A National Literacy Trust Research report

Improving the literacy skills of disadvantaged teenage boys through the use of technology

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In recent decades, a growing dependence on digital forms of communication has brought with it exciting visions of the potential for technology to support learning. For many of us, much of what we read on a typical day will be accessed using technology, whether news, social media, websites or ebooks. Reading on screen is also popular with young people, with more UK children and young people saying that they read in this format than on paper outside school (Picton, 2014). UK studies also indicate that disengaged boy readers, older pupils and those eligible for free school meals are more likely to read fiction on screen that their peers (Clark and Picton, 2019).

This report aims to explore the potential role of technology in addressing the gender and disadvantage gap in young people's literacy attitudes and outcomes. It combines insights from a review of the literature related to supporting teenage boys' reading with new information gathered from interviews, focus groups and surveys of teachers, librarians, academics and young people from schools across the UK in 2019. Findings from qualitative and quantitative research conducted for this study suggest that screen-based reading is particularly popular with boys with the lowest levels of reading enjoyment and those from lower income backgrounds and is considered by many educators to be effective in supporting reading engagement and performance in these groups. We are grateful to The Sir Halley Stewart Trust for funding this research, which will inform the development and publication of a framework of guiding principles to support the use of technology in promoting young people's reading enjoyment in 2020.

Key findings

Evidence from existing studies

- England has the lowest teenage literacy rate in the OECD (Kuczera et al., 2016) and the gap between boys' and girls' reading is one of the widest in the developed world (Read On. Get On. [ROGO], 2014).
- Girls outperform boys in reading tests at every stage of schooling. More than 3 in 10 boys leave primary school unable to read well, with 69% reaching the expected standard, compared with 78% of girls (National Statistics, 2019). Just 54% of boys achieved a good GCSE grade in English, compared with 70% of girls (Joint Council for Qualifications [JCQ], 2019).
- It is important that conceptualisations of reading focus not only on skills but consider also the affective and behavioural processes that help develop and sustain the cognitive processes associated with reading. Research shows that children and young people who enjoy reading are nearly four times more likely to read above the level expected for their age compared with those who do not enjoy reading (30.1% vs. 8.1%; Clark and Teravainen-Goff, 2019).

The challenge of the teenage years

- Teenagers are much less likely than younger children to say that they enjoy reading or that they read daily in their free time. In 2019, nearly twice as many children aged 5 to 8 said they enjoy reading than those aged 14 to 16 (76.3% vs. 40.6%). Our data also shows a gradual decline in reading frequency with age, with nearly three times as many 5 to 8-year-olds saying they enjoy reading in their free time compared with those aged 14 to 16 (53.6% vs. 16.3%).
- While 60.3% of girls aged 9 to 18 say that they enjoy reading, just 46.5% of boys say the same. Boys' reading enjoyment decreases significantly with age: 64.5% of boys aged 8 to 11 said that they enjoy reading in 2019, compared with 44.3% of boys aged 11 to 14, and 32.0% of boys aged 14 to 16 (ibid., 2019).

The role of disadvantage

- An international comparison study of 15-year-olds showed that in all participating countries, a student's socioeconomic background is associated with their reading performance to some extent (OECD, 2011). However, young people from disadvantaged backgrounds who read frequently and have positive attitudes to reading are better readers than their less disadvantaged peers who are not engaged in reading, suggesting that engaging students in reading might be one of the most effective ways to leverage social change (OECD, 2002).

How technology can help mitigate the impact of gender and disadvantage on reading

- Reading on screen is popular with young people, with more UK children and young people saying they read on screen than on paper outside school (Picton, 2014).
- International studies have found that the gap between boys' and girls' reading performance narrows significantly when literacy assessments take place on screen (OECD, 2015b; Griffiths, 2019) while UK research shows that disengaged boy readers, older pupils and those eligible for free school meals are more likely to say they read fiction on screen compared with their peers (Clark and Picton, 2019). International research has found that young people who read fiction, in particular, have significantly stronger reading skills than those who do not (Jerrim and Moss, 2019).
- While the research evidence on learning using technology "consistently identifies positive benefits" (Higgins et al., 2012), the wide range of impact found across studies suggests that positive findings may be less related to the use of technology itself, and more to how well it was employed. Educators have a key role to play in "'build[ing] a bridge, connecting knowledge and skills students already possess to the academic content and skills required for success" (Considine et al., 2009).
- One meta-analysis found that educational technology had a slightly higher positive impact on reading outcomes in low SES students (Cheung and Slavin, 2011), while a later study found that providing digital resources to disadvantaged lower secondary students improved interest and narrowed gaps in knowledge and understanding (Zheng et al., 2014). However, alongside increasing access to technology, engaging students in low SES locations also requires "exemplary pedagogies" which facilitate challenging and enjoyable learning experiences (Callow and Orlando, 2015).

What this study has added: pupil voices

- Our large-scale research has long evidenced a sharp decline in reading enjoyment as children start secondary school. In 2019, while 71.9% of pupils aged 9 to 11 said they enjoy reading, this decreased to just 49.5% of those aged 11 to 14 (Clark and Teravainen-Goff, 2019).
- Qualitative work conducted for this study suggested that while reading is enjoyed at primary school, it is not considered 'cool' at secondary school. However, reading on a screen may be less of a concern. Surveys indicated that more than a third (34.3%) of young people agreed that "Reading on screen is cooler than reading a book", increasing to half (49.9%) of boys who don't enjoy reading.

The role of disadvantage

- Boys in our survey sample who are eligible for free school meals (FSMs) are significantly less likely to say that they enjoy reading. Just over a quarter (26.6%) say they enjoy reading, compared with 2 in 5 (40.1%) of boys not eligible for FSMs. The

gap is widest at ages 11 to 14, where fewer pupils eligible for FSMs say that they enjoy reading compared with their peers who are not eligible for FSMs (38.1% vs 45.4%).

How technology can help

- Boys eligible for FSMs are significantly less likely to say that they have a book of their own at home (67.1% vs. 77.5%). However, there is no difference between boys eligible and not eligible for FSMs with regard to access to smartphones (92.4% vs. 92.3%), tablets (74.7% vs. 76.4%) or laptops (74.7% vs. 82.6%).
- At the same time, boys eligible for FSMs are more likely than those not eligible for FSMs to say that they prefer to read on screen both at school (36.6% vs. 26.3%) and at home (56.0% vs. 45.6%).

Technology and reading engagement

New findings from our surveys indicated significant differences between boys who do and do not enjoy reading, emphasising the essential role technology may play in supporting reading engagement:

- Boys who do not enjoy reading are more likely to say they prefer to read on screen in school (38% vs. 24.5% of those who enjoy reading) and at home (62.9% vs. 35.1%).
- Boys with the lowest levels of reading engagement and older pupils are more likely than their peers to say that they read materials such as fiction on screen (Clark and Picton, 2019). In addition, qualitative feedback suggests that some boys felt more able to find reading about topics that interested them (such as gaming and sports) online. Indeed, young people's comments on their reading outside school often related to texts linked with technology (e.g. computer games, YouTube, Discord and Reddit).

Teachers' views

Attitudes to using technology to support literacy

- Teachers interviewed for the study were more likely to say technology had a positive impact on disengaged and struggling students than those from different socio-economic backgrounds. Surveys showed that 9 in 10 (91.9%) felt technology had the most potential for positive impact on reluctant boy readers, and more than three-quarters (78.4%) on less able boys. Three-quarters of teachers felt technology had a positive impact on students' reading skills (74.9%) and confidence (75.3%), and more than three-quarters on their reading motivation (85.4%) and enjoyment (82.2%).

Access to technology to support literacy

- Barriers to using technology to support literacy were more resource than attitude-related. Most teachers cited lack of hardware, software and wifi (58.4%), finances (51.6%) and outdated or insufficient hardware (45.2%) as the main barriers to using technology to support literacy in the classroom. Almost a quarter (23.3%) of

respondents to our survey said they had had neither initial nor ongoing training in the area of using technology to support literacy learning.

Introduction

The impact of low literacy

Low literacy has an impact on many areas of life. People with low literacy are more likely to be unemployed or on a low income, to experience mental health problems and to have a shorter life expectancy (Morrisroe, 2014; Gilbert et al., 2018). Low literacy skills also present a significant cost to the economy; indeed, this has been predicted to reach £32.1 billion by 2025 (ROGO, 2014). At the same time, good literacy skills can increase academic attainment across a range of subjects, including maths and science (Sullivan & Brown, 2013; Nunes et al., 2017). Improving literacy is therefore vital both for improving an individual's life chances and for safeguarding the future prosperity of the UK economy. Indeed, as the economy transitions from a largely industrial base to one heavily dependent on information, literacy is more important for young people today than it has ever been.

While a number of studies, reviews and meta-analyses have found mixed results in relation to using technology to support literacy, it has been shown to be effective in supporting both reading engagement (Picton and Clark, 2015) and reading performance (e.g. Hess, 2014; OECD, 2015a; Griffiths, 2019). Indeed, findings from the Programme for International Student Assessment (PISA) in 2018 found that globally, when teenagers took the literacy section of the assessment online, boys did much better, with the lead researcher stating:

> "Boys are doing better in the digital world. Books put off boys. But reading online changes that. There is greater digital learning by boys. They do not like books [as much] as screens."
>
> (Scheicher, as cited by Griffiths, 2019)

This research project aims to explore the potential for technology to support reading skills and engagement particularly in disengaged boys aged 11 to 16. This group have the lowest levels of reading enjoyment and attainment compared to girls and younger age groups but tend to feel confident around technology and devices (OECD, 2015a). Findings from existing research (Clark and Picton, 2019) and new research carried out for this study indicate that screen-based reading is popular with boys, particularly those with the lowest levels of reading enjoyment. However, even though young people say they would be motivated to read this way and a high percentage of teachers believe technology can be particularly effective in engaging boys and reluctant readers, opportunities to read on screen at school are limited. This indicates a need for greater provision of information, evidence-based resources and training to ensure that digital tools and resources may be used more effectively to support positive literacy outcomes for all children.

The impact of age, gender and socioeconomic background on literacy attainment and engagement

When reading attainment is measured at age 7, the gap between boys and girls stands at 8 percentage points, with 71% of boys reaching the expected standard compared with 79% of girls (Department for Education [DfE], 2019). At the end of secondary school, the gap between boys and girls achieving grade 4 and above in GCSE English Language[1] stands at 16 percentage points, with more than 2 in 5 (43%) boys failing to achieve a good grade (A*-C or 9-4) compared with just under a third (27%) of girls (National Statistics, 2018). Poorer performance in reading is likely to influence boys' attainment in other subjects, as reading proficiency is "…the foundation upon which all other learning is built; when boys don't read well, their performance in other school subjects suffers too" (PISA, 2009).

We know that gender influences both reading skill and reading engagement. Indeed, this 'gender gap' has been a concern for decades (Clark and Burke, 2012) and is evidenced internationally, with a 2009 survey finding that an average of just 52% of 15-year-old boys say that they read for enjoyment compared with 73% of girls (OECD, 2009). Our own large-scale research indicates that boys' reading enjoyment decreases significantly with age: 64.5% of boys aged 8 to 11 say they enjoy reading in 2019, compared with 44.3% of those aged 11 to 14 and 32.0% of those aged 14 to 16 (Clark and Teravainen-Goff, 2019).

Socioeconomic background has also long been associated with poorer educational performance. A gap in attainment between children eligible for free school meals (FSMs) and those not eligible is apparent at the Early Years Foundation Stage and can again be seen to increase at secondary school level (Sammons, Toth & Sylva, 2015; Hutchinson et al., 2019). In 2017/18, just 21.6% of young people eligible for FSMs achieved a strong pass in GCSE English and maths, compared with 46.4% of their peers[2].

Echoing findings relating to gender, an international comparison study of 15-year-olds showed that in all participating countries, a student's socioeconomic background is associated with their reading performance to some extent (PISA OECD, 2011). However, earlier evidence indicated that while social background is a powerful predictor of performance, pupils from disadvantaged backgrounds who read regularly and feel positive about reading have higher reading performance than their more advantaged peers who are not engaged in reading (OECD, 2002). This suggests that supporting reading for enjoyment could be one of the most effective ways to leverage social change (ibid.)

[1] https://www.gov.uk/government/statistics/key-stage-4-nd-multi-academy-trust-performance-2018-revised

[2] https://www.ethnicity-facts-figures.service.gov.uk/education-skills-and-training/11-to-16-years-old/a-to-c-in-english-and-maths-gcse-attainment-for-children-aged-14-to-16-key-stage-4/latest#by-ethnicity-and-eligibility-for-free-school-meals

How technology can help

Enthusiasm for bringing technology[3] into the school setting to support literacy outcomes has been tempered in recent years by inconsistent findings in studies exploring its impact on learning (e.g. OECD, 2015; OECD, 2015a). While the research evidence about the impact of digital technologies on learning "consistently identifies positive benefits" (Higgins et al., 2012) significant variance across studies suggests software is often "more effective for some students and less effective for others" (Connor et al., 2014). For example, some studies have indicated that technology can support "lower attaining pupils (Lou et al., 2001), those with special educational needs (e.g. Li and Ma, 2010) or those from disadvantaged backgrounds (e.g. Cheung and Slavin, 2011) to catch up with their peers" (Higgins et al., 2012). A uniting feature of many studies in this area is that digital reading offers "both promises and perils to different types of readers", with the influence of digital affordances "dependent on the child's skill level and the technology itself" (Barzillai et al., 2017).

A number of studies have found that ebooks specifically, rather than more generic 'online reading', can have a positive influence on some young people's reading. One US study found that using ebooks in the classroom was associated with a significant difference in reading assessment scores in the intervention group, narrowing the gap between boys' and girls' attainment (Hess, 2014). Similarly, an evaluation of an ebooks platform on more than 800 UK pupils also found that after being given opportunities to read ebooks over an average of 4.2 months, boys' reading levels increased by an average of 8.4 months, compared to 7.2 months for girls (Picton and Clark, 2015). Furthermore, the percentage of boys taking part in this study who felt reading was cool increased from 34.4% to 66.5%, while boys who started the intervention with the lowest reading enjoyment not only enjoyed reading more on screen, but were also four times more likely to say they enjoyed reading in print after taking part. More recently, a study of 565 5-year-olds found that children who carried a specific allele (a variant form of a gene) that made them particularly 'distractible' (susceptible to environmental influences) were "more able to focus, learn and even outperform their peers" when exposed to particular types of multimodal ebook formats (Plak et al., 2016).

Other research has found different outcomes for screen reading relating to gender. A study of PISA data from 2015 found that the gap between girls' and boys' reading performance narrowed significantly when the assessment took place on screen rather than paper (from 38 points [equivalent to a year's schooling] to 26 points, OECD, 2015; Griffiths, 2019). Researchers suggested this might be explained by boys' familiarity and comfort with computers and computer games. While observing that "…the more frequently students play

[3] The term 'technology' is used in this review to describe to the use of computers, portable electronic devices and touchscreens to access platforms, programmes and apps that support literacy learning.

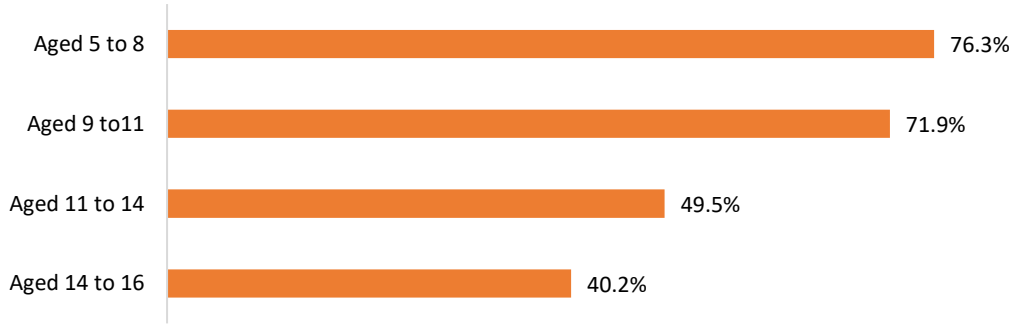
one-player video games and collaborative online games, which boys tend to play more than girls, the worse their relative performance on paper-based tests," they speculate, "…in computer-based tests, the negative effects of video-gaming may be counterbalanced by its positive effects on students' ability to navigate through digital texts."

The wide range of impact found across studies exploring technology and reading also indicates that positive findings may be less related to the use of technology itself, and more to how well it was employed. This highlights the essential role that teachers play in supporting effective learning with technology, and there is considerable consensus in the literature that "…despite familiarity with personal technologies, learners are generally poor at deploying their digital skills in support of learning" (Beetham et al., 2009; see also Butterworth, 2009; Green and Gordon, 2014). As Considine et al. (2009) observe, "…educators must 'build a bridge' connecting knowledge and skills students already possess to the academic content and skills required for success". An example of this is the need to teach today's students both technology-based and 'deep' reading techniques, with developmental psychologist and cognitive scientist Maryanne Wolf describing these skills in terms of 'biliteracy' (see Richardson, 2014; see also Delgado et al., 2018; Mangen & Kuiken, 2014 and Wolf & Barzillai, 2009).

Young people's reading attitudes and behaviours in 2019

Along with gender and socioeconomic background, National Literacy Trust data[4] indicates that age has a significant impact on reading engagement. Figure 1 highlights the gradual decline of reading enjoyment with age, with nearly twice as many children aged 5 to 8 as those aged 14 to 16 in 2019 saying that they enjoy reading.

Figure 1: Levels of reading enjoyment in 2019 by age group

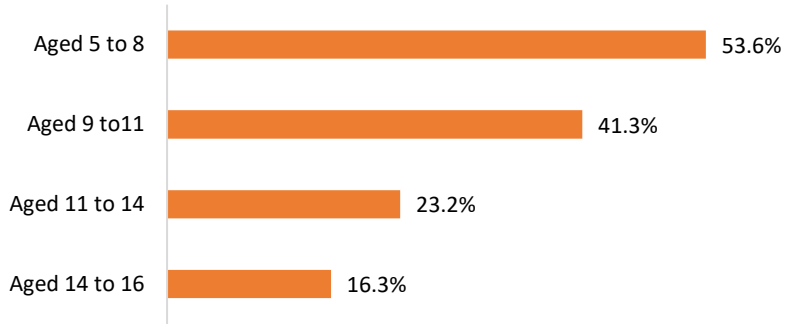


A steady decline with age is also evidenced in daily reading levels, with nearly three times as many 5 to 8-year-olds saying that they read daily in their free time compared with those aged

[4] Clark, C. and Teravainen-Goff, A., (2020) *Children and young people's reading in 2019*, London: National Literacy Trust

14 to 16 (see Figure 2). Indeed, only 1 in 6 young people aged 14 to 16 say that they read daily in their free time.

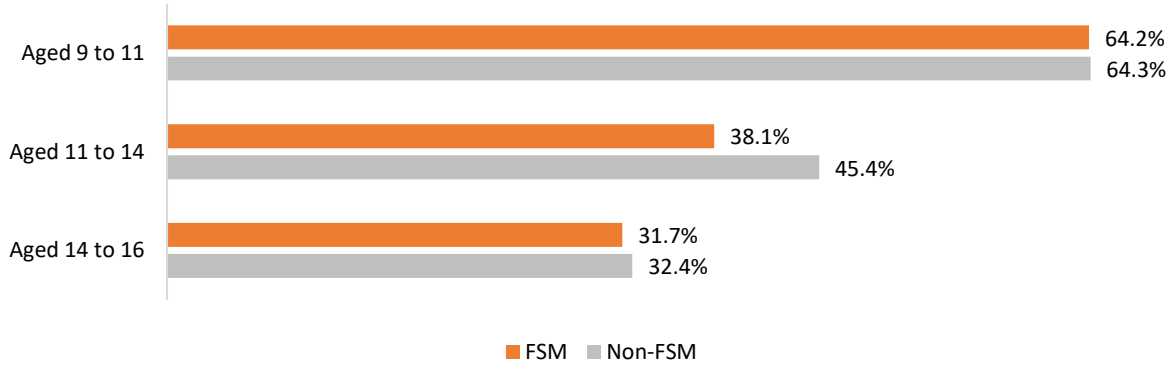
Figure 2: Levels of daily reading in free time in 2019 by age group



FSMs and teenage boys

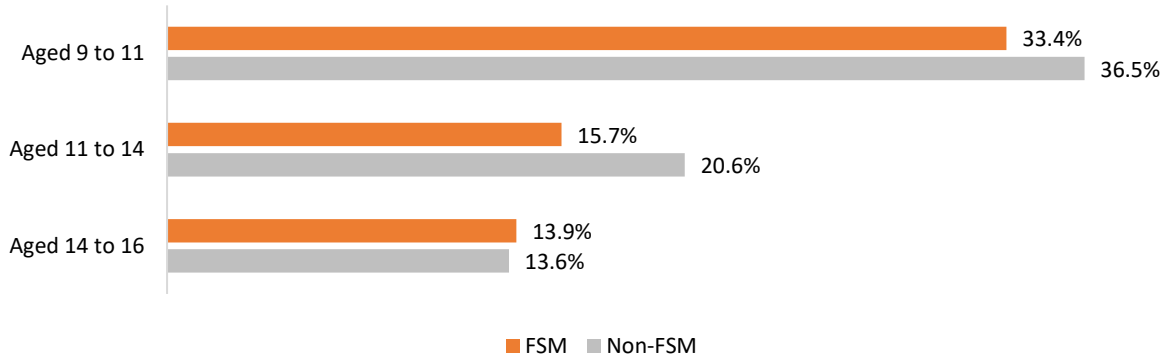
Teenage boys who are eligible for free school meals are significantly less likely to say that they enjoy reading. Just over a quarter (26.6%) say they enjoy reading, compared with 2 in 5 (40.1%) of teenage boys not eligible for FSMs. Looking at levels of reading enjoyment by age and free school meal uptake in 2019 shows that the gap is widest at ages 11 to 14, where fewer pupils eligible for FSMs say that they enjoy reading compared with their peers who are not eligible for FSMs (see Figure 3).

Figure 3: Reading enjoyment by age and FSM eligibility in 2019



Similarly, the greatest gap between those who receive FSMs and those who don't in daily reading levels is evident at ages 11 to 14 (see Figure 4).

Figure 4: Reading daily by age and FSM eligibility in 2019



Once young people reach secondary school, increased homework, greater opportunities to socialise and the world of social media are likely to make increased demands on leisure time, reducing the time available to read for enjoyment. Focus groups conducted for this study in schools with higher than national average numbers of children eligible for free school meals[5] confirmed that reading could be 'crowded out' by other priorities, and that it became more associated with work than with pleasure:

"…you've got online homework and normal homework; if you go to a club you've got to worry about that. Four different homeworks, you have to do that all and check it every night…"

"Sometimes school can take the fun or the leisure out of reading as well. With literature, if you're forced to read it, it kind of deters you from reading other books as well."

At the same time, surveys carried out for this research found young people were more than twice as likely to agree with the statement "There are lots of things *I'd prefer* to do in my free time than reading" than they were to agree with the statement "I don't have time to read" (68.9% vs. 31.1%). Boys were significantly more likely than girls to say there were other things they'd prefer to do, with more than three-quarters (76.8%) agreeing compared to 3 in 5 (61.0%) of girls. Some focus group comments reflected this sense of increased distractions:

"…when people go into secondary school …reading just kind of plummets, like your interest in reading, because there's so many more things …to worry about, be interested in and focus on…"

Alongside time, attitudinal factors featured strongly in many teenage boys' comments about reading in focus group discussions:

"It's almost like it's not fashionable, if that makes sense?"

[55] Based on a national average of 14.1% of secondary pupils: https://www.gov.uk/government/statistics/schools-pupils-and-their-characteristics-january-2019

"It's sort of like a hierarchy. It's like you're not cool if you read. And everybody wants to be cool."

"More so to be popular nowadays as well, you kind of have to be, to put it bluntly, like a confident idiot basically."

Surveys found that just over a third of teenagers (34.3%) agreed with the statement "Reading on screen is cooler than reading a book" suggesting that being offered opportunities to read digitally may also reduce a sense of reading being less 'socially acceptable' for many young people in the secondary school environment. Other comments expressing a preference for reading on screens tended to focus on their accessibility, adaptability, convenience and customisation (for example, changing font colour and size, screen brightness etc.). Some young people related the benefits of each format to different content, while others could see no difference at all:

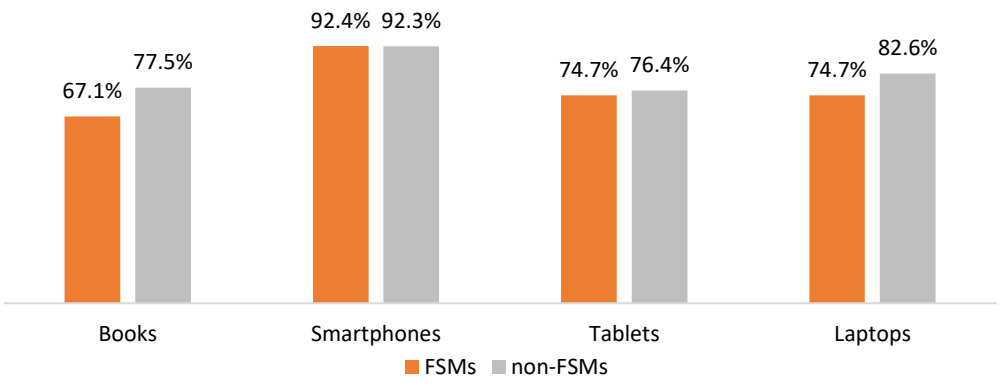
"I love lining all my books up on my shelf, and the scent of the pages. I also like to physically see my progress. It has a pretty cover and is really simple to navigate. A screen is a lot more 2D."

"For story books, I like paper, but for information I like reading on a screen."

"…the internet is an easier way to find stuff I'm into e.g. gaming, sports but at school there is barely anything about that, say I would like to read about my favourite football team …on paper there is less variety."

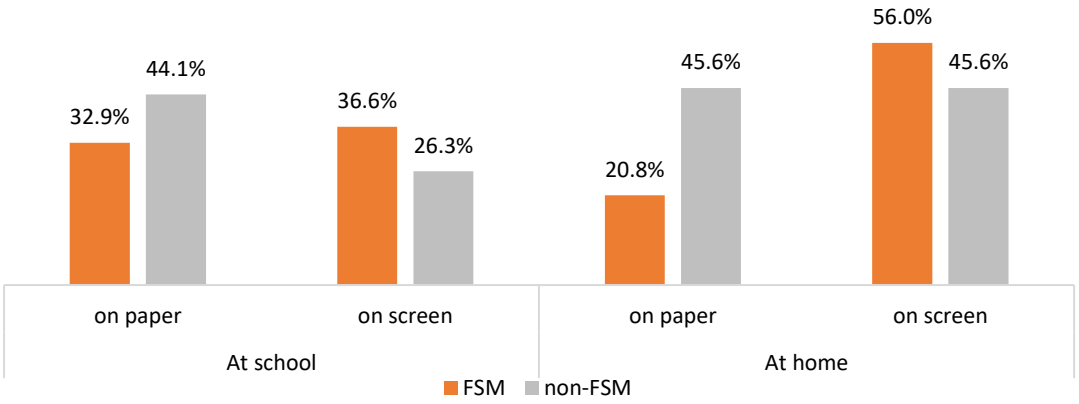
Such remarks serve as a reminder of the importance of considering each young reader as an individual, with distinct preferences for formats as much as for different reading materials.
In terms of potential access to different reading formats, while boys eligible for FSMs are significantly less likely to say that they have a book of their own at home (see Figure 5), there is no difference between them and their peers who are not eligible for FSMs with regard to access to smartphones (92.4% vs. 92.3%) and tablets (74.7% vs. 76.4%), and a slight gap in relation to laptops (74.7% vs. 82.6%).

Figure 5: Boys' access to resources at home by socioeconomic background



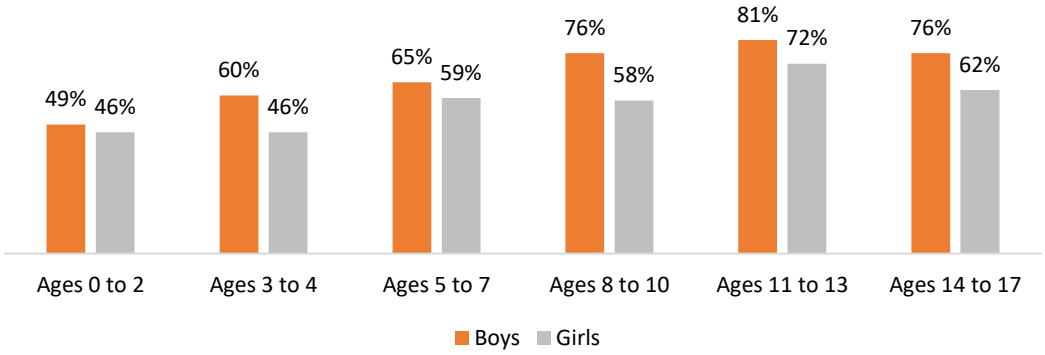
At the same time, teenage boys eligible for FSMs are more likely than those not eligible for FSMs to say that they prefer to read on screen both at school and at home (see Figure 6).

Figure 6: Preference for reading format by socioeconomic background



Research by Egmont in 2019 found that while there are no evident differences in accessibility of technological devices between genders, boys were more likely to say they prefer to spend time using screens than reading books, particularly at ages 11 to 13 (see Figure 7).

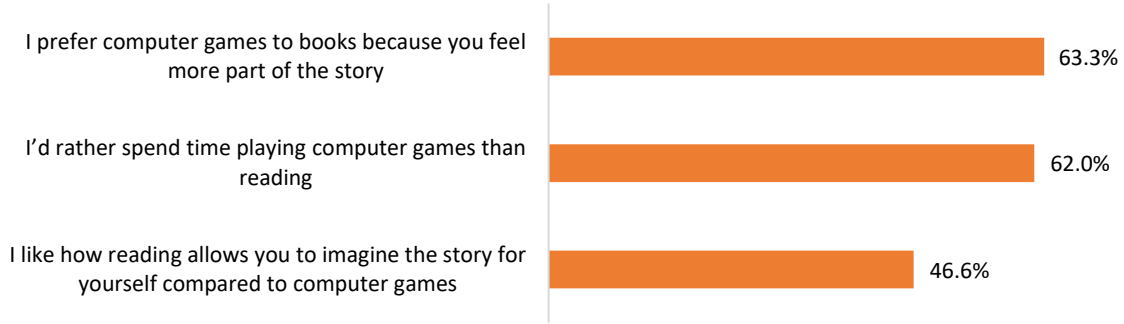
Figure 7: Prefer using/watching screens to reading books



Source: Nielsen's Understanding the Children's Book Consumer, 2018; Egmont (2019)

International research has also found that boys are less likely to spend time on homework and more time playing computer games at home (OECD, 2015a). We asked about this popular screen-based activity in our survey, and found that more than 9 in 10 (92.7%) of boys said that they played computer games at home, compared to just over half (52.7%) of girls. Almost two-thirds (63.3%) of young people who play computer games agree that they prefer them to books "because you feel more part of the story" and a similar percentage (62.0%) say that they'd "rather spend time playing computer games than reading" (see Figure 8).

Figure 8: Reading and computer games



However, 46.6% of game players also agree with the statement, "I like how reading allows you to imagine the story for yourself compared to computer games", indicating that many young people enjoy the different experiences offered by each format. Boys that enjoy reading are more than twice as likely to agree with this statement (61.4% vs. 24.8%) whereas those who don't are significantly more likely to agree with the statement "I prefer computer games to reading because you feel more part of the story" (83.2% vs. 56.0%).

Our research not only indicated that computer game playing is a very popular activity that helps many young people to experience feeling part of a story, but also that a great variety of reading is also taking place relating to computer game playing. Young people were invited to share what screen-based reading they choose to do outside school, and we were surprised by the number of responses that were either associated with, or referenced directly, computer game playing (see Figure 9).

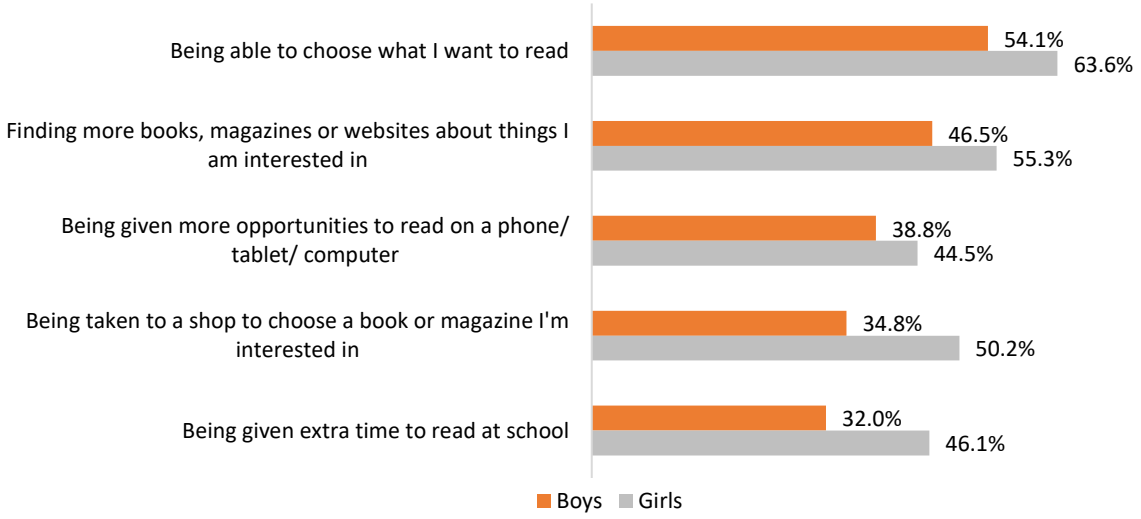
Figure 9: Other screen-based reading material, young people aged 11 to 16

More than 50 examples of reading taking place outside school by young people referenced reading texts such as computer game 'blurbs', instructions, in-game text, dialogue and help files, and online forums such as Discord and Reddit. A further 20 comments related to reading text linked to YouTube (such as titles, descriptions or comments) and several young people

mentioned reading subtitles on online videos or Netflix. Finally, a small but significant number mentioned reading their own or others' online writing. Research has indicated that boys' reading interests and preferences, both in terms of format and content, may be less honoured by publishers and less valued both at home and in the classroom (Clark and Burke, 2002; Smith and Wilhelm, 2002). However, a 2012 study by Steinkuehler found that, in some cases, boys read up to eight grades higher than their expected reading level when given a choice of reading matter that engaged their interest (in the case of this study, texts relating to computer game playing). We hope to explore these findings further with more detailed research in due course.

As noted in earlier research (e.g. Clark and Phythian-Sence, 2012), top motivators for reading in this age group included having a choice of what to read and finding reading material that matched their interests (see Figure 10). However, being given more opportunities to read in a different format (e.g. on a phone, tablet or computer) was also a popular option chosen by both genders. Taken together, these findings suggest that considering how to promote screen-based reading activities may be a practical way of encouraging some young people to read by offering this through a format that most appeals to them.

Figure 10: Agreement with statements about what would help you to enjoy reading more



It is essential that any guidance on using technology to support literacy considers young people's perspectives on the topic. Young people were asked in what way digital tools and resources might better support their literacy engagement. The most frequent response was the provision of free ebooks (for example, through free apps or a school-based ebook library).

"If every device came with a free reading app and audio books…"

"…by making books free like YouTube videos."

" I think the school could make an ebook library where we can borrow and read books online."

Many comments focused on the affordances of devices for providing reminders and support for reading, tailoring reading suggestions to suit an individual's interests, 'gamifying' reading, setting challenges and providing rewards:

"…there could be a system that tracks how much you read and what you read and picks the right books for you, and sends notifications if your reading is improving or you haven't been reading enough"

"Make reading more fun by involving games of some sort"

"…making challenges that include reading to bring in people that do not normally read (e.g. me)"

Multimedia elements also featured strongly, with many young people suggesting that audiobooks would support reading enjoyment, or that videos of people reading or "telling stories" could engaging them further:

"Audiobooks can help people understand harder words while they are reading along"

"…do a meet up online with facecam on a …website like discord or Skype"

"Using technology may make it easier to have a book club and share with other people because it is easier to share thoughts online"

Developing the evidence base for the use of technology in creating positive literacy outcomes in young people

Informed by insights from existing research relating to the impact of technology on literacy teaching and learning in the school environment, we gathered new information from surveys (n=261) and interviews (n=12) of UK teachers conducted in late 2018 (219) and early 2019 (42). The 2018 survey included both primary and secondary teachers, allowing a comparison of findings for different settings, while the 2019 survey focused only on secondary teachers, exploring themes arising over the course of the study in more depth. Findings will inform the design of a framework of guidance reflecting access to resources and training needs.

Access to digital tools and resources in the secondary school setting

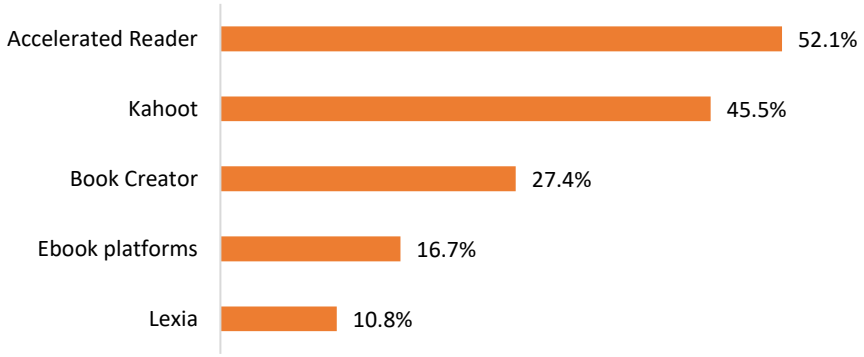
A 2017 report by BESA (British Educational Suppliers Association) found that an average secondary school had 431 computers[6]. However, our survey indicated that access to (rather than availability of) hardware, software and wifi in schools is poor, with several teachers mentioning the difficulties of booking hardware even when it was theoretically available. While secondary teachers report much greater access to desktop computers than primary teachers (65.0% vs. 34.7%), in terms of portable devices, secondary students were at a disadvantage, with just 40.0% having access to laptops compared to 69.5% of primary pupils. Primary teachers were also nearly twice as likely to report access to wifi than their secondary

[6] https://www.besa.org.uk/key-uk-education-statistics/

counterparts (60.2% vs 35.2%). Perhaps as a result, more than a third of secondary teachers (34.9%) say they 'rarely' or 'never' use technology to support literacy, compared to 1 in 10 primary teachers (11.0%).

In terms of access to software (e.g. platforms, programmes and apps) used to support literacy, the five mentioned most by teachers responding to our surveys were Accelerated Reader (52.1%), Kahoot (a 'quizzing' tool - 45.5%), Book Creator (27.4%), ebook platforms (16.7%) and Lexia (see Figure 11).

Figure 11: Platforms, programmes and apps most mentioned by survey respondents



Interviews with teachers reflected the popularity of platforms suggested in the surveys, but also many other ways in which technology was being used to support reading for enjoyment:

"We use AR and STAR reading tests with Year 7 and 8 students but can't afford to extend it into Year 9 at the moment. Lexia is used in tutor time as an intervention - the students like how visual it is and the support of headphones."

"Bedrock Vocabulary. Research-based, easy to set homework using it."

"Kahoot – we use it for quizzes about literary devices, grammar or questions on the text they are studying."

"I've found *Lexia Core 5/Strategies* to be really effective for pupils who have low literacy skills, they seem to be enjoying …the programmes and we see an increase in the majority of pupils' reading ages."

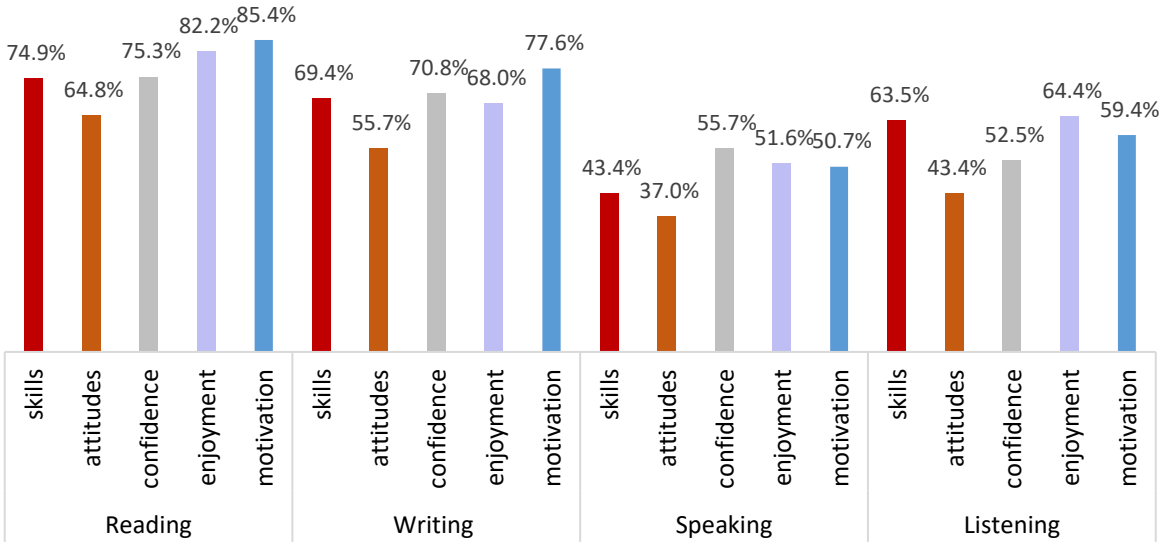
"[Texthelp's] *Read&Write* app is not only a computer reader but has also been useful in allowing pupils to generate individualised picture dictionary glossaries – this has been a useful way to aid understanding and revision."

"Our DEAR ('Drop Everything and Read') sessions include reading using technology. Children can read on Wattpad, or graphic novels.""

"School-wide use of Google documents …and collaborative working"

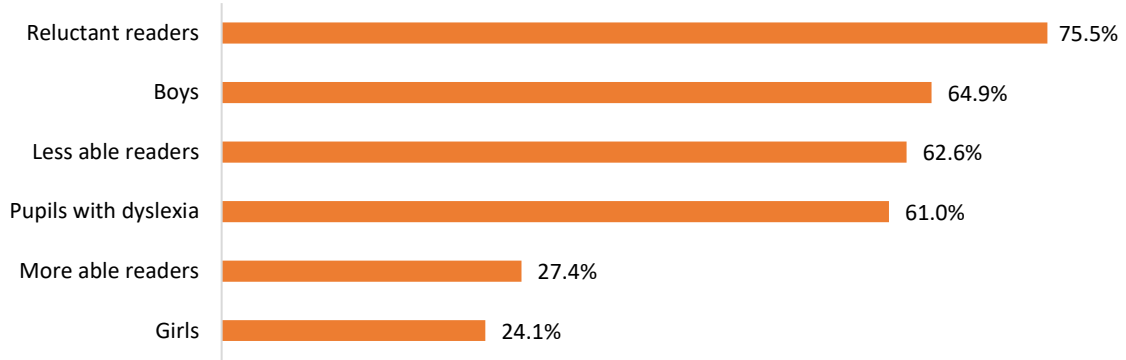
Most teachers considered the ability to engage (86.8%) and enable (66.7%) pupils to be the principal benefits of using technology in the school setting, and most felt it offered greater benefits in relation to reading than other aspects of literacy such as writing, speaking and listening (see **Figure 12**). Indeed, three-quarters of teachers responding to our surveys felt technology had a positive impact on students' reading skills (74.9%) and confidence (75.3%), and more than three-quarters on their reading motivation (85.4%) and enjoyment (82.2%).

Figure 12: Teachers' perceptions of aspects of literacy most positively impacted by technology



Echoing the findings above in relation to the impact of technology on engagement and motivation, teachers were most likely to say they thought technology could have a particularly positive impact on reluctant readers and boys (see Figure 13).

Figure 13: I feel technology can have a more positive impact on…



3 in 5 also noted the benefits for enabling less able readers (62.6%) and pupils with dyslexia (61.5%) but less than a third felt technology could have a positive impact on their most able readers and just a quarter felt it could best support girls. Focusing on secondary teachers, almost all (91.9%) felt technology had most potential for supporting reluctant boy readers,

and almost 4 in 5 (78.4%) on less able boys. In terms of how technology was being used to support this group, several comments reflected the engaging nature of reading on screen:

"We encourage the use of laptops with less able readers, the idea of looking at a screen instead often appeals more to the boys."

"Adjusting font size, changing the background and font colours for dyslexic students, using iPads for both academic and pleasure reading, various apps to encourage reading and comprehension."

"We use technology to engage as many pupils as possible. We have iPad apps that helps early readers (reads to them) …if we can find PDF versions of books we use them as whole class reading or as guided reading group work."

"I will allow pupils to read from a Kindle or phone during reading sessions."

"Encouraging use of ebooks and audiobooks."

"We have purchased over 150 books and put them on the school's intranet for their use and enjoyment."

However, one teacher expressed reservations about using technology before reading skills and stamina had been developed, prioritising the importance of books with engaging content:

"…these boys are excited about having access to tech [but] many come from homes that have no reading culture. It would be good to introduce them to tech-free spaces before utilising tech to support reading. Concentration and focus are best achieved with relatable narratives."

Case study: Using technology to engage reluctant readers

We have many reluctant readers and work hard to support their confidence and learning. We're about to start the new (National Literacy Trust) Skills Academy programme. We find termly targeted interventions work well to keep pupils' interest and attention and build vocabulary and comprehension, important for their GCSEs and wider enjoyment of reading.

For young people today, reading on a screen is how they read, they're used to it being interactive and switching between pages across screens. I think we need to prepare the students to use future media and technologies and to do whatever it takes to engage them with literacy and the enjoyment reading can bring.

When it comes to technology, some staff are more confident than others. I think training is most effective when you get time to try things out and go away with something you can immediately use in the classroom.

Teacher, North West England

Case study: A balanced approach to technology

Using technology is good in that it engages students, but can also be restrictive when it presents an instant solution. We need to help pupils think more about what's behind some of the things technology enables them to do. When it comes to exams, these will be on paper so children can't just go in and skim read. We don't allow phones in lessons so most technology is PC-based and we use specific programmes, for example, SAM Learning and Show My Homework, and Reading Eggs with some Year 7s and 8s (they are developing the platform for up to Year 9 and we're one of their test schools).

We've recently started using PiXL Unlock, which promotes a more thoughtful approach, for maths, English and humanities. The teaching staff are trying it out first before we offer it to pupils, as we've found when teachers aren't thoroughly familiar with how something works, that can mean the children disengage when something goes wrong.

We also use lots of non-technological techniques to support children's reading – we have a 'Literacy Box', with games like Scrabble and Pass the Bomb to help children engage with words and literacy, extend their vocabulary and build their confidence.

Teacher, secondary school, South West England

In addition to the surveys and interviews with practitioners detailed above, further consultations with a number of specialist consultants were carried out to inform the development of a framework of guidance and advice. Selected comments from these consultations are detailed below.

Expert interview: Paul Clayton, English specialist consultant

"Firstly, from experience, while boys predominately may be engaged by technology, it can also engage and inspire girls. Secondly, we must also consider whether we are looking for engagement or skills. Yes, technology, carefully and strategically used, can better engage students, but I think we have to consider what technology can do to support intrinsic motivation to read, or what aspects of technology. You need to be strategic, rather than things like allowing students 10 minutes on a game because they did well on a text. Rather you can use technology to support traditional classroom practices, and help get young people ready for exams and for life. For example, creating quest narratives for computer games can help pupils structure their creative writing – so my advice would be, if you are using it, be mindful of why you are using it.

The most useful technology to support literacy can quite often be that which is readily available, rather than specially designed apps. For example, using Google maps to find out where an author was born, using PowerPoint to help students engage with a poem by using images, adding text to those images, considering how it might be animated – that can be effective, compared with just going through a poem line by line. I've also seen some really interesting use of technology in relation to assessment, with teachers scanning a student's work so it could appear on a screen (a dedicated YouTube channel) with both written commentary and audio feedback. Students seem to respond positively to this.

I think you could put together a good CPD session on helping teachers use what they have already to better support learning, but think there is a real need for better signposting of what kind of things like this are 'out there', to help teachers to navigate what is good and what isn't."

Expert interview: Ruth Everett, education consultant

"The area of how technology might support literacy has yet to be fully 'tapped into', certainly in relation to CPD. Furthermore, it is important to recognise that children's literacy needs are so individual and so complex, it's unlikely you'll find just one thing 'works'. In terms of approach, I think I would urge anyone to try using technology with young people to see if they seem more engaged and animated by something they're reading online, test their comprehension and then if that is OK, stick at it, and if it doesn't work, scrap it.

I also think it's important to use a range of formats – you can't beat hearing stories read aloud by your teacher, it's an intimate experience, whereas hearing them online isn't. Similarly, if reading on screen, just as reading in print, you're better to do guided reading, modelling first, especially with more reluctant readers who can feel more 'on the back foot' to start with.

Technology can support multimodal learning - we're hardwired to hear sound rather than to read, so reading aloud first is a good technique whatever the format, for example, if you use a PowerPoint on the interactive whiteboard that allows children to see, hear and then discuss a text. Sometimes I think there can be a reluctance to try things out and reflect, but as teachers, I think we have a moral duty to keep learning."

Expert interview: Ruth Shallcross, education consultant

"Many children enjoy the tangibility of a book, but for those more 'at risk' of losing interest in reading, a screen may be compelling, so it would make sense that some readers may shift more towards reading on screen. On the one hand, it is great that there is this avenue that may keep them reading longer, but on the other we have to be mindful of the health problems associated with screen time, such as the effect of blue light on sleep. We also need to consider the quality, and their comprehension, of what they might be reading on screens.

I have seen technology used to support reading, for example, at primary level, a platform to support spelling, grammar and guided reading. If it were to be offered during school time or library time, I think this could help navigate around concerns about screens and bedtime. It's also important to consider how sedentary children and young people might be (for some young people I've worked with, there are less opportunities to do something outside), and also the presence (or otherwise) of print books in the household. For those reasons, it's important that any use of technology to support literacy is balanced with a love of books, and that screen time is used effectively.

Text choice is absolutely paramount, and I think boys will read whatever format matches their interests, whether that's on paper or on screen, which brings the question, where are they going to access good-quality texts to read digitally? They need a wide range of reading opportunities, so they can choose for themselves, but schools have so little money I'm not sure they can afford ebook platforms alongside physical books, and you also have to factor in the admin time with many technology platforms. It's a commitment, so it really needs to feel worth it. There should be a free platform through which all UK schools can access high-quality texts to support pupils' reading and learning."

Highlighting challenges for educators using technology to promote reading enjoyment in young people

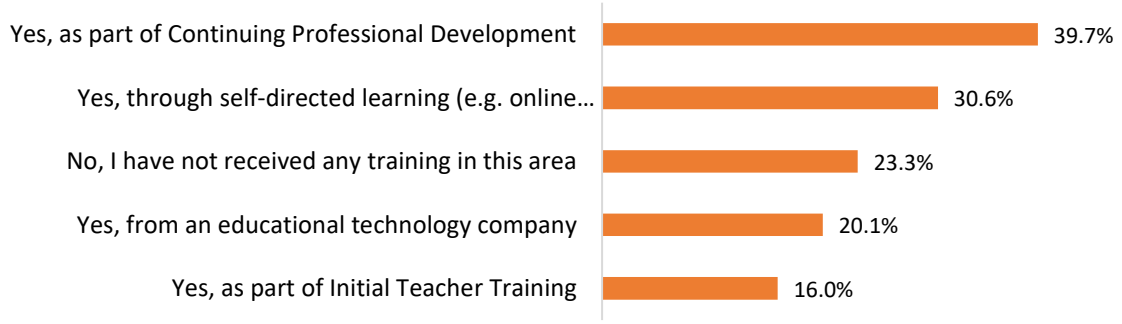
As mentioned, teachers responding to our survey had a broadly positive attitude towards using technology to support learning, and in addition, almost 9 in 10 (88.1%) agree that children needed to be prepared for a digital workplace. However, reflecting the views of educational experts interviewed for this study, most held a balanced view of the use of technology. Indeed, when asked to select their top three barriers to using technology to support literacy, top ranked reasons were resource rather than attitude-related, with lack of

time and knowledge of effective platforms also ranking ahead of issues relating to confidence, attitude and training (see Figure 14).

Figure 14: Barriers to using technology to support learning

Almost a quarter (23.3%) of respondents said they had received neither initial nor ongoing training in using technology to support literacy (see Figure 15). This was not to say there was no appetite for learning in this area. Almost a third of teachers had trained themselves through self-directed learning, with more of those from secondary settings reporting self-directed learning (41.0% vs. 25.4%).

Figure 15: Have you received any training relating to using technology to support literacy?



When asked what would most help them use technology to support reading engagement more effectively, the most frequent theme in free response text was financial resources, followed by the training and resources to support the effective use of technology, and information and evidence about the most effective platforms. Comments included:

"…easy to access courses, possibly free, resource-sharing in local areas"

"I have never had any outside training as a librarian and it would really useful to know what was available to encourage reading"

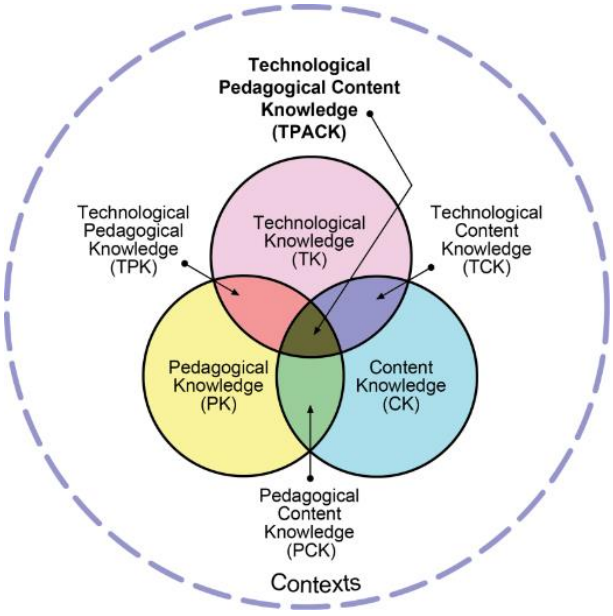
A note on multimodal and 'new' literacies

It is important to acknowledge how "…new literacy technologies [are] both a product and a shaper of their times" (Tyner, 1998). While some studies describe a successful assimilation of traditional and new literacies (see e.g. Price-Dennis et al., 2015) others call for better recognition of the "entanglement of the digital and non-digital in everyday life as people move fluidly between devices, modes and media" and the "increasing divergence between the texture of young people's literacy practices, state-mandated literacy curricula and assessment, and the rhetoric of 21st Century Literacies" (Burnett and Merchant, 2015). Furthermore, it is clear that literacy that enables learning and employment is increasingly a digital experience, and that the education sector should seek evidence of the opportunities today's technologies may offer for raising digital literacy levels.

Proposing a framework of guiding principles for educators around using technology to promote reading enjoyment in young people

Overall, our findings indicate a need for greater provision of the resources and training needed to ensure technology is used effectively to support positive literacy outcomes for all children. Research indicates that teachers' pedagogical beliefs, knowledge and experience are important factors in technology integration (Graham, 2008; Avramides, 2016; Ertmer, 2016). A number of frameworks have been developed to support technology integration in education, with Mishra and Koehler's TPACK framework (see Figure 16) one of the best-known models. This model foregrounds the need for educators to understand how content, pedagogy and technology "work together, supplement one another, and are indivisible if technology is to enhance education" (Cook et al., 2013).

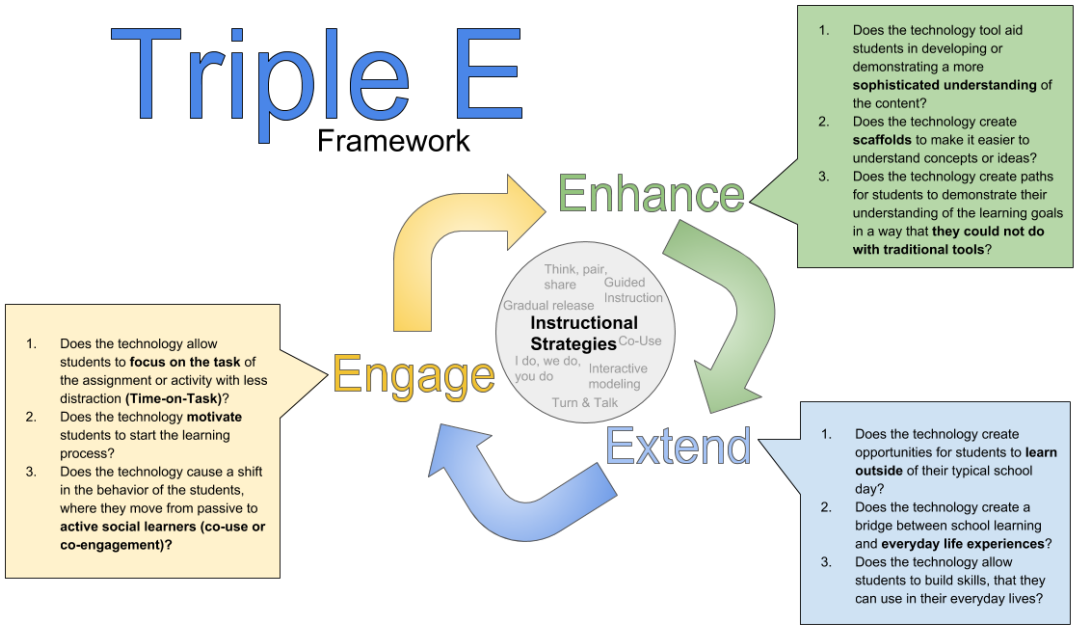
Figure 16: The TPACK framework



Other researchers have focused on describing the progressive stages of effective technology integration. For example, Plomp et al. (2009, as cited in ICF, 2015) identified three distinct stages: using technology to support traditional methods of teaching; showing more innovation as teachers become more confident; and an 'inventive' stage that supports active, creative and collaborative learning. Similarly, Puentedura's well-known SAMR model builds on the TPACK framework to illustrate four stages of technology-use in pedagogy: substitution, augmentation, modification and redefinition[7]. Other researchers have pointed out the importance of sustained use to allow technology to become embedded in teaching practice, for example, citing Somekh et al. (2007), Underwood (2009) notes that the impact of digital technology on learning may not be visible until the "second cohort, at least a year into using the technology".

The 'Triple E' framework[8], developed in 2011 by Liz Kolb, while also including aspects of the TPACK model, provides a question-based approach to considering technology use in the classroom (see Figure 16).

Figure 16: The Triple E framework



(Kolb, 2011)

The practical nature of this framework reflects the decade that Kolb spent working with school leaders to determine the most effective uses of technology in the classroom (as cited in Flaxman, 2019). As noted in a 2015 review by ICF, studies determining the factors linked to positive outcomes when using digital tools consistently find that "it is teachers that make the

[7] http://hippasus.com/resources/sweden2010/SAMR_TPCK_IntroToAdvancedPractice.pdf
[8] https://www.tripleeframework.com/

changes to exploit and harness digital technology". A US study of a small-scale scheme providing laptops for secondary students from low-income backgrounds noted that teachers' skills in designing learning explained much of the differences found in learning outcomes (Mouza et al, 2008). Indeed, while Archer and Savage's 2014 meta-analysis of studies in this area found an average effect size of 0.18 in programmes using technology to support learning, this increased to 0.57 where studies were clear that training and support had been provided.

The thinking behind these frameworks, and learning from the literature, will inform the development of our own resources, carried out in consultation with teaching experts. These will provide teachers and senior school leadership with an overview of the research evidence relating to the effective use of technology to support young people's literacy, and provide a set of questions to ask before, during and after the use of technology to support literacy to enable effective integration and evaluation. The framework and guidance will be shared with our network of literacy professionals across the UK, and lay the foundation for the development of CPD and step-by-step activities designed to highlight effective ways to use technology to improve learning outcomes for disengaged readers. Feedback will be gathered on the perceived usefulness and ease of implementation of the proposed guidelines, outcomes and lessons learned approximately six months after principles have been downloaded.

Conclusion

It is important to recognise the popularity and relevance of technology in the lives of children, young people and families, to investigate how its various affordances may support the components of literacy, and how features designed to capture and retain attention may be used to engage young people in effective learning. While it is essential that the potential disadvantages of technology use are thoroughly explored, academics suggest there is also an urgent need for:

> "…good-quality longitudinal studies which explore the context and content of technology use beyond just screen time use, including how technology can be harnessed for its positive benefits…"
>
> Dubicka and Theodosiou (2020)

A number of studies, reviews and meta-analyses (e.g. Jewitt et al., 2011; Cheung and Slavin, 2012; Higgins et al., 2012; Archer et al., 2014) have explored how technology may be used to support literacy, and findings consistently show that "ICT helps improve reading and writing skills, as well as developing speaking and listening skills" (ICF, 2015). Quantitative and qualitative work carried out for this study found screen-based reading to be popular with boys, particularly those eligible for free school meals and with the lowest levels of reading enjoyment. Indeed, boys in this group are more likely to say they prefer to read on screen both in school and at home and to believe that reading on screen is cooler than reading a

book. This is important as our research shows that children and young people who enjoy reading are nearly four times more likely to read above the level expected for their age.

However, even though young people say they would be motivated to read this way, and a high percentage of teachers believe technology can be particularly effective in engaging boys and reluctant readers, opportunities to read on screen at school are limited. Our findings indicate a need for greater provision of the resources and training to ensure technology is used effectively to support positive literacy outcomes for all children. Teacher surveys and interviews with educational experts further indicate that such resources take into account poor levels of access to hardware, a lack of training in using technology to support literacy, and a need for further information about how technology may be used most effectively to support literacy skills. We hope that the following framework, based on findings from surveys, focus groups and interviews, will provide a useful starting point for educators on the principles of using technology to promote reading for enjoyment in young people.

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Appendix

Methodology and respondent characteristics

Over the course of 2018 and 2019, 14 interviews with academics and educationalists were conducted and 9 focus groups discussions were used to gather views from different groups of stakeholders. Quantitative survey data consisted of 2,134 responses from pupils aged 11 to 16 and 261 responses from teachers. The year groups represented were Year 6/Primary 7 (n=25; 1.2%), Year 7/Secondary 1 (n=518; 24.3%); Year 8/Secondary 2 (n=601; 28.2%); Year 9/Secondary 3 (n=563, 26.4%), Year 10/Secondary 4 (n=344; 16.1%), Year 11/Secondary 5 (n=56; 2.6%) and Year 12/Secondary 6 (n=18; 0.8%). In terms of gender, pupil data consisted of boys (n=1,000; 47.6%), girls (n=989; 47.1%), other (n=44; 2.1%) and would rather not say (n= 69/ 3.3%). 165 (7.9%) of respondents were eligible for free school meals, 1,734 (81.3%) were not eligible, 136 (6.4%) didn't know and 59 (2.8%) would rather not say. Findings from bespoke surveys were contextualised with data from our Annual Literacy Survey, which reached 56,905 children and young people in early 2019.

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About the National Literacy Trust

Our charity is dedicated to improving the reading, writing, speaking and listening skills of those who need it most, giving them the best possible chance of success in school, work and life. We run Literacy Hubs and campaigns in communities where low levels of literacy and social mobility are seriously impacting people's lives. We support schools and early years settings to deliver outstanding literacy provision, and we campaign to make literacy a priority for politicians, businesses and parents. Our research and analysis make us the leading authority on literacy and drive our interventions. Literacy is a vital element of action against poverty and our work changes life stories. Visit www.literacytrust.org.uk to find out more, donate or sign up for a free email newsletter. You can also find us on Facebook and follow us on Twitter.