002/jaal.685

Foo, S., Majid, S., & Chang, Y. K. (2017). Assessing information literacy skills among young information age students in Singapore. *Aslib Journal of Information Management, 69*(3), 335-353. https://doi.org/10.1108/AJIM-08-2016-0138

Francois, C. (2015). An urban school shapes young adolescents' motivation to read. *Voices from the Middle, 23*(1), 68-72.

Gambrell, L. B., Marinak, B. A., Brooker, H. R., & McCrea-Andrews, H. J. (2011). The importance of independent reading. In S. J. Samuels & A. E. Farstrup (Eds.), *What research has to say about reading instruction* (4th Edition ed., pp. 143-158). International Reading Association.

Garces-Bacsal, R. M., Tupas, R., Kuaur, S., Paculdar, A. M., & Baja, E. (2018). Reading for pleasure: Whose job is it to build lifelong readers in the classroom? *Literacy, 52*(2), 95-102. https://doi.org/10.1111/lit.12151

Halamish, V., & Elbaz, E. (2020). Children's reading comprehension and metacomprehension on screen versus on paper. *Computers and Education, 145*. https://doi.org/10.1016/j.compedu.2019.103737

Hall, L. A. (2019). "I didn't enjoy reading until now": How youths and adults engage with interactive digital texts. *Research in the Teaching of English, 54*(2), 109-130.

Henri, J., Hay, L., & Oberg, D. (2002). *The role of the principal in an information literate school community: Findings from an international research project.* Paper presented at the 68th IFLA Council and General Conference.

Hess, S. A. (2014). Digital media and student learning: The impact of electronic books on motivation and achievement. *New England Reading Associate Journal, 49*(2), 35-39.

Hutchinson, A., Berschorner, B., & Schmidt-Crawford, D. (2012). Exploring the use of the iPad for literacy learning. *The Reading Teacher, 66*(1), 15-23. https://doi.org/10.1002/trtr.01090

Ivey, G. (2014). The social side of engaged reading for young adolescents. *The Reading Teacher, 68*(3), 165-171. https://doi.org/10.1002/trtr.1268

Jang, B. G., & Henretty, D. (2019). Understanding multiple profiles of reading attitudes among adolesecents. *Middle School Journal, 50*(3), 26-35. https://doi.org/10.1080/00940771.2019.1603803

Jerrim, J., & Moss, G. (2019). The link between fiction and teenagers' reading skills: international evidence from the OECD PISA study. *British Educational Research Journal, 45*(1), 181-200. https://doi.org/10.1002/berj.3498

Johnsson-Smaragdi, U., & Jönsson, A. (2006). Book reading in leisure time: Long-term changes in young peoples' book reading habits. *Scandinavian Journal of Educational Research, 50*(5), 519-540. https://doi.org/10.1080/00313830600953600

Jones, T., & Brown, C. (2011). Reading engagement: A comparison between e-books and traditional print books in an elementary classroom. *International Journal of Instruction, 4*(2), 5-22.

Kapitzke, C. (2001). Information literacy: The changing library. *Journal of Adolescent and Adult Literacy, 44*(5), 450-456.

Katz, R. L., Felix, M., & Gubernick, M. (2014). Technology and adolescents: Perspectives on the things to come. *Education and Information Technologies, 19*, 863-886. https://doi.org/10.1007/s10639-013-9258-8

Ketron, S., & Naletelich, K. (2016). How e-readers have changed personal connections with books. *Qualitative Market Research, 19*(4), 433-452. https://doi.org/10.1108/QMR-10-2015-0078

Kim, J., & White, T. G. (2011). Solving the problem of summer reading loss. *Kappan, 92*(7), 64-67. https://doi.org/10.1177%2F003172171109200714

Kirsch, I., de Jong, J., Lafontaine, D., McQueen, J., Mendelovits, J., & Monseur, C. (2002). *Reading for change: Performance and engagement across countries: Results from PISA 2000.* OECD. https://doi.org/10.1787/9789264099289-en

Kong, Y., Seo, Y. S., & Zhai, L. (2018). Comparison of reading performance on screen and on paper: A meta-analysis. *Computers and Education, 123*, 138-149. https://doi.org/10.1016/j.compedu.2018.05.005

Kramer-Dahl, A., & Kwek, D. (2011). 'Reading' the home and reading in school: Framing deficit constructions as learning difficulties in Singapore English classrooms. In C. Wyatt-Smith, J. Elkins, & S. Gunn (Eds.), *Multiple perspectives on difficulties in learning: Literacy and numeracy* (pp. 159-178). Springer. https://doi.org/10.1007/978-1-4020-8864-3_7

Kuhlthau, C. C. (2010). Guided inquiry: School libraries in the 21st century. *School Libraries Worldwide, 16*(1), 17-28.

Kurcirkova, N., Littleton, K., & Cremin, T. (2017). Young children's reading for pleasure with digital books: Six key facets of engagement. *Cambridge Journal of Education, 47*(1), 67-84. http://dx.doi.org/10.1080/0305764X.2015.1118441

Kuzmicova, A., Schilhab, T., & Burke, M. (2018). m-reading: Fiction reading from mobile phones. *Convergence: The International Journal of Research into New Media Technologies, 26*(2), 333-349. https://doi.org/10.1177/1354856518770987

Lam, L. (2020, May 9). Surge in e-book checkouts, with more borrowing cookbooks and juvenile fiction during ciruit breaker: NLB. *CNA.* https://www.channelnewsasia.com/news/singapore/surge-in-e-book-checkouts-with-more-borrowing-cookbooks-and-12715320

Larson, L. C. (2010). Digital readers: The next chapter in ebook reading and response. *The Reading Teacher, 64*(1), 16-22. https://doi.org/10.1598/RT.64.1.2

Larson, L. C. (2012). It's time to turn the digital page: Preservice teachers explore e-book reading. *Journal of Adolescent & Adult Literacy, 56*(4), 280-290. https://doi.org/10.1002/JAAL.00141

Laurenson, P., McDermott, K., Sadlier, K., & Meade, D. (2015). From national policy to classroom practice: promoting reading for pleasure in post-primary English classrooms. *English in Education, 49*(1), 4-24. https://doi.org/10.1111/eie.12054

Leu, D. J., Forzani, E., & Kennedy, C. (2015). Inequality and the online reading gap. *The Reading Teacher, 68*(6), 422-427. http://doi.org/10.1002/TRTR.1328

Lim, H. J., & Jung, H. (2019). Factors related to digital reading achievement: A multi-level analysis using international large scale data. *Computers and Education, 133*, 82-93. https://doi.org/10.1016/j.compedu.2019.01.007

Liu, Z. (2005). Reading behaviour in the digital environment: Changes in reading behaviour over the past ten years. *Journal of Documentation, 61*(6), 700-712. https://doi.org/10.1108/00220410510632040

Loh, C. E. (2015). Building a reading culture in a Singapore school: Identifying spaces for change through a socio-spatial approach. *Changing English, 22*(2), 209-221. https://doi.org/10.1080/1358684X.2015.1022509

Loh, C. E., Ellis, M., Wan, Z. H., & Paculdar, A. (2017). Building a successful reading culture through the school library: A case study of a Singapore secondary school. *IFLA Journal, 43*(4), 335-347. https://doi.org/10.1177/0340035217732069

Loh, C. E. & Liew, W. M. (2016) Voices from the ground: The emotional labour of English teachers' work. *Teaching and Teacher Education, 55,* 267-278. http://dx.doi.org/10.1016/j.tate.2016.01.016

Loh, C. E., & Sun, B. (2020). Cultural capital, habitus and reading futures: Middle-class adolescent students' cultivation of reading dispositions in Singapore. *British Journal of Sociology of Education, 41*(2), 234-252. https://doi.org/10.1080/01425692.2019.1690426

Loh, C. E., & Sun, B. (2019). "I'd still prefer to read the hard copy": Adolescents' print and digital reading habits. *Journal of Adolescent & Adult Literacy, 62*(6), 663-672. https://doi.org/10.1002/jaal.904

Loh, C. E., & Sundaray, S. (2019). *School library perspectives survey report 2018*.

Love, K., & Hamston, J. (2003). Committed and reluctant male teenage readers: Beyond bedtime stories. *Journal of Literacy Research, 36*(3), 335-400. https://doi.org/10.1207%2Fs15548430jlr3603_4

Lupo, S., Jang, B. G., & McKenna, M. (2017). The relationship between reading achievement and attitudes toward print and digital texts in adolescent readers. *Literacy Research: Theory, Method and Practice, 66*(1), 264-278. https://doi.org/10.1177/2381336917719254

Mangen, A. (2008). Hypertext fiction reading: Haptics and immersion. *Journal of Research in Reading, 31*(4), 404-419. https://doi.org/10.1111/j.1467-9817.2008.00380.x

Mangen, A., Walgermo, B. R., & Bronnick, K. (2013). Reading linear texts on paper versus computer screen: Effects on reading comprehension. *International Journal of Educational Research, 58*, 61-68. https://doi.org/10.1016/j.ijer.2012.12.002

Manuel, J., & Carter, D. (2015). Current and historical perspectives on Australian teenagers' reading practices and preferences. *Australian Journal of Language and Literacy, 38*(2), 115-128.

Maynard, S. (2010). The impact of e-books on young children's reading habits. *Publishing Research Quarterly, 26*(4), 236-248. https://doi.org/10.1007/s12109-010-9180-5

McElvany, N., & Schwabe, F. (2019). Gender gap in reading digitally? Examining the role of motivation and self-concept. *Journal for Educational Research Online, 11*(1), 145-165.

McGeown, S. P., Osborne, C., Warhurst, A., Norgate, R., & Duncan, L. G. (2016). Understanding children's reading activities: Reading motivation, skill and child characteristics as predictors. *Journal of Research in Reading, 39*(1), 109-125. https://doi.org/10.1111/1467-9817.12060

McKenna, M. C., Conradi, K., Lawrence, C., Jang, B. G., & Meyer, J. P. (2012). Reading attitudes of middle school students: Results of a U.S. survey. *Reading Research Quarterly, 47*(3), 283-306. https://doi.org/10.1002/RRQ.021

McVicker, C. J. (2019). Plugged and unplugged reading: Studying the preferences of readers. *The Reading Teacher, 72*(6), 731-740. https://doi.org/10.1002/trtr.1791

Merga, M. K. (2014). Are teenagers really keen digital readers: Adolescent engagement in ebook reading and the relevance of books today. *English in Australia, 49*(1), 27-37.

Merga, M. K. (2019). How do librarians in schools support struggling readers? *English in Education, 53*(2), 145-160. https://doi.org/10.1080/04250494.2018.1558030

Merga, M. K., McRae, M., & Rutherford, L. (2018). Adolescents' attitudes toward talking about books: Implications for educators. *English in Education, 52*(1), 36-53. https://doi.org/10.1111/eie.12144

Merga, M. K., & Roni, S. M. (2017). The influence of access to eReaders, computers and mobile phones on children's book reading frequency. *Computers and Education, 109*, 187-196. http://dx.doi.org/10.1016/j.compedu.2017.02.016

Miller, E. B., & Warshauer, M. (2014). Young children and e-reading: Research to date and questions for the future. *Learning, Media and Technology, 39*(3), 283-305. https://doi.org/10.1080/17439884.2013.867868

Miranda, T., Williams-Rossi, D., Johnson, K. A., & McKenzie, N. (2011). Reluctant readers in middle school: Successful engagement with text using the e-reader. *International Journal of Applied Science and Technology, 1*(6), 81-91.

Moje, E. B., Overby, M., Tysvaer, N., & Morris, K. (2008). The complex world of adolescent literacy: Myths, motivations, and mysteries. *Harvard Educational Review, 78*(1), 107-157. https://doi.org/10.17763/haer.78.1.54468j6204x24157

Moody, A. K. (2010). Using electronic books in the classroom to enhance emergent literacy skills in young children. *Journal of Literacy and Technology, 11*(4), 22-52.

Moody, A. K., & Swafford, J. (2019). Practical strategies for e-book use in early childhood classrooms (K-5). In J. E. Kim & B. Hassinger-Das (Eds.), *Reading in the digital age: Young children's experiences with e-books (International Studies with e-books in diverse contexts)* (pp. 217-236). Springer. https://doi.org/10.1007/978-3-030-20077-0_12

Neuman, D., Grant, A., Lee, V., & DeCarlo, M. J. T. (2015). Information and digital literacy in a high-poverty urban school: An I-LEARN project. *School Libraries Worldwide, 21*(1), 38-53. https://doi.org/10.14265.21.1.003

Neuman, S. B., & Celano, D. (2012). *Giving our children a fighting chance: Poverty, literacy, and the development of information capital*. Teachers College Press.

Ng, I. Y. H. (2013). Education and intergenerational mobility in Singapore. *Educational Review, 66*(3), 362-376. https://doi.org/10.1080/00131911.2013.780008

Notten, N., & Becker, B. (2017). Early home literacy and adolescents' online reading behavior in comparative perspective. *International Journal Comparative Sociology, 58*(6), 475-493. https://doi.org/10.1177/0020715217735362

O' Connor, M. L. C. (2019). Now serving an appealing menu of digital literacy tools and resources. *Knowledge Quest, 47*(5), 17-21.

Petscher, Y. (2010). A meta-analysis of the relationship between student attitudes towards reading and achievement in reading. *Journal of Research in Reading, 33*(4), 335-355. https://doi.org/10.1111/j.1467-9817.2009.01418.x

Prensky, M. (2001). Digital natives, digital immigrants. *MCB University Press, 9*(5), 1-6.

Prezyna, D. M., Garrison, M. J., Gold, C. P., & Lockte, H. A. (2017). Principal leadership and reading specialist role understanding in the era of test-based accountability policies. *International Journal of Education Policy and Leadership, 12*(2). https://doi.org/10.22230/ijepl.2017v12n2a686

Pribesh, S., Gavigan, K., & Dickinson, G. (2011). The access gap: Poverty and characteristics of school library media centers. *The Library Quarterly, 81*(2), 143-160. https://doi.org/10.1086/658868

Rainie, L., Zickuhr, K., Purcell, K., Madden, M., & Brenner, J. (2012). *The rise of e-reading.* Pew Internet & American Life Project. https://www.pewresearch.org/internet/2012/04/04/the-rise-of-e-reading-5/

Reardon, S. F. (2013). The widening income achievement gap. *Educational Leadership, 70*(8), 10-16.

Revelle, G. L., Strouse, G. A., Troseth, G. L., Rvachew, S., & Forrester, D. T. (2019). Technology support for adults and children reading together: Questions answered and questions raised. In J. E. Kim & B. Hassinger-Das (Eds.), *Reading in the digital age: Young children's experiences with e-books (International studies with e-books in diverse contexts)* (pp. 103-134). Springer. https://doi.org/10.1007/978-3-030-20077-0_7

Rideout, V. J., Foehr, U. G., & Roberts, D. F. (2010). *Generation M²: Media in the lives of 8- to 18-year-olds.* Kaiser Family Foundation.

Roberts, M. C., & Barber, C. R. (2013). Effects of reading formats on the comprehension of new independent readers. *Journal of Literacy and Technology, 14*(2), 24-55.

Seok, S., & DaCosta, B. (2017). Gender differences in teens' digital propensity and perceptions and preferences with regard to digital and printed text. *TechTrends, 61*, 171-178. https://doi.org/10.1007/s11528-016-0134-4

Sikora, J., Evans, M. D. R. & Kelley, J. (2019) Scholarly culture: How books in adolescence enhance adult literacy, numeracy and technology skills in 31 societies. *Social Science Research, 77,* 1-15. https://doi.org/10.1016/j.ssresearch.2018.10.003

Simpson, A., & Walsh, M. (2015). Children's literature in the digital world: How does multimodality support affective, aesthetic and critical response to narrative. *English Teaching: Practice & Critique, 14*(1), 28-43. https://doi.org/10.1108/ETPC-12-2014-0005

Singer, L., & Alexander, P. A. (2017). Reading on paper and digitally: What the past decades of empirical research reveal. *Review of Educational Research, 87*(6), 1007-1041. https://doi.org/10.3102%2F0034654317722961

Strouse, G. A., & Ganea, P. A. (2017). A print book preference: Caregivers report higher child enjoyment and more adult-child interactions when reading print than electronic books. *International Journal of Child-Computer Interaction, 12*, 8-15. https://doi.org/10.1016/j.ijcci.2017.02.001

Takacs, Z. K., Swart, E. K., & Bus, A. G. (2015). Benefits and pitfalls of multimedia and interactive features in technology-enhanced storybooks: A meta-analysis. *Review of Educational Research, 85*(4), 698-739. https://doi.org/10.3102/0034654314566989

Turner, K. H., & Hicks, T. (2015). *Connected reading: Teaching adolescent readers in a digital world.* National Council of Teachers of English.

Tveit, K., & Mangen, A. (2014). A joker in the class: Teenage readers' attitudes and preferences to reading on different devices. *Library and Information Science Research, 36*(3-4), 179-184. https://doi.org/10.1016/j.lisr.2014.08.001

Wejrowski, K., & McRae, M. (2013). Developing a culture of readers through effective library planning. *Knowledge Quest, 42*(1), 39-43.

Wolf, J. M., & Bokhorst-Heng, W. D. (2008). Polices of promise and practices of limit: Singapore's literacy education policy landscape and its impact on one school

programme. *Educational Research in Policy and Practice, 7*, 151-164. https://doi.org/10.1007/s10671-008-9048-z

Wolf, M., & Barzillai, M. (2009). The importance of deep reading. *Educational Leadership, 66*(6), 32-37.

Wong, K. M., & Neuman, S. B. (2019). The power of a story: Reading live and electronic storybooks to young children. In J. E. Kim & B. Hassinger-Das (Eds.), *Reading in the digital age: Young children's experiences with e-books (International studies with e-books in diverse contexts)* (pp. 157-173). Springer. https://doi.org/10.1007/978-3-030-20077-0_9

Zebroff, D., & Kaufman, D. (2017). Texting, reading, and other daily habits associated with adolescents' literacy levels. *Education and Information Technologies, 22*, 2197-2216. https://doi.org/10.1007/s10639-016-9544-3

Zhang, Y., & Kudva, S. (2014). E-books versus print books: Readers' choices and preferences across contexts. *Journal of the Association for Information Science and Technology, 65*(8), 1695-1706. https://doi.org/10.1002/asi.23076