UNDERSTANDING THE IMPACT OF AN IPAD ON THE READING EXPERIENCE OF STRUGGLING ADOLESCENT READERS

by

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Abstract

Although evidence suggests that enjoyment in reading is declining (Sainsbury and Schagen, 2004), students that enjoy reading are likely to read more often and be better readers (Clark and De Zoysa, 2011). The last decade has seen a well-publicised proliferation of digital reading devices as a platform for the delivery of electronic books (e-books). E-books include features that influence the reading experience, and the present study aims to explore the impact of using an iPad as an e-book on the reading experience (state enjoyment) of struggling adolescent readers.

A mixed methods approach was used, including an experimental repeated-measures design where thirty participants (from years 7 – 9) were allocated to groups that read the same book for fifteen minutes across three conditions (a print book, iPad without features deployed, iPad with features deployed). The conditions were experienced in different orders and state enjoyment was measured through a questionnaire. Follow up focus groups were conducted to complement the questionnaire data.

Analysis of the results shows that the iPad (with features deployed) had a significant, positive impact on the state enjoyment of struggling adolescent readers. Although some of the impact is likely attributable to the novelty of the iPad, the focus groups suggested that the dictionary and narration, and the size of the font were important for struggling adolescent readers.

Whilst care must be taken with the results of this study, not least as it does not consider the maintenance of any changes in enjoyment, it is tentatively suggested that electronic reading devices with congruent features may encourage disaffected, struggling adolescent readers to return to reading. The implications of this are discussed.

Keywords

Reading enjoyment. Reading for pleasure. E-book. iPad.

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CHAPTER 1 - INTRODUCTION

1.1 Focus of the study

This study aims to understand the capacity of e-books (accessed through an iPad) to impact on the reading experience of struggling adolescent readers. An e-book is defined as 'a digital object with traditional book-like properties that can be provided in an electronic environment' (Vassiliou and Rowley, 2008).

For the purposes of this study, state enjoyment was used as a proxy for the reading experience. State emotions, such as enjoyment, are experienced in the present and are hypothesised to influence the development of trait emotions (emotions that are built up over time based on a retrospective review of cumulative experience) (Goetz et al., 2010).

Further research questions in the study consider whether the existing level of trait enjoyment for reading mediated the impact of the iPad on state enjoyment, whether the iPad impacted on reading speed and which features of the iPad were most important in shaping the state enjoyment of struggling adolescent readers. These ancillary questions were anticipated to inform understanding of any relationship established between the iPad and a change in state enjoyment.

1.2 The enjoyment of reading within the context of reading attainment

Reading attainment is substantially predicted by the amount of independent reading undertaken (Cox and Guthrie, 2001), and there is a strong relationship between the amount of independent reading undertaken and the enjoyment of reading (Clark and De Zoysa, 2011). Accordingly, the model of reading relationships (Clark and De Zoysa, 2011) defines reading enjoyment as a 'doubly powerful' source of influence on reading

attainment. Various authors (including Whetton et al., 2007) have suggested that increases in reading skills may come at the expense of enjoyment of reading.

Analysis of long-term trends in literacy standards in the UK suggest they have been remarkably constant since 1948, punctuated by gradual improvements between 1948 - 1960 and 1997 – 2004 (Rashid and Brooks, 2010). Yet there remains a well-publicised 'tail of underachievement' (Marshall, 2013) comprising 17% of 16 – 19 year olds that are characterised as 'functionally illiterate' (Rashid and Brooks, 2010). For this population, their level of literacy is lower than the requirement to 'partake fully in employment, family life and citizenship and to enjoy reading for its own sake' (p. 64; Rashid and Brooks, 2010).

Struggling adolescent readers are likely to comprise the 17% referred to by Rashid and Brooks (2010) and more, and they experience a wide range of difficulties related to their reading. This includes the fact that they are less likely to enjoy reading (Polychroni et al., 2006). Motivational theories such as the expectancy-value model of achievement motivation (Wigfield and Eccles, 2000) and the control-value theory of achievement emotions (Pekrun, 2006) outline a potential role for e-books in making reading more accessible and enjoyable to struggling adolescent readers. These theories both underline the significance of how an individual feels about a task or activity prior to embarking on it. Individuals that feel they are likely to be successful, that they are competent and that they have a degree of control over the outcomes are more likely to be motivated to complete a task and feel positive about it. Further, the four-phase model of interest development (Hidi and Renninger, 2006) outlines a role for state emotions (such as short-term enjoyment of reading) to shape a longer-term propensity to engage in an activity such as reading.

1.3 Local context

The study was completed within a secondary school in a large shire county in the East of England. 'S' Village College (SVC) caters for students between the ages of 11 – 16. Under the provision of the Academies Act (2010), SVC was granted academy status in the summer of 2011. There are 1,215 students at the school. Based on national data (The Office for Standards in Education; Ofsted, 2011), SVC has an average proportion of students with special educational needs, and a below average proportion of students known to be eligible for free school meals. Ofsted found SVC to be 'an outstanding school in every respect' (April 2011, p. 4). Comments throughout the inspection report reference high standards of learning, and that the 'needs of every child are met' (p.5).

SVC is supported by a number of local authority services. The Educational Information and Communication Technology (ICT) service is responsible for the county's 2012-2015 Children and Young Person's Services Strategic Framework for Information and Communication Technology. The framework states that 'technology has opened up immense opportunities for communication and collaboration beyond the classroom, for involving parents, and for supporting and challenging learners, whatever their needs and talents' (p. 5). Two specific statements of intent are made related to introducing developments such as e-books:

- '… we will help schools and settings to benefit from the latest thinking about current and future technology and its use' (p. 4).
- 'Specialised resources can help children with specific needs to catch up if they have fallen behind' (p.7).

Since September 2011 I have acted as the school's assigned (Doctoral Trainee) Educational Psychologist (EP). Across the county, The Community Educational Psychology Service is positioned to support, amongst other areas, literacy improvement. This is in line with a research report published by The Department for Education and Employment in 2000, which suggested EPs have a role to play in supporting literacy planning and delivery in schools (Kelly and Gray, 2000). Farrell et al. (2006) suggested this role may be extended into homes and the community.

A key driver for the study was that SVC asked for my support in making a decision regarding a school-wide investment in portable reading aids, such as Kindles or iPads. A National Literacy Trust (2013) survey of over 34,000 children found that four out of ten owned a tablet (such as an iPad) or a smartphone. This proliferation of devices led to SVC identifying portable reading aids as a potential tool to improve reading attainment, and iPads were being marketed to schools through the ICT service at a cost of £16 per pupil per month (with a small additional parent subsidy).

On review of the available evidence regarding the use of e-books in education, it became clear that the majority of the studies focused on academic (not affective) outcomes for younger, typically developing children (not struggling adolescent readers). The e-books used in the majority of previous studies were predominantly accessed through desktop computers, rather than a portable e-reader. The opportunity for further investigation was the genesis for this study.

1.4 Structure

Following this introductory chapter, chapter 2 contains a critical literature review of this field. Specific attention is paid to the interrelationships of reading and the

emergence of e-books to serve the needs of a generation of digital natives (Prensky, 2001). Chapter 3 details the participants, design, methods and data analysis techniques used, as well as the predominant ethical considerations. Chapters 4 and 5 outline the findings and the key interpretations of the findings. Latterly, chapter 5 considers the threats to the interpretation of the findings and the professional implications for EPs and schools. Chapter 6 draws together the research and suggests areas worthy of further examination.

CHAPTER 2 - LITERATURE REVIEW

2.1 Introduction to the literature review

The present study aims to evaluate the impact of introducing an iPad on the reading experience of struggling adolescent readers. The literature review begins by outlining the importance of reading and the national policy context. The interrelationships between reading attainment, behaviour, attitude and enjoyment are introduced in order to understand the many facets that comprise the reading experience, specifically for struggling readers. Many technological advances in education have been introduced to satisfy the learning preferences of a digital generation of children, and the introduction of electronic aids to reading is one such development. Research published to date on the impact of e-books on academic reading outcomes and the reading experience is reviewed, before the rationale for this study is detailed.

2.2 The importance of reading

2.2.1 The functions of reading

Alan Milburn, the ex-Member of Parliament, wrote a social mobility report (Independent Reviewer on Social Mobility and Child Poverty, 2012), that led Barnardos (2012) to argue that learning basic literacy skills, including reading, is what will enable the most vulnerable children to climb up and out of poverty. Indeed, Usherwood and Toyne (2002) contend that reading can be transformational for children, as it can act as the gateway to a social, economic and civil life (Holden, 2004). Reading is recognised to be a prerequisite for almost all cultural and social activities (Department for Culture, Media and Sport; DCMS, 2003).

More pragmatically, Stokmans (1999) identified four functions of reading:

Function of reading	
Individual development	Gaining insight into yourself, others and life.
Educational utility	Attaining educational or vocational success through learning literacy skills (Krashen, 2004) or developing general knowledge (Cunningham and Stanovich, 1998).
Enjoyment	The pleasure derived from reading.
Escape	Reading as a distraction.

Table 1 – The functions of reading.

It has also been suggested that the amount of reading a child completes is related to active participation in social communities (Bus et al., 1995).

Various surveys have investigated the functions of reading from an adolescent's perspective. Working with 11 – 18 years olds in 2003, the Nestle Family Monitor found that:

- 55% of respondents stated books helped them understand different people / cultures;
- 40% wanted to learn more about new subjects; and
- 33% felt that books encouraged them to try new hobbies.

The 2005 Reading Connects Survey (Clark and Foster, 2005), found that the majority of pupils emphasised skills-related reasons for reading. The same survey concluded that boys were more likely to be utilitarian in their reasons for reading than girls – boys were more likely to read to get a job (45% vs. 41%), while more girls than boys indicated they read because it was fun (50% vs. 44%), it teaches them how other people live (43% vs. 31%) and because it gives them a break (38% vs. 32%).

2.2.2 National policy initiatives

The National Literacy Strategy (NLS) was established in 1997 by the incoming UK government to raise standards of literacy in English primary schools. The phonics-based

strategy, formalised through documents such as Progression in Phonics (Department for Education and Skills; DfES, 1999), set out the details of a 'steady, consistent strategy' (p. 5; Beard, 2000) for raising standards of literacy, and in 2006 was renewed to refer to 'reading on page and on screen' (DfES, 2006). It has been argued that the introduction of the NLS has been responsible for a reduction in the opportunities for voluntary and independent reading for pleasure (Cremin, 2007). Some authors suggest that a relentless focus on the technicalities of reading has led to the fragmentation of the reading experience, with decoding skills divorced from comprehension (Fisher, 2005).

More recently, a number of high profile government-backed initiatives have been aimed at improving literacy and reading standards in the UK. Some of these initiatives, such as the Big Diamond Jubilee Read (NLT, 2012) and the Reading Miles Global Challenge (NLT, 2012), have aimed to increase reading. The majority of the initiatives, however, have focused on the implementation of renewed systematic synthetic phonics-based approaches, including new screening checks and resources, supported by additional funding (Department for Education; DfE, 2012).

2.3 The interrelationships of reading

Uncertainty regarding the drivers of reading attainment led Clark and De Zoysa (2011) to map the interrelationships between reading enjoyment, attitudes, behaviour and attainment. They recognised that there had been few studies considering the interplay between a number of reading-related factors, with the landscape obscured by 'a lack of common definitions, frequently confused terms, over-used buzz words and… sweeping statements that are not based on empirical evidence' (p. 10).

Within their work they posed thirty two questions to 4,503 children from Upper Key Stage 2 (aged 9 – 11), and it led to a mediated, semi-hierarchical model that explained 41% of the total variance in reading attainment:

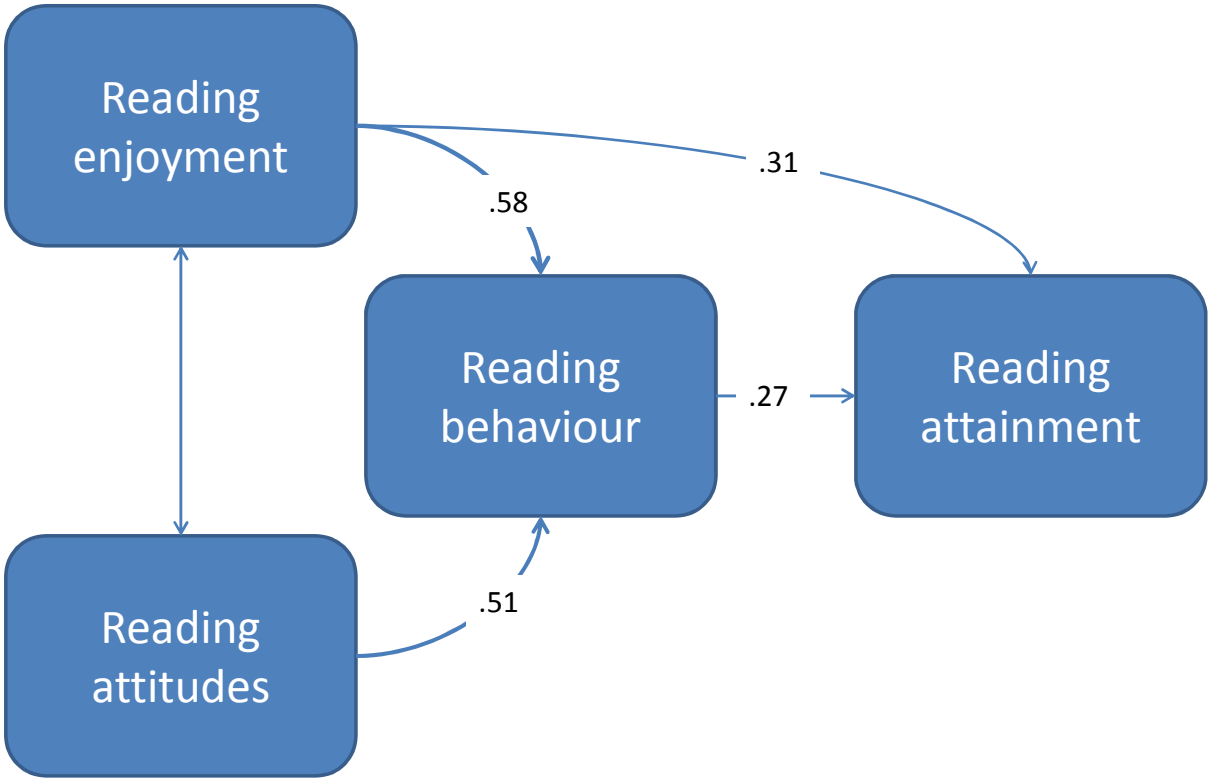
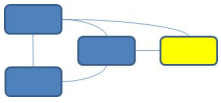


Figure 1 – Model of reading relationships (Clark and De Zoysa, 2011).

Within the model, the strength of the relationships is indicated by the correlation coefficients. As the review below will go onto show, Clark and De Zoysa's findings underscore the importance of reading for pleasure as a long-term investment, as reading enjoyment relates to reading attainment directly, and also indirectly (through reading behaviour).

2.3.1 Reading attainment



Measured through the administration of national teacher and summative assessments, Ofsted has stated that attainment in English (and reading) has risen in secondary schools since 2008, but that there has only been limited improvement in primary

schools (Ofsted, 2012). However, The Programme for International Student Assessment (PISA) survey (Bradshaw et al., 2010), considering reading attainment of fifteen year olds across sixty five countries, suggested that England's reading performance between 2006 and 2009 remained static (at around the Organisation for Economic Co-operation and Development – OECD – average), whilst other countries improved at a quicker rate. Within the national reading performance (and internationally), girls outperform boys (Bradshaw et al., 2010).

The drivers of reading attainment

As Figure 1 shows, reading attainment is driven by various factors, including the amount one reads (behaviour) and the enjoyment of reading. Various correlational studies (Twist et al., 2007) have shown that those that read more are better readers, and, conversely, underperforming readers indicate they read less than their peers (Clark and De Zoysa, 2011).

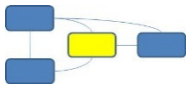
Although indirectly related to attainment through reading behaviour, positive reading attitudes have consistently been shown to be linked to reading attainment (McKenna and Kear, 1990) and this relationship was found to be stronger for primary age children than older children (Petscher, 2010). Once established, the relationship between attitude and attainment is assumed to be self-perpetuating (Clark and De Zoysa, 2011).

Having measured four aspects of reading motivation, Retelsdorf et al. (2011) confirmed what has been outlined above in Figure 1, that enjoyment of reading and reading for interest (both intrinsic motivators) enjoy a strong positive relationship with reading performance and growth. Stanat and Kunter (2001) further evidenced the relationship by showing that the achievement gaps between boys and girls disappeared when

controlling for intrinsic motivation. Various studies have shown that enjoyment is related to discrete components of attainment, including text comprehension and grammar (Cox and Guthrie, 2001) as well as breadth of vocabulary (Angelos and McGriff, 2002).

Relatedly, studies have found that reading performance and reading self-concept are positively correlated when concurrently measured (Aunola et al., 2002). Lastly, and outside Figure 1, family background (Yeung et al., 2002) and the amount of books at home (Twist et al., 2003) have been both related to reading achievement; Snowling et al. (2000) contend that the majority of variance in reading outcome can be accounted for by individual differences in the skills with which children enter school.

2.3.2 Reading behaviour



Reading behaviours, or habits, are defined as 'settled or regular tendencies to read particular types of material' by Davies and Brember (1993; p. 305). Survey findings differ on exactly how often children and young people read:

Authors	Year	Number of participants	Age of participants	Finding
Clark and De Zoysa	2011	4,503	9 - 11	Most young people read outside of class every day (32%) or two to three times a week (29%). Only 7% do not read outside of class.
Clark and Foster	2005	8, 206	6 - 16	The majority said they read outside school every day or once / twice a week.
Hopper	2005	707	11 - 15	61% reported reading a book at home that week. 93% of students indicated that they had chosen to read material other than books in the course of the week.

Authors	Year	Number of participants	Age of participants	Finding
Dungworth et al.	2004	132	9 - 10	51% read every day.

Table 2 – Frequency of reading.

Reflecting on earlier research (including Hall and Coles, 1999), Hopper (2005) indicated that adolescent reading habits have remained relatively stable over the last fifteen years. It is commonly recognised that the amount of reading a child completes declines with age (Clark, 2010) and that this may be more pronounced when considering fiction specifically (Maynard et al., 2008). Girls and those from higher social economic status families tend to read more than their peers (Hall and Coles, 1999). The largest proportion of young people (25%) read up to thirty minutes at a time, although those that receive help at school are less likely to read for sustained periods (Clark, 2010).

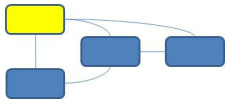
Factors affecting reading behaviour

As the strong correlations in Figure 1 indicate, the amount children read is influenced by how much they enjoy reading and how positive their attitudes to reading are. 40.4% of students in the Clark and Foster (2005) survey indicated they would read more if they enjoyed it more.

There are a number of contextual factors that impact on the amount children read. Maynard et al. (2008) found that the genre of the book and the ability of the reader to relate to the characters in the story were important contributory factors to reading behaviour. In addition, research has illustrated the detrimental impact of exams (Hopper, 2005), reading on the internet and being entertained by the television on time available for reading for pleasure.

Whilst 47.4% of children indicated they would read more if they had more time (Clark and Foster, 2005), the 2003 Nestle Family Monitor Research survey showed that 70% of children would rather watch television (or a DVD / video) than read and 55% reported a preference for the internet over reading. Nippold et al. (2005) suggested that adolescence is when peer-related socialisation usually starts to displace solitary activities, and it is at this age that peer attitudes to reading start to become more influential (Clark and Foster, 2005).

2.3.3 Reading enjoyment



Conceptualising enjoyment

Figure 1 illustrates that reading enjoyment correlates highly with reading attitudes, and it is also related to reading behaviour and to a lesser extent with reading attainment. Reading enjoyment as a concept has been identified as vague and elusive (Tellegen and Frankhuisen, 2001), before Clark and Rumbold (2006) stated that it referred to: '…reading that we do of our own free will, anticipating the satisfaction that we will get from the act of reading'. (p. 6). Their definition of reading for pleasure underlines that it is an activity that reflects the choice of the participant.

Lumby (2011) argued there were four related, and not mutually exclusive, conceptualisations of enjoyment:

Conceptua-lisation	Supporting authors	Definition	Critique
Flow	Csikszentmi-halyi (1977)	Refers to a state of consciousness that emphasises absorption with the activity, a narrowing of focus and a sense of control.	Flow is a more restrictive term than enjoyment (Lin et al., 2008), and it is largely absent in education (Lumby, 2011).

Conceptua-lisation	Supporting authors	Definition	Critique
Anxiety-based	Fenichel (1945)	Pleasure as a cessation of anxiety.	Pleasure can be experienced without anxiety preceding it.
Satisfaction	Kremer-Hayon and Goldstein (1990)	Pleasure stems from satisfaction, where outcomes exceed expectations.	Pleasure can be derived when outcome and expectations are simultaneously low.
Relationship-based	Goodenow (1992)	Enjoyment resides in human relations, and through a sense of belonging.	Less relevant for independent pastimes.

Table 3 – Conceptualisations of enjoyment.

Based on a review of literature across a broad range of fields, Lin and Gregor (2006) concluded that the concept of enjoyment involves three sub-dimensions: engagement (focused attention), positive affect (positive attitude / good feelings) and fulfilment (satisfaction of a need or desire). In these sub-dimensions, engagement relates closely to flow, as higher levels of attention are associated with higher levels of enjoyment. The affect sub-dimension refers to emotional states of pleasure, happiness and content. Finally, the fulfilment sub-dimension requires a need or desire to be fulfilled (whether it has been recognised consciously or not) (Lin et al., 2008). As outlined in more detail in section 5.5.2, the four-phase model of interest development (Hidi and Renninger, 2006) suggests that focused attention and a positive affective reaction characterise the piquing of situational interest. Situational interest is hypothesised to act as a precursor to individual interest, a relatively stable predisposition to reengage with an activity (such as reading).

In their conceptualisation of emotions, Goetz et al. (2006) draw upon theories of personality to distinguish between two different phenomena – trait and state emotions. The central distinction between the two is a temporal one (Goetz et al., 2010), with trait

emotions built up over time based on a retrospective review of cumulative experience and state emotions experienced real time in the present. When considering enjoyment in schools, Lumby (2011) concluded that there were relatively few examples of enjoyment as a state emotional experience evident. Where trait emotions of enjoyment were uncovered, there were in response to social relationships and satisfaction in achieving.

The impact of enjoying reading

As Figure 1 outlines, the enjoyment of reading has a number of interrelationships. Reading for pleasure has been linked to:

Detail	Supporting authors
Increased reading frequency.	Krashen (2004)
Attainment - young people who enjoy reading the most were more likely to be above average readers for their age.	Clark (2010)
More positive attitudes - reading enjoyment accounted for 21% of the variance in the attitude to reading.	Sainsbury and Schagen (2004)
Increased text comprehension, grammar, breadth of vocabulary and reading strategies.	Cox and Guthrie (2001), Angelos and McGriff (2002) and Weisendanger et al. (2009)
Better general knowledge.	Cunningham and Stanovich (1998)
Improved self-confidence as a reader.	Guthrie and Alvermann (1999)
Pleasure reading in later life.	Aarnoutse and van Leeuwe (1998)
Wider cultural understanding.	Meek (1991)
More community participation.	Bus et al. (1995)
A greater insight into human nature and decision-making.	Bruner (1996)
Enhanced social skills and lessened loneliness in adults.	Allan et al. (2005) and Rane-Szostak and Herth (1995)

Table 4 – Factors associated with reading for pleasure.

Accordingly, one of the goals of Every Child Matters (DfES, 2003) was for children to enjoy education.

The extent children and young people enjoy reading

Various surveys between 2003 and 2010 considered the amount children and young people enjoyed reading:

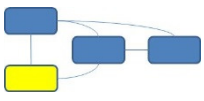
Authors	Year	Number of participants	Age of participants	Finding
Clark	2010	18,141	8 – 17	Just under half of young people enjoyed reading either very much or quite a lot. Nearly 4 in 10 enjoyed reading a bit. 1 in 10 did not enjoy reading at all.
Clark et al.	2005	1,512	8 – 14	61.2% of pupils enjoyed reading quite a lot or very much.
Clark and Foster	2005	8, 206	6 - 16	Half the sample of pupils said they enjoyed reading either very much (22.3%) or quite a lot (28.7%).
Nippold et al.	2005	200	9 - 14	Reading was moderately popular (51% said they liked to do it).
Dungworth et al.	2004	132	9 - 10	47% of boys and 69% of girls indicated they liked reading 'a lot'.
Nestle Family Monitor	2003	914	11 – 18	65% said they found reading enjoyable, with 21% claiming it was very enjoyable.

Table 5 – Reading enjoyment statistics.

Broadly, the data gathered in the surveys above indicated around 50 – 60% of children surveyed enjoyed reading very much or quite a lot. Almost all of the surveys displayed gender and age effects, with boys usually 10 – 20 percentage points behind girls in the extent they enjoyed reading very much or quite a lot (Clark and Foster, 2005; Dungworth et al., 2004) and primary school age children indicating they enjoyed reading more than secondary school age children (Clarkson and Betts, 2009; Clark and Foster, 2005). Relationships between enjoyment of reading and free school meal uptake (young people who do not receive free school meals enjoyed reading more than young people who do) and enjoyment of reading and ethnic background (white young people enjoyed reading the least) are also evident (Clark, 2010).

Since 1998, there is evidence that enjoyment in reading has declined. Although it is hard to compare data across surveys (Clark and Rumbold, 2006), Sainsbury and Schagen (2004) found that reading enjoyment has declined over a five year period between 1998 and 2003. This was particularly evident amongst older children and boys, thereby exacerbating an existing disparity. A Schools Health Education Unit survey (2003) found that the number of boys in Year 6 (ages 10 – 11) who read at playtime and / or dinnertime was 17%, a drop of 12% from 1997. Various suggestions have been made as to why reading enjoyment has declined, with the NLS and reading scheme books (Sainsbury and Schagen, 2004; Solity and Vousden, 2009), national testing strategies (Dungworth et al., 2004), advances in technology and cultural changes (Clark and Rumbold, 2006) all implicated as contributory factors.

2.3.4 Reading attitudes



The last of the four factors under consideration in Figure 1 is reading attitudes. Distinct from the enjoyment of reading, reading attitudes refer to the feelings and beliefs that

students have regarding reading (Cooter and Alexander, 1984). McKenna et al. (1995) regard attitude as the continuum of positive to negative feelings towards reading and Stokmans (1999) argues that attitudes are enduring, stable and shaped by experience. As a result, attitudes act as a predisposition (Good, 1973) to respond in a certain way to situations, and a consolidation of attitudes to reading make reading more or less probable (Smith ,1990). As outlined in Figure 1, studies have shown that positive attitudes are related to higher reading achievement and more frequent reading (Baker and Wigfield, 1999).

Generally, children hold positive attitudes to reading, and Clark et al. (2005) found that 78.9% of respondents in their survey felt that reading was important. When comparing England against sixty five other countries, Bradshaw et al. (2010) concluded that students in England appeared to be slightly more negative in their attitude to reading.

As outlined previously, younger children were more positive than older children in their attitudes to reading - fourteen year olds were eight percentage points below the overall average of attitudes in the Hall and Coles analysis (1999). It may be, however, that this is a reaction to teaching methods that restrict choice, rather than reading itself (Ross et al., 2006). Equally, girls have more positive attitudes to reading than boys (Sainsbury and Schagen, 2004).

2.3.5 Limitations of the interrelationship studies

The studies above repeatedly refer to relationships between the four factors under consideration, and within the research it is difficult to confidently infer directions of causality between the factors (Clark and De Zoysa, 2011). Generally, research in this area has failed to investigate the bi-directional nature of relationships (Clark and De

Zoysa, 2011), and to consider and control for the possible mediating factors (Lumby, 2011). When creating a one-time snapshot of the nature of relationships, it is impossible to establish 'where the ball started rolling', and what was the initial causal contributor (Clark and De Zoysa, 2011). Much of the data within the studies is from potentially unreliable self-reported perceptions (Lumby, 2011). Questionnaire-based measures, kept consistent over time to establish trends, have had difficulty accounting for developments in society and technology (Clarkson and Betts, 2009).

Differences in the scope (timescales and populations) and methods (measures) of studies are likely to be responsible for any apparent contradictions to the data presented by Clark and De Zoysa. These differences have also meant that tracking changes in the nature of the relationships between factors over time is extremely difficult.

2.3.6 Attainment at the expense of enjoyment

The vast majority of studies suggest that increases in reading attainment have come at the expense of reading for pleasure. The Progress in Literacy International Reading Literacy Study (PIRLS) (Twist et al., 2003) considered reading achievement in over 140,000 10-year olds across thirty five countries. PIRLS showed that whilst children in England were among the most able in the world in terms of reading achievement (3rd in attainment), they had a much poorer attitude to reading and read less often for pleasure than pupils in other countries:

Measure	England	Average
% that disliked reading	13	6
% that were confident about reading	30	40

Table 6 – PIRLS data, England vs. average (Twist et al., 2003).

Gregory and Williams (2000) observed a clear distinction between the reading matter enjoyed at home and that sanctioned at school, and this led to Pullman (2003) stating that reading had become divorced from pleasure. Anwyll, the director of the NLS, acknowledged in 2004: 'If we're increasing the attainment of children at the expense of their engagement and enjoyment, then we're failing to do the whole job and we have to take that seriously.' (Hall, 2004; p. 120).

Accordingly, Lumby (2011) suggested that '…learning is contingent on a willingness to engage and to persist, and that this will not be forthcoming unless the learning task is assessed as potentially enjoyable, resulting in motivation to start, and experienced as enjoyable, resulting in persistence' (p. 252). Similarly, Clark and De Zoysa (2011) argue that to promote learning without enjoyment may work in the short-term, but, in the long-term, enjoyment is a key motivating factor that leads to sustainable learning habits.

2.4 Struggling adolescent readers

To refer to someone as a 'struggling' or 'reluctant' reader is an umbrella term (Earl and Maynard, 2006). A lack of motivation (Adam and Wild, 1997), general disengagement (Guthrie and Davis, 2003) and unwillingness and disinclination to read (Goodwin, 1995) are often inferred, as a struggling reader represents 'a student who is experiencing significant difficulty learning to read' (Ertem, 2010; p. 11). Struggling readers may or may not be labelled as 'dyslexic', but this study has not utilised this terminology relative to the participants.

Rashid and Brooks (2010) indicate that the proportion of young adults with poorer reading (the ability to handle only simple texts and straightforward questions) has

remained stubbornly at about 17% from 1948. Ofsted (2005) published that 25% of children continue to fail to learn to read, although it is generally not clear whether this failure relates to difficulties with decoding or comprehension. Nevertheless, students that are unable to read form the illiterate 'tail' of underachievement in the UK education system (Marshall, 2013).

Clark and Foster's (2005) survey indicated almost half of the 8,206 respondents (aged 6 – 16) rated themselves as proficient readers (49.9% gave themselves an 8, 9 or 10 out of 10 for proficiency). Clark et al., (2005) found that their respondents (1,512, aged 8 – 14) gave themselves an average proficiency score of 6.79 / 10. The PISA 2009 data (Bradshaw et al., 2010) indicated that in England there was a relatively large difference between the score points of the lowest scoring pupils and the highest scoring pupils compared with many other countries. As stated earlier, students are more likely to be identified as struggling readers if they are boys, older and receive free school meals.

Many studies have focused on common issues experienced by struggling readers, and Stauffer (2007) highlighted the impact of sociocultural expectations that discourage older boys from reading. Whilst the issues frequently experienced by struggling readers are outlined below, the 'segregationist and exclusionary nature' (Stauffer, 2007; p. 418) of much of the literature on struggling readers should be recognised. Indeed, Alvermann (2001) highlighted the negative impact on a reader's identity when labelled as a 'struggling reader', so the term should be used cautiously. Research indicates that struggling readers experience reading differently from other children:

Issue	Evidence / citing authors
(Per Figure 1) Struggling readers are likely to read less frequently.	13% of reluctant readers reported reading outside school (vs. 63% of enthusiastic readers) (Clark and Foster, 2005).

Issue	Evidence / citing authors
(Per Figure 1) Struggling readers are less likely to enjoy reading.	Children with dyslexia did not value reading for its contribution to school success and for their own enjoyment (Polychroni et al., 2006). 61% of reluctant readers would read more if they enjoyed it more (vs. 22% of enthusiastic readers) (Clark and Foster, 2005).
(Per Figure 1) Struggling readers are less likely to have positive attitudes to reading.	Reluctant readers were less inclined to agree with every indicator of reading attitude compared to enthusiastic readers (Clark and Foster, 2005). It should be noted that Polychroni et al. (2006) believe few studies exist to support this inference.
Struggling readers are less likely to be motivated to read.	Any motivation to read is likely to be extrinsic (Guthrie and Davis, 2003) and / or task orientated (Battraw, 2002). Polychroni et al. (2006) found that dyslexic students valued reading less than their peers. Children with dyslexia usually attribute reading failures to internal and stable causes (Humphrey and Mullins, 2002).
Struggling readers may have fewer opportunities to learn (Baker et al., 2000).	Schools may contribute to a cycle of disengagement through inflexible teaching structures that reinforce failure (O'Brien et al., 1997). Reluctant readers are likely to be encouraged to use reading scheme books and are less likely to have choice in what they read (Earl and Maynard, 2006).
Struggling readers understand less of what they are reading (Baker, 2002).	They are likely to be less strategic in their approach to reading (Swanson and Alexander, 1997) and less fluent (Ehri, 1994). They are more likely to have a weakness in phonological decoding (Torgesen, 2002).
Struggling readers may find books overwhelming.	Cooper et al. (2006) found that when the same text was represented differently (less text on the pages, more illustrations), struggling readers were better able to read and comprehend the text.
Struggling readers are likely to experience low self-confidence and self-efficacy (Wigfield et al., 1998).	Struggling readers may be affected by inner inhibitions (Goodwin, 1995) as they are embarrassed when compared to their peers (Earl and Maynard, 2006). They may engage in defensive, self-handicapping reading behaviours (Guthrie and Davis, 2003).
Struggling readers are likely to be socially marginalised.	Anderman (1999) stated that struggling readers often felt disrespected, uncomfortable in school and that they did not belong. Struggling readers often also had special educational need categorical classifications which may exacerbate these feelings (Allington, 1994).

Issue	Evidence / citing authors
Struggling readers may be experiencing contributory visual issues.	Allen et al. (2009) confirmed that visual correlates of reading difficulties include visual stress, binocular instability and accommodative anomalies. Struggling readers may also find directional tracking and attention to detail (they may tend to look at the first and last letters only) problematic (Gagen, 2007).

Table 7 – The reading experience of struggling readers.

Other contextual factors are also likely to have influenced struggling readers, including the impact of family (Nestle Family Monitor, 2003), teachers (Applegate and Applegate, 2004) and peers (Battraw, 2002). Clark and Rumbold (2006) emphasised the importance of parental involvement in their child's literacy practices, and Earl and Maynard (2006) addressed the cumulative effect of early experiences (such as access to vocabulary) on later reading development. Enjoyment is believed to be a critical mechanism in the intergenerational transmission of literacy (Snow et al., 1998).

The factors outlined above highlight the complex landscape that surrounds struggling readers, and research related to struggling readers has been hindered by the heterogeneity of the population, a lack of consistent definitions and difficulties determining the direction of causal relationships (Polychroni et al., 2006). The key finding related to struggling readers has been referred to as 'the Matthew effect' (Stanovich, 1986). For all the reasons outlined above, struggling readers typically read less than their peers, and, as a result, get progressively further behind their peers in their attainment. In this theory of reciprocal causation, the outcome is a vicious, self-perpetuating circle that struggling readers find it difficult to remove themselves from (Juel, 1988).

2.5 Digital natives

The NLS as an approach to improving literacy standards has co-existed with the emergence of a generation of digital natives (Prensky, 2001). A digital native has been defined as someone who comes from a 'media-rich household, who uses the internet as the first port of call for information, multi-tasks using information and communication technology (ICT) and uses the internet to carry out a range of activities' (Helsper and Eynon, 2010; p. 515). The generation has been split into two cohorts, the first born since 1983 and the second born since 1994.

Digital natives are espoused to have differences in the way they communicate and socialise (Helsper and Eynon, 2010) as well as process and use information (Bittman et al., 2011). This led Berube (2005) to refer to ICT as 'something akin to oxygen' for this generation. As a result, in education, digital natives are proposed to have a number of learning preferences:

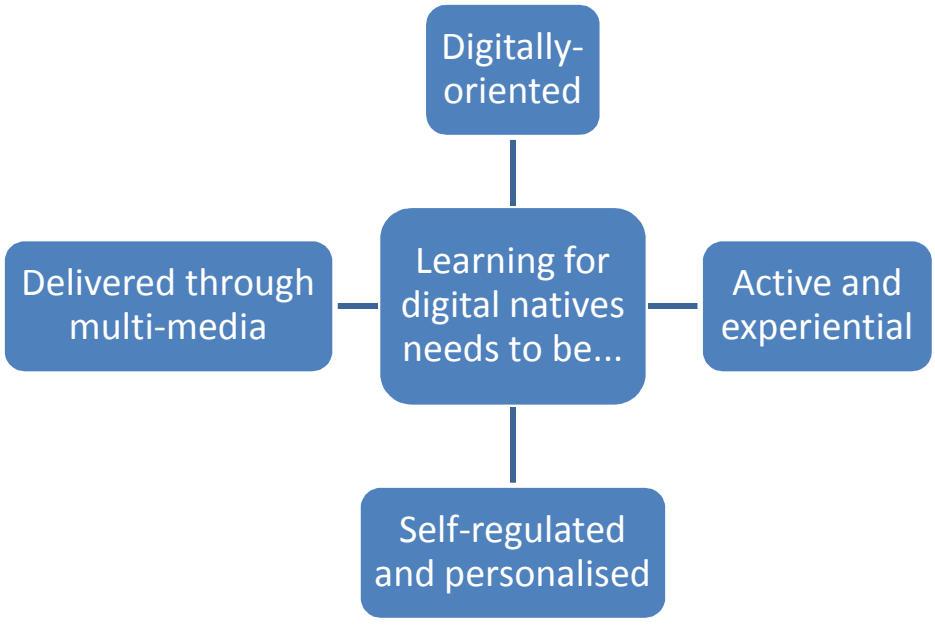


Figure 2 – The learning preferences of digital natives (adapted from Helsper and Eynon, 2010; Mayer, 2003; Bittman et al., 2011).

In an effort to meet these learning preferences, it is estimated that maintained schools in the UK spent £487 million on ICT equipment and services in 2009 – 2010 (James, 2010).

The homogeneity of digital natives as a generation has been challenged, as it downplays factors such as access to technology (Helsper and Eynon, 2010), socio-economic status and the presence of other cultural resources (Bittman et al., 2011). Within the group of digital natives, considerations related to personal skills (Helsper and Eynon, 2010) and distinct developmental stages (Bittman et al., 2011) are also largely ignored. The focus on technically adept students and on technology practices irrelevant to education led Bennett et al. (2008) to liken the digital native debate to the academic equivalent of a moral panic. They characterise such a panic as the public discourse that attracts 'a prominence that exceeds the evidence in support of the phenomenon' (p. 782), largely due to the threat to societal norms.

2.6 The use of technology in education

The premise that a generation of digital natives possess distinct learning preferences has led to an increase in the use of new media in education. Reinking et al. (2000) introduced a developmental framework for integrating digital literacy technologies into literacy research and instruction. Utilising Piaget's developmental learning theory, they outline the emergence of technology in education through two stages:

Stages	Meaning	Examples

Stages	Meaning	Examples
Assimilation	New information is merged with existing knowledge structures without changing those structures.	Technology is used to minimally change existing practice - CD storybooks are related to conventional literature and they conform to existing curricula and pedagogic practice in ways that are comfortable and familiar.
Accommodation	Existing knowledge is restructured to fit new information, which eventually transforms the way a learner views and understands the world.	Technology is used to fundamentally alter the existing environment. Traditional page-based literacies are disregarded in favour of new narratives.

Table 8 – A developmental framework for integrating digital literacy (Reinking et al., 2000).

Today's progression into the accommodative stage underlines the transformative possibilities of new technologies, and this movement has been triggered by a blend of maturation and experience that have made assimilation alone insufficient (Reinking et al., 2000). As a result, digital literacy (defined as critical thinking in the context of technology use; Bittman et al., 2011) continues to emerge in education, to the extent that 'electronic media are not simply changing the way we tell stories: they are changing the very nature of the story, of what we understand (or do not understand) to be narratives.' (Hunt, 2000; p. 111).

The introduction of transformative technologies rests on a number of theories of digital learning relevant to children:

Theory	Author	Key tenet
Theories of neuroplasticity	Cited in Helsper and Eynon (2010)	Our brains are plastic, flexible and subject to change through life in response to changes in the environment.

Theory	Author	Key tenet
Synergy theory	Neuman (2009)	Exposure to a coordinated array of media is especially helpful in improving reading among young children. Extra non-verbal features function additively to support the making of inferences when reading.
Cognitive theory of multimedia learning	Mayer (2003)	The theory rest on three assumptions: • The dual channel assumption: visual and verbal representations utilise separate information processing systems. • The limited capacity assumption: processing capacity within each channel is limited. • The active learning assumption: meaningful learning occurs when learners engage in active cognitive processing.
Multiliteracy theory	Cope and Kalantziz (2000)	There is a plurality of literacies, including digital literacy. Different technological platforms and environments may require different constellations of literacy skills.
Dual coding theory	Paivio (1986)	Different classes of information (one for non-verbal objects and events and one for language) are handled cognitively by separate systems of representation that are structurally and functionally distinct but that may support and expand each other in conveying the same content. As a result, the benefits gained from multimedia accumulate each subsequent session (Verhallen et al., 2006).

Table 9 – Theories of digital learning.

2.7 Electronic books (e-books) for reading

2.7.1 The history and definition of e-books

Andries Van Dam coined the term 'electronic book' in 1967 (Zucker et al., 2009) and the first digital library dates back to Project Gutenberg, in 1971 (Hart, 1992). Twenty years later, Sony produced the first dedicated, portable e-book player (Schcolnik, 2001). Even within this relatively short period, there has been a lack of consensus on a single definition of e-books (Armstrong et al., 2002). Central to this debate has been whether

the term e-book refers to hardware (a device), software (technology on a device) or content (the literature) (Abdullah and Gibb, 2008). The Open eBook forum avoids using the term e-book at all as it is so contested, so differentiates between:

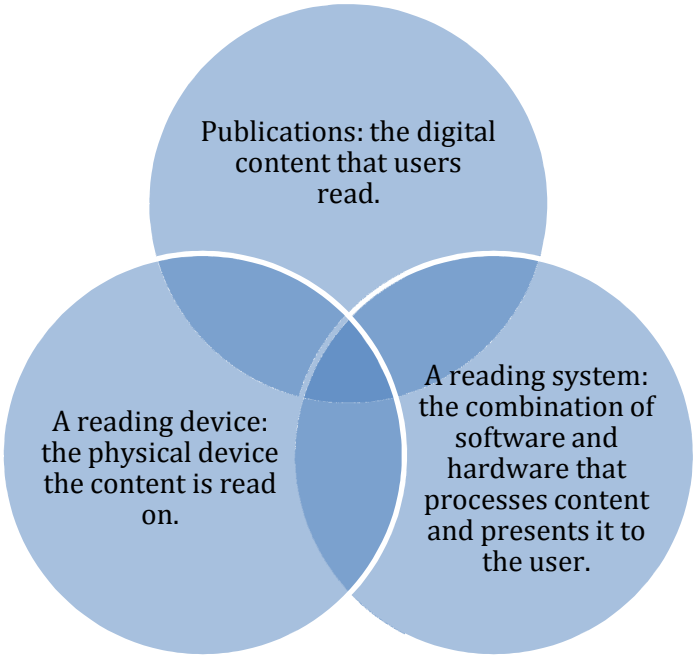


Figure 3 - The Open eBook forum guidance, cited in Shiratuddin et al. (2003).

For non-expert users, however, it seems arbitrary to separate the device and the content, and generic e-book definitions that are widely accepted reflect an integration of the classical book structure with various electronic features (Landoni et al., 2000). For the purposes of this study, an e-book is defined as 'a digital object with traditional book-like properties that can be provided in an electronic environment' (Vassiliou and Rowley, 2008). The definition above avoids prescribing the device (e.g. desktop computers, laptop computers, personal digital assistants, dedicated e-readers), the software and the content (e.g. fiction, text-books), and this seems sensible given the proliferation of development in this area (Dougherty, 2010).

Various authors (including Pope, 2010), attribute the success of e-books to the fact they have maintained the same typographical features as books. The book metaphor has been largely respected in e-books, and they generally require pages to be turned to progress through the book. Such a page turning interface is skeumorphic, in that it is evocative of obsolete features (Trushell et al., 2001), but these features reduce ambiguities, conflicts, inconsistencies or confusion for the user (Landoni et al., 2000). The print conventions present in e-books leverage familiar situations and existing schemas to in order to help users cope with the new media (Pope, 2010). The main difficulty of utilising the book metaphor in the term e-book is that it has been stretched to the extent it is unrecognisable from the originating paper book, and this confuses users (Landoni and Diaz, 2003).

2.7.2 The emergence of e-books

Of the titles of books published in the UK in 2011, 23% were e-books or online resources (Nielson, 2012). It has been reported that the retailer Amazon sells 242 downloadable books on its Kindle e-reader for every hardback book in Britain (The Sunday Times, 2012). The proliferation of e-books is likely to be related to the emergence of portable e-readers, which are deemed preferable than computers for reading from (Schcolnik, 2001).

In 2013, the NLT surveyed 34,910 children, aged 8 – 16 (NLT, 2013) and found that 39% of children read daily using electronic devices (compared to 28% that read printed materials daily). They reported that the number of children reading e-books had risen from 6% to 12% in two years. Further, 52% of those surveyed indicated they would rather read on electronic devices (vs. 32% that would prefer to read in print). Girls were

more likely to read e-readers (84% girls vs. 69% boys) and tablets (70% girls vs. 67% boys), but this also held for reading in print.

2.7.3 Evaluating the qualities of e-books read on portable e-readers

Whilst e-books and e-readers differ in the marketplace, various studies have indicated that the qualities of e-books accessed through e-readers cluster around convenience:

Quality	Details	Additional considerations
General ergonomics (Pattuelli and Rabina, 2010) and portability (Landoni and Diaz, 2003).	The small size and light weight of portable e-readers mean users feel unrestricted when they are reading (Hewett et al., 2012).	E-readers, however, are fragile and rely on charging (Lund et al., 2011). There may also be environmental issues, such as an inability to change the battery (Lund et al., 2011).
Ease of use.	E-readers are physically comfortable to use (Marshall et al., 1999) and can be used with one hand (Kilgour, 1998).	
Easy navigation (Schcolnik, 2001).	Readers predominantly follow linear paths through books, and the clear navigation allows them to experience the beginning, middle and end of books (Pope, 2010).	Volatile or fractured structures cannot easily be navigated around, and a lack of clear narrative and structural markers in e-books cause readers problems (Pope, 2010).
Ease of access.	E-books provide instant access to a wide range of content (Maynard and Cheyne, 2005) and have good storage capacities (Schcolnik, 2001).	Digital rights management permissions often restrict availability of e-books (Drinkwater, 2010), and e-books have made sharing books harder (Berube, 2005).

Table 10 - The qualities of e-books read on portable e-readers.

2.7.4 Evaluating the features of e-books read on portable e-readers

Landoni et al. (2000) refer to e-books as overcoming the limitations of the paper book through electronically enabled added value features. Unsworth (2006) introduced a framework for outlining the compositional features of e-books along four continuums:

Linear (progressive, sequential and ordered)	- - - -	Hyperlinked (linking within and across episodes and stories)
Monomodal (print only)	- - - -	Multimodal (print, images, sound effects and music)
Still images	- - - -	Dynamic, animated images
Receptive / passive (i.e. scrolling, page turning)	- - - -	Interactive (responding, navigating, making choices)

Figure 4 – Compositional features in digital narratives (Unsworth, 2006).

Figure 4 provides a structure for the range of features that e-books deploy, which are increasingly multimodal, dynamic and interactive. How these features manifest varies extensively between e-books. Table 11 below summarises and evaluates the features most often present in e-books.

Feature	Advantages / evidence	Disadvantages / concerns
Touchscreen: allows users to navigate through the e-book based on touch.	• The touchscreen was well received by the twelve participants in the Hewett et al. (2012) case study. • Paging is superior to scrolling in terms of performance and user preference (Muter, 1996), and was preferred by 90% of the 103 respondents in the Schcolnik (2001) study.	• Touchscreens can lead to accidental activation of features (Nielsen, 2010). • Using touch as a sense when reading may be disruptive (Mangen, 2011). • The absence of touch on all devices becomes frustrating for users in other forums (Pattuelli and Rabina, 2010).
Some e-readers allow users to manipulate the brightness of the screen.	• More positive polarity (dark on light) eases reading (Muter, 1996).	• Non e-ink screens are likely to give off glare (Lund et al., 2011).
Some e-readers allow users to manipulate the theme of the screen (colour of the background).	• May ease eyestrain from heavy reading (Allen et al., 2009). • May aid the achievement of a chromaticity close to that which is optimal for text clarity (Wilkins et al., 2007). • May change the distribution of the firing pattern within the visual cortex and reduce the effects of corticol hyperexcitability (Wilkins et al., 2007). • May lead to improvement in perceptual efficiency (Allen et al., 2009).	• The Allen et al. (2009) and Wilkins et al. (2007) evidence relates to the use of overlays, rather than background colours. • The effects of the colour on reading speed are very specific (Wilkins et al., 2007).

Feature	Advantages / evidence	Disadvantages / concerns
The screen can be manipulated to portrait or landscape orientation depending on user preference. This may vary whether one or two pages is on the screen.	• 90% of the 103 respondents in the Schcolnik (2001) study preferred portrait orientation. • Davidson et al. (1997) found that being able to see two pages at once was an important advantage for readers.	
Various 'positional' features help orientate users within the book.	• Lund et al. (2011) found that page numbering, having a slide bar to navigate between chapters and that the e-book returns to the last point when opened up were all important features. • Readers require clear and easily accessed backtracking (Nielsen, 1990).	• Several participants of the twenty in the Pattuelli and Rabina (2010) case study were concerned with the sense of disorientation caused by not recognising the familiar logical structure of the book. For example, they did not like or understand the progress indicators.
Graphics and pictures are included in the e-books (sometimes via hotspots). In 2003, De Jong and Bus considered a selection of Dutch e-books, and they found 72% included multimedia in pictures. Korat and Shamir (2004) found that 82% of the e-books they studied had dynamic visuals.	• The graphics provide visual clues to the text on the page (Jenna Scribbles blog, 2011). • The pictures dramatise the story to help inference (De Jong and Bus, 2003). • The e-books mentioned most by the 109 children in Lin's (2010) study were those with vivid animations. • UKLA Reading on Screen research found a higher preference for multimodal screen based texts over those composed mainly of words (UKLA, 2007).	• Some features are inconsiderate / incongruent (more information below).

Feature	Advantages / evidence	Disadvantages / concerns
E-books have narrative support. In the same De Jong and Bus (2003) study, all the e-books had text to speech capability and oral reading options. 74% of the e-books highlighted the text as it was being read.	• The most favoured feature mentioned by the 109 children in Lin's (2010) study was the oral reading. • The features remove the effort from decoding individual words and allow the child to focus on meaning (Lewin, 2000). • The features aid phonological awareness, which is a good predictor for decoding accuracy, reading fluency and reading comprehension (Catts et al., 1999). • Digital texts have the capability to eliminate decoding and fluency problems through text-to-speech and digitised speech (Dalton and Strangman, 2000). • Reading while listening helps children derive both phonetic rules (Carbo, 1978) and correct pronunciation of irregular words (Reitsma, 1988). It helps 'to accentuate a 'right' reading of the text' (James, 1999; p. 49). • Some features (text highlighting, pronunciation support, letter by letter pronunciations) bolster word recognition skills (McKenna, 1998; McKenna et al., 2003).	• The text-to-speech function can become a crutch (Rinkel, 2012).

Feature	Advantages / evidence	Disadvantages / concerns
The e-books include dictionaries to define words when they are selected. In the same De Jong and Bus (2003) study, 11% had dictionaries. 4% of e-books had dictionaries in the Korat and Shamir (2004) study.	• Dictionaries aid comprehension (Horney et al., 1999). • The phonetic breakdown in dictionaries may aid word recognition and reading out loud. • 'The dictionary spaces difficult words out so I can read a hard word (like ex.tra.cur.ric.u.lar). I used to skip words that were hard to read'. (Aimee Daniells blog, 2011).	• The dictionaries are frequently unimpressive (De Jong and Bus, 2003) and do not include age appropriate words (children are unable to read the words in the dictionary) (Grimshaw et al., 2007). • The phonetic breakdowns in dictionaries may also not be aligned with how a student has been taught the word at school (Grimshaw et al., 2007).

Feature	Advantages / evidence	Disadvantages / concerns
The size of text can be changed.	• Being able to change the size of print was considered a 'good' feature by the majority of the twelve participants in the Maynard (2010) case study. • '…you can change the way the text is organized (bigger print, more space between the lines) to make text easier to read.' (Simply stated blog; Brandt, 2011) • It has been argued that text in children's books gets too small too quickly (Hughes and Wilkins, 2000). • Bigger text has been associated with fewer crowding effects (Hughes and Wilkins, 2002) and less visual stress (Wilkins and Nimmo-Smith, 1987). • Bigger text size has been linked to quicker comprehension and reading speed (Wilkins et al., 2009), greater accuracy (Wilkins et al., 2009) and a higher reading age (Allen et al., 2009).	• Maynard and McKnight (2001) found that those who read the e-books read the text more slowly (compared to printed text). • Nielsen (2010) found that those reading the iPad had a 6.2% lower reading speed than the printed book.
The font can be changed.	• Sans serif fonts are perceived as easier to read (Bernard et al., 2002). • Longer reading times have been reported for words and fonts with high auto-correlation (Wilkins et al., 2009).	

Feature	Advantages / evidence	Disadvantages / concerns
Notes can be made and words / passages can be highlighted.	• The ability to personalise reading, through highlighting / note-taking, is a key feature of e-books (Korat and Blau, 2010).	

Table 11 - The features of e-books read on portable e-readers.

One of the recurring themes evident when evaluating the features of e-books is the congruence of the features. Zucker et al. (2009) characterise the congruence of features along a continuum:

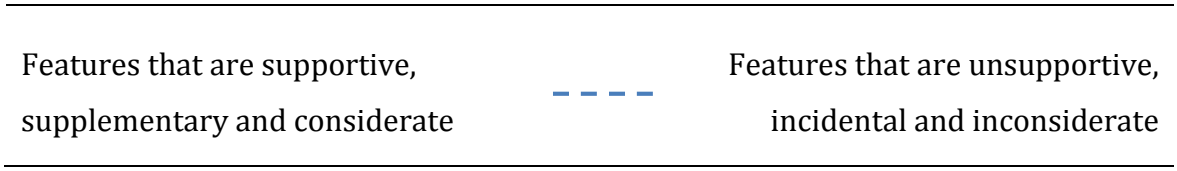


Figure 5 – A continuum of congruence (Zucker et al., 2009).

Verhallen et al. (2006) showed that congruent features (such as hotspots or animations) aided reading comprehension, and the quantity and quality of visual design features can influence the impact of e-books on learning outcomes (Zucker et al., 2009). Readers, however, have an 'urge-to-click' (Mangen, 2008), and this can result in unhelpful distractions, overwhelming reader passivity and a reduction in the number of conclusions being drawn by the reader (Trushell et al., 2003; Labbo and Kuhn, 2000) - Pope (2010) referred to this as the relegation of reading. Most (60%) of the e-books considered within the De Jong and Bus (2003) study contained games as part of the story (this was deemed a distraction), and 91% of the interactive hotspots were believed to be moderately / totally incongruent with the story.

2.7.5 The e-book reading experience

The features outlined above, if available and used, are likely to offer a different narrative experience for readers, one that opens up more interpretative possibilities to them as they read (Unsworth, 2006). Indeed, with the array of qualities and features outlined above, it seems surprising that e-books are not more widely accepted. A few years ago this may have been attributable to market confusion regarding the products on offer (Warren, 2009) or a lack of awareness of e-books and e-readers (Warren, 2010). Today, however, resistance is more likely to be because e-books are seen to be solving

something that is not a problem – reading with print books. The development of electronic reading has primarily been led by technological capability rather than user requirements (Landoni and Diaz, 2003) and this has meant that there are large proportions of readers that retain a preference for printed books (62% as reported by Langston, 2003) over e-books. Some readers may have even tried e-books and have reverted to print books. Lastly, there is some evidence to suggest that, in the eyes of the consumer, e-books are over-priced, and they should be available more cheaply than print books (Gomez, 2008).

2.7.6 The impact of e-books on academic outcomes

Ten years apart, two central meta-analyses have been undertaken relative to the impact of electronic aids for reading development:

Author (year)	Studies included	Conclusions
McKenna et al. (1999)	Twenty one studies focused on the results associated with computer technology in the classroom.	• All the studies reported positive results, and that computer technology can be used for reading instruction. • Computer-supported environments 'may help compensate for inadequate reading ability' (McKenna et al., 1999; p. 113).
Zucker et al. (2009)	Seven experimental studies, eleven quasi-experimental studies, nine observational / qualitative studies and three other studies specific to the impact of e-books on reading comprehension and decoding. The subjects were between the ages of four and eleven, and the studies were published in English between 1997 and 2007.	• The studies that generated effect sizes indicated that e-books aid comprehension (the effect was small, but statistically significant) but not decoding (no statistically significant effect).

Table 12 – E-book meta-analyses.

Zucker et al. (2009) highlighted a number of characteristics relative to the studies included in their meta-analysis. The studies they considered generally employed small sample sizes (none above 150), were focused on typically developing children in primary grades and utilised one-off measures that did not consider the maintenance of changes. More widely, Ertem (2010) refers to research on e-books as 'inconsistent'. There are a limited number of primary experimental studies available, and evidence of publication bias (towards supportive findings) and sampling bias (towards younger, typically developing children) (Zucker et al., 2009). Finally, the quality of e-books has been discrepant (Shamir et al., 2008), and this has meant that accurately attributing cause and effect between the use of e-books and their academic outcomes is problematic (Ertem, 2010).

More recently, an independent pilot (unpublished, cited in Brooks, 2013) investigated the impact of Rapid Plus online software (which deployed a number of facilitative features through e-books). The software was introduced to thirty six struggling readers in key stage 3 over a three month period, and they experienced substantial gains in both accuracy and comprehension.

The NLT survey published in 2013 suggested that children that read on-screen only on a daily basis were nearly twice less likely to be above average readers that those who read daily in print or in print and on-screen. The causal relationship is not discussed, which suggests it is as likely that less able readers choose to read on screen as it is that on-screen reading leads to lower reading ability.

2.7.7 The impact of e-books on non-academic outcomes

Some of the studies outlined earlier have sought to investigate how electronic aids impact reading enjoyment, attitudes and behaviour.

The impact of electronic aids on…	**Findings**

Reading enjoyment	• Medwell (1998), working with ten mixed Reception / Year 1 classes, found that the children enjoyed the talking books as they might enjoy traditional books they found easy to read.
	• Underwood and Underwood (1998) coined the term 'edutainment' to illustrate how sixty two eight year old children interacted with animations to enhance story retelling and enjoyment.
	• 85% of the 103 respondents surveyed by Schcolnik (2001) indicated that that enjoyment / pleasure was one of the purposes they could accomplish with an e-reader.
	• Anecdotal, non-academic sources indicate students enjoy reading e-books:
	  ○ 85% of the 120 students researched would take a Kindle out of the classroom to read (Rinkel, 2012);
	  ○ 'Children are encouraged to focus on one word or one page at a time, and they concentrate on the story more and enjoy it more' (Jenna Scribbles blog, 2011);
	  ○ 'My son has also been diagnosed with specific learning disabilities in reading and writing. We bought him an [eReader] and the difference has been amazing. He reads constantly now and really enjoys it.' (Brandt, 2011);
	  ○ 'I've been struggling with dyslexia for years. I am approaching my 30s and I have only recently started to enjoy reading, using the Kindle' (Aimee Daniells blog, 2011).

The impact of electronic aids on…	Findings
Reading attitudes	• Adam and Wild (1997) completed a four week study with forty five children from two Y3 classes. Those in the treatment group read an interactive storybook for a minimum of 200 minutes over that period. Children identified as reluctant readers particularly enjoyed the reading, and demonstrated a significant and positive development in attitude to reading. • Students react positively to good computer-assisted instructional programmes (Reinking, 1987). • Research consistently shows positive student attitudes to working with computers (Balajthy, 1989). • Attitudes to e-books are positive (Armstrong et al., 2002). • Users are satisfied reading from tablet (handheld) computers (Ozok et al., 2008).
Reading behaviour	• In the Pattuelli and Rabina (2010) study, where twenty students used a Kindle for a week, the amount of reading increased due to the convenience associated with the portability of the device. In this study, it was evident that e-readers were effortlessly and seamlessly integrated into the day-to-day activities of the subjects. • However, Hernon et al. (2007) found that students did not want to read an e-book in its entirety, but preferred to browse and scan content. • From academic fields, such as higher education institutions, there is some suggestion (Abdullah and Gibb, 2008; Rowlands et al., 2007) that e-books are preferred for reference over pleasure.

Table 13 – The impact of electronic reading aids on reading enjoyment, attitudes and behaviour.

The NLT (2013) found that those that read on-screen are three times less likely to enjoy reading very much (12% vs. 51%). However, as discussed earlier, whether reading on-screen lessens enjoyment or is a function of little enjoyment in reading is not made clear.

Various criticisms have been levelled at the studies outlined above. The sample sizes are once again small (Pattuelli and Rabina, 2010), and are more often focused on adult early adopters or students in higher education. Survey or focus group methods have largely been used to gather qualitative attitudinal data (Berg et al., 2010), and the impact of interface design on reading pleasure is under-researched (Pope, 2010). The studies are primarily focused on static, computer-based e-books (Pattuelli and Rabina, 2010), and have not controlled for novelty effects through the observation of maintenance trends (Adam and Wild, 1997).

2.7.8 Explaining the impact of e-books on enjoyment and attitudes

The studies above illustrate the impact e-books have been shown to have across a number of dimensions. Various authors have attempted to define the mediators between e-books and a more enjoyable reading experience, and Figure 6 represents established theories in this field:

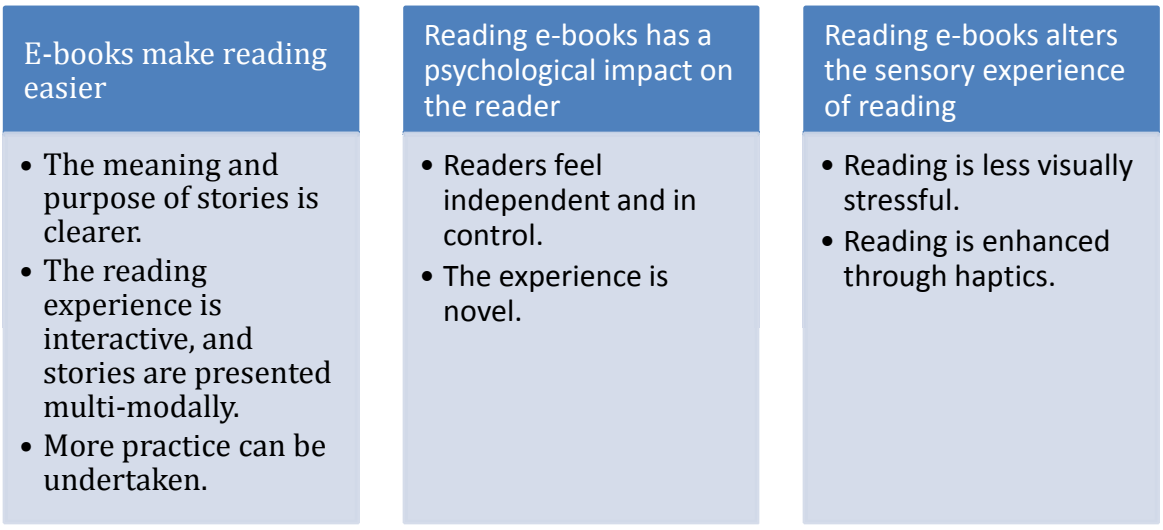


Figure 6 – Mediators of the relationship between e-books and a more enjoyable reading experience.

E-books make reading easier

Reading for pleasure is about the search for meaning and purpose in books (Cremin, 2007), and the features of e-books serve to enhance story comprehension. A greater level of understanding leads to a more engaged affective domain (Dungworth et al., 2004), where the reader is better able to make connections, engage emotionally and feel deeply about the story.

The key features that aid understanding are the inherent interactivity in most e-books, and the multi-modal presentation of the story. Whilst the first generation of e-books were overly didactic (Laurillard, 1987), the features available in today's e-books facilitate greater interaction between readers and the text, and it is that interaction that forms the basis for the reader constructing meaning (Rosenblatt, 1983). For struggling readers, the interactive features are hypothesised to act as electronic scaffolds (Bus et al., 2006) that are beneficial to student learning (Grant, 2004). Lumby (2011) found that experiential, interactive forms of learning are a source of positive feelings for students. Similarly, multi-modal forms of presentation (sounds, text, pictures) provide contextual support to aid understanding (Trushell et al., 2003) and lessen the decoding burden (McNabb, 1998). Zucker et al. (2009) argue that children who lack proficiency in decoding have to allocate more of their cognitive resources to this process, and this comes at a 'cost' as fewer cognitive resources are available for comprehension (Stanovich, 1980). They believe that e-books reduce the 'cost' to the cognitive resource supply by providing various on-demand compensatory mechanisms to meet individual student needs in areas such as decoding (McKenna and Zucker, 2008).

Lastly, it has been argued that e-books allow readers to regularly and accurately practice the mapping between orthography and phonology (Korat and Shamir, 2007),

which helps when learning to read. Labbo and Reinking (1999) argue that e-books delivery a more authentic reading experience than traditional drill / exercise methods of fostering literacy.

Reading e-books has a psychological impact on the reader

For struggling readers, reading can be a laborious, public activity in which they are humiliatingly dependent on others (peers, parents and teachers). E-books can change this dynamic as the books being read and the help needed do not have to be disclosed to others (Grimshaw et al., 2007). Support for reading is provided by the e-book in a non-judgemental, patient and private manner (Johnston, 1997). These factors lead to a greater sense of independence, choice and control for readers (Guthrie and Cox, 2001; Sanacore, 1999), which are all essential if a student is to enjoy reading and enter into a state of flow (Shernoff et al., 2003).

With this in mind, e-books may also imply novelty to readers (Lin, 2010). The expectancy-value model of achievement motivation (Wigfield and Eccles, 2000) is predicated on the beliefs that an individual holds about how well they will do on the activity and the extent to which they will value the activity (Wigfield and Eccles, 1992). E-books, with their enhanced features and sense of novelty, may shape ability and expectancy beliefs and can help (struggling) readers become more motivated (Mercer et al., 2003), engaged (Karemaker et al., 2010) and self-confident (Mioduser et al., 2000). E-books may provide a route for (struggling) readers to develop a sense of mastery and achievement (Lumby, 2011).

Reading e-books alters the sensory experience of reading

As alluded to earlier, e-books have the capability (through changes to the appearance of the text) to reduce visual demands and perceptual distortions (Wilkins et al., 2009) and ease eyestrain (Allen et al., 2009).

Mangen (2011) has focused her work on the impact of digital technology on reading, and specifically the haptics (the process of touch) involved in reading from digital sources. She has highlighted how digital reading involves changes to the composition, layout and physical structure of text, and that this may result in a different, and new, experience for readers. Whilst research in this field is still emerging, Mangen (2011) outlines how reading e-books is likely to affect the cognitive and perceptual processes and sensorimotor actions of readers (for example, touching the screen to turn a page), and how the phenomenological experience of immersion may be impacted. As a result, Mangen (2008) argues that readers using digital texts are more vulnerable to distractions and are less likely to engage in the contemplative and deeply focused reading that leads to immersion and flow.

2.7.9 The profiles of e-book users

In 2007, Rowlands et al. used questionnaires, deep log analysis and interviews to establish the views of 1,818 staff and students at a leading UK University. Although children were not included, they found that age was a good predictor of e-book usage (younger people used e-books more).

This links to research that suggests that beginner and / or struggling readers are the most likely to benefit from e-books to support reading development. As far back as 1987, Balajthy wrote that 'the lower the grade or ability of the students, the more

effective computer based instruction is' (p. 77). Beginner or struggling readers using e-books as a form of assistive technology (Zucker et al., 2009) have the most to gain. One interpretation of the NLT (2013) data is that readers disaffected with print books (Maynard and McKnight, 2001) or those with specific deficiencies in the process of phonological recoding (van Daal and Reitsma, 2000) are likely to benefit from the introduction of a new reading medium.

2.7.10 Key enablers for children reading e-books

Various studies have sought to understand whether e-books can replace adult support for reading. Tzuriel and Shamir (2002) concluded that adult instruction / mediation is necessary in order to promote young children's accomplishments while working on a computer in addition to the children's independent activity. Further, Bittman et al. (2011) highlight that a supportive parental context is needed for the use of media such as e-books. The Zucker et al. (2009) meta-analysis concludes that e-books are likely to be most effective when teachers play an active role in their use.

Korat et al. (2009) set up a four group study with 128 children (aged 5 – 6) from twelve kindergarten classes. The group that utilised an e-book with adult support was superior to all other conditions in sustaining emergent literacy.

In addition, various studies have investigated the role of peers in using e-books, investigating the belief that computers are a good focus for collaborative learning (Littleton and Light, 1999). These studies highlight that the gender composition of the peers (Underwood and Underwood, 1998) and the collaborative styles of the groups (Wood et al., 2005) are essential facilitators to the effective use of e-books for joint work.

Lastly, Verhallen et al. (2006) argued that children, as they lack experience, need intense and regular access to technologies such as e-books in order to accrue the benefits of developing, and enjoying, their reading.

2.8 Rationale for the study

2.8.1 Existing research in this field

As outlined above, much of the research related to e-book usage has investigated expected academic outcomes, rather than affective or behavioural outcomes (such as the likelihood to read more or how much reading is enjoyed). Studies have also, for the large part, focused on younger, typically developing children as opposed to struggling adolescent readers. Adolescents have been shown to be more sensitive to context (Guthrie and Davis, 2003), yet are often seen to be at the point where their difficulties in reading are intractable (Baker et al., 2000). Lastly, many of the studies have considered static devices (e-books as CD-ROMs viewed on desktop computers), where discomfort may have distorted the results (Schcolnik, 2001).

2.8.2 The iPad as a portable e-reader

The e-books used in this study were accessed on an iPad, which Lund et al. (2011) assessed in a usability study and concluded 'leisure reading of e-books on devices [such as the iPad] can be a particularly pleasurable experience'. Based on the evidence cited in Tables 11 and 20, a number of e-book / iPad features were introduced within the study:

E-book / iPad features that were introduced / manipulated within the study	E-book / iPad features that were excluded from the study
The touchscreen, to activate other features and turn the pages.	The highlighting of words or passages.
The brightness of the screen.	Note-taking.

E-book / iPad features that were introduced / manipulated within the study	E-book / iPad features that were excluded from the study
The orientation of the page.	Bookmarking.
The size and font of the text.	Searching within the book.
The colour of the font and background (the theme).	Downloading new content.
The use of the dictionary.	Pinch enlargement of the screen.
The use of the narration.	

Table 14 – iPad features introduced / manipulated in the study.

Under the influence of the county-wide ICT and Community Educational Psychology services, SVC staff were actively considering how the introduction of e-books might be expected to influence the reading enjoyment, behaviour and attainment of their students. This was particularly the case for students whose literacy assessments suggested they were falling behind their peers.

CHAPTER 3 - METHOD

3.1 Introduction to the method

The present study looked to explore and understand the impact of an iPad on the reading experience of struggling adolescent readers. The study utilised the iPad as an e-book, and specifically considered the level of state enjoyment of struggling adolescent readers when reading with an iPad compared to with a print book.

Colombo et al. (2012), in defining the reading experience, suggest it equates to reading for pleasure. A decision to read for pleasure is made based on anticipation of the satisfaction that the reader will get from the act of reading (Clark and Rumbold, 2006). Whether the experience is enjoyable can be expected to impact a decision to read for pleasure, and it seems reasonable, therefore, to measure state enjoyment as a proxy for the reading experience. In addition, state enjoyment was selected for measurement based on the predictive relationship enjoyment has with reading behaviour and attainment (Clark and De Zoysa, 2011). This is predicated on the belief that students that experience high intensities of enjoyment will undertake an activity more often (Goetz et al., 2006).

The purpose of the study is to develop good practice (Denscombe, 2009), and to achieve this both descriptive and explanatory research was conducted (De Vaus, 2001). The research sought to answer one main question and three ancillary sub-questions (White, 2009), and the questions and associated predictions are outlined below:

Questions		**Predictions**
Main	What is the impact on the state enjoyment of struggling adolescent readers when reading with an iPad vs. a print book?	The state enjoyment of struggling adolescent readers will increase when reading with an iPad vs. a print book.

Questions		Predictions
Ancillary sub-questions	Is any impact on the state enjoyment of struggling adolescent readers when reading with an iPad vs. a print book mediated by their existing level of trait enjoyment for reading?	Struggling adolescent readers with the lowest levels of trait enjoyment for reading will experience greater gains in their state enjoyment when reading with an iPad vs. a print book.
	Do struggling adolescent readers read more quickly with an iPad vs. a print book?	Struggling adolescent readers will read more quickly with an iPad vs. a print book.
	What iPad features are most important in shaping the state enjoyment of struggling adolescent readers?	Not applicable.

Table 15 – Research questions and hypotheses.

3.2 Critical realism

Pring (2004) recognised the historical, false and ultimately unhelpful dualism of educational research: that it must either be quantitative and qualitative in its nature. Whilst drawing on both positivist and constructivist principles, this study is ultimately rooted in a critical realist perspective (Bhaskar, 1998) enabled by the compatibility of the values and beliefs (Reichart and Rallis, 1994) between both quantitative and qualitative research.

A critical realist perspective rests on four fundamental ontological assumptions (summarised by Danermark, 2002 and Sayer, 2000):

Ontological assumption	Description

Ontological assumption	Description

Reality is differentiated	• There are three levels of reality:
	  ○ The real: 'the realm of objects, their structures and powers' (Sayer, 2000; p. 11).
	  ○ The actual: what happens in reality when mechanisms are activated and events occur (Collier, 1994).
	  ○ The empirical: what we experience.
	• Accordingly, there is an 'ontological gap between what we experience and understand, what really happens, and – most important – the deep dimension where the mechanisms are [real domain] which produce the events' (Danermark et al., 2002; p. 39).

Reality is stratified	• Generative mechanisms belong to different layers or strata of reality (Collier, 1994). • Each level of reality has its own generative mechanism, and one cannot explain events in terms of mechanisms working at just one level.
Events are tendencies, caused by contextually-dependent mechanisms	• Causality from a critical realist perspective is the process of 'identifying causal mechanisms and how they work, and discovering if they have been activated and under what conditions' (Sayer, 2000; p. 14). • Realists redefine laws so they are better understood as explanatory and non-predictively normic (events being the outcome of mechanism interplay) (Potter and Lopez, 2001; p. 10). • Mechanisms have the power to produce events, and they exist under the empirically observable surface. We experience them indirectly by their ability to cause (i.e. their ability to make things happen). • All events are produced in highly complex contexts, and the outcome of the mechanism is therefore always context-dependent. The context shapes how the mechanisms are empirically manifested. • Empirical manifestations (results or events) should not be studied in terms of regularities but tendencies. In the open systems in social science, the same causal power can produce different outcomes.

Ontological assumption	Description
There are two dimensions of knowledge – intransitive and transitive (Bhaskar, 1978)	• The intransitive dimension refers to the real entities or objects of scientific knowledge that constitute the natural and social world (Outhwaite, 1987). • The theories and discourse surrounding the objects of science form the transitive dimension. • Although our understanding and theories (the transitive) of the world may change, this does not necessarily mean the world or reality (the intransitive) that they are about changes too (Sayer, 2000). • There exists an 'external-of-us' independent reality (an intransitive dimension) and that reality is full of mechanisms that cause those events. About this reality we have fallible knowledge (the transitive dimension).

Table 16 – The ontological assumptions of critical realism.

As stated previously, the research draws on elements of both positivist and constructivist stances. Studying the interactions of the participants with iPads is based on the premise that the participants, as objects, can be studied, with their 'interrelations noted, regularities discovered, causal explanations found and results given' (Pring, 2004; p. 49). However, the methodological decision to further elicit the views of the participants in focus groups rests on constructivist principles, including that truth is based on the emergence of consensus and there are likely to be multiple realities within the consensus (Pring, 2004). Critical realists, however, choose not to reside in the extremes of either the positivist or constructivist stances. A critical realist, for example, recognises that external forces (such as an iPad) can shape behaviour and events (Cohen et al., 2007), but also that human behaviour cannot be viewed in reductionist or mechanistic terms as people consistently exhibit intention, choice, freedom and individuality (Cohen et al., 2007).

A critical realist approach encourages the quantitative to be suggestive of differences to explore in a more interpretative mode (Pring, 2004), and it allows objectivist and

subjectivist philosophies to co-exist (Robson, 2002). Most relevantly, however, a critical realist exhibits humility in research. Embracing a fallibilistic approach to research (Seale, 1999), the critical realist is critical of our ability to know reality with certainty (Moutinho and Hutcheson, 2011). As a result, definite predictions are impossible, no facts are beyond dispute (Robson, 2002) and findings should be viewed as probabilistic rather than deterministic (De Vaus, 2001). It is with this appreciation for the equivocality of all scientific knowledge (Shadish et al., 2002) in mind that the study was designed.

3.3 The setting and the participants

In this study, the setting and the participants were defined by the research problem to be addressed and the practical issues of access and availability (Bechofer and Paterson, 2000).

3.3.1 The setting

SVC was introduced in section 1.3, and it was chosen as the setting for the study as:

- they were interested in the research question and vested in the answer;
- they were happy to make the desired population available; and
- they provided suitable rooms and facilities (stop clocks, books from the library, refreshments, flipcharts) as required.

3.3.2 The population

The population from this study was taken from Years 7 – 9 (key stage 3). The population was assessed by the SVC's English department to be four or more national curriculum

sub-levels below the end of 2011 / 12 academic year expectation in assessment focus 3 (AF3) (inference and deduction) for reading.

Published in 2009, the national strategies (Department for Children, Schools and Families, DCSF, 2009) indicate that assessment focuses are based on the national curriculum programmes of study and level descriptions (they reside between the two). AF3 for reading requires students to be able to 'deduce, infer or interpret information, events or ideas from texts' (DCSF, 2009). In 2008, the DCSF commissioned research that confirmed how central AF3 is to reading success overall as 'the ability to draw inferences predetermines reading skills' (Kispal, 2008), and it is for this reason that AF3 was used to identify the population in this study.

The level descriptions used to identify the population represent 'attainment targets' (Qualifications and Curriculum Authority, 2012) split into eight levels (each with three sub-levels). A level 5 example is included below:

Level 5	5+ : High standard of achievement within this level, including some elements of the next level (level 6)
	5: Secure level of achievement at this level
	5- : Low standard of achievement within this level, including some elements of the previous level (level 4)

Figure 7 – National curriculum levels (an example).

Based on teacher assessment, the level descriptions help establish the progress of a child against national expectations. The table below represents the national expectations for progress at the end of Years 7, 8 & 9, and the number of students at SVC that were four or more national curriculum sub-levels below the end of 2011 / 12 academic year expectation in AF3.

Year	National expectation at end of the 2011 / 12 academic year	Number of students four of more sub-levels below the national expectation
7	Level 5-	9
8	Level 5+	29
9	Level 6	13
TOTAL		51

Table 17 – Research population.

The Rose report (2009) defines dyslexia as 'a learning difficulty that primarily affects the skills involved in accurate and fluent word reading…' (p. 10). However, dyslexia remains a contested term, not least because Rose contends it is best thought of as on a continuum (an indistinct category without clear cut-off points). As a result, whilst a number of the participants in this study had been identified as dyslexic, this was not considered when selecting the population or the sample.

3.3.3 The sample

The population and sample were identified based on homogeneous criteria (Punch, 2009), and all fifty one students identified in the population were approached to be part of the study. A participant information sheet (appendix 1), a parent information sheet (appendix 2) and a consent form (appendix 3) were distributed to the fifty one students.

Of those students, thirty three consented for their involvement (the sample was therefore self-selecting). Three of these students were randomly assigned to the pilot, and the remaining thirty students were part of the main study.

Year	Number	Average age (June 2012)	Female	Male	White-British / 'other' ethnicity
7	7	12:03	4	3	7 / 0
8	17	13:03	2	15	15 / 2
9	6	14:02	1	5	6 / 0

Year	Number	Average age (June 2012)	Female	Male	White-British / 'other' ethnicity
TOTAL	30	13:02	7	23	28 / 2

Table 18 – Sample information.

Of the thirty students involved in the main study, nineteen had identified special educational needs. However, only three of the students were in receipt of a statement of special educational needs (one related to an autism spectrum disorder, one related to a speech, language and communication difficulty and one related to a social, emotional and behavioural difficulty).

No additional information was shared by SVC regarding the eighteen students identified as eligible for the study that did not consent to their participation. As a result, it is possible that there is an unidentified response bias in the results.

It was decided that a minimum of thirty participants were required to enable the counterbalancing design (outlined in section 3.4.2) and a degree of statistical analysis (Cohen et al., 2007) (outlined in section 3.6.1).

3.4 Design

3.4.1 Mixed methods design

A mixed methods design, requiring the collection and analysis of both qualitative and quantitative data (Punch, 2009), was utilised in this study. Johnson and Onwuegbuzie (2004) described mixed methods as combining 'the methods in a way that achieves complementary strengths and non-overlapping weaknesses' (p. 18). This mixed method design is explanatory in nature, in that it is a two-phased design, where qualitative methods are used to build on data collected through quantitative methods (Creswell and Plano Clark, 2006). The design integrates at the level of explanation, as the data

sources and methods aim to contribute to a convincing and coherent argument (Mason, 2002).

Mixed method designs are valued as they enable the triangulation of data (Gorard, 2001). It is argued that they reduce the likelihood of 'inappropriate certainty' (Robson, 2002; p. 370) by balancing any experimental confounds and responding to plausible threats (Robson, 2002). In short, they are used to demonstrate validity (Wilson, 1997).

Mason (2002) takes issue with the idea that data can be triangulated, arguing that different methods and data sources are likely to throw light onto different social or ontological phenomena or research questions, rendering triangulation obsolete. Equally, Wilson (1997) recognised that multiple methods can be contaminating of each other.

Chapter 2 outlined a developmental framework for integrating digital literacy technologies into literacy research (Reinking et al., 2000). As part of that work, they recognised that assimilative perspectives tend to generate research questions comparing new technologies to more conventional approaches, utilising quantitative methods. Accommodative perspectives, on the other hand, with a focus on transformational changes, tend to utilise qualitative methods. The mixed method design in this study reflects this dual intent.

3.4.2 Experimental component of the design

The experimental component of the study utilised a within-subjects (repeated measures) design. Breakwell et al. (2007) defines a within-subjects design as one in which 'the same group of people receive all the conditions' (p. 75). The advantages of this design are that fewer participants are needed and each condition has an equivalent

sample – the 'near-perfection of the match' (Robson, 2002; p. 130). The disadvantages relate to sequential nature of the conditions. This may lead to order effects, where performance in later conditions is influenced by earlier conditions (e.g. fatigue), or carry-over effects, where performance in one condition is dependent in part on the conditions which precede it (e.g. the purpose of the study is reinterpreted by participants) (Breakwell et al., 2007).

The design of the experimental component of this study attempted to overcome these disadvantages by randomising the order of the conditions and counterbalancing the groups (equal number of participants going through the conditions in an equally different order).

Conditions

The conditions in the study are detailed in Figure 8. The iPads were appropriately configured for each condition ahead of the participants arriving, and the instructions the participants received ahead of each condition are included in appendix 4.

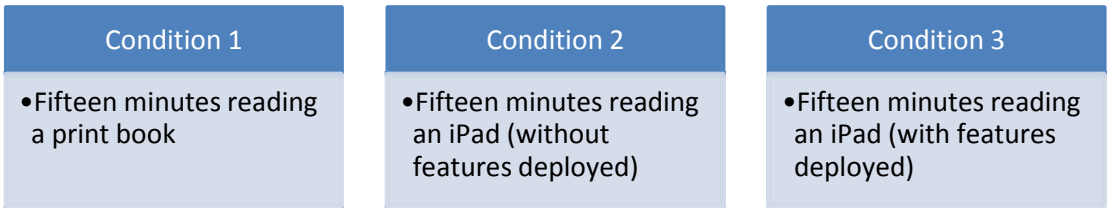


Figure 8 – Study conditions

The introduction of condition 2 addressed a further threat to validity – that of novelty. With the features set at 'standard' (per Table 19), condition 2 was designed to be as similar as possible to reading a print book on the iPad. It was anticipated that condition 2 would enable clarification as to what extent any differences in state enjoyment

between conditions 1 and 3 could be attributed to the 'advanced' features of the iPad (introduced in condition 3), rather than the novelty of the iPad itself.

All the conditions utilised the same book – one that had been selected by the participant from a choice of ten. The books had been identified by the school librarian as suitable for, and popular with, the age group of the participants, and were available in print form and on the iPad.

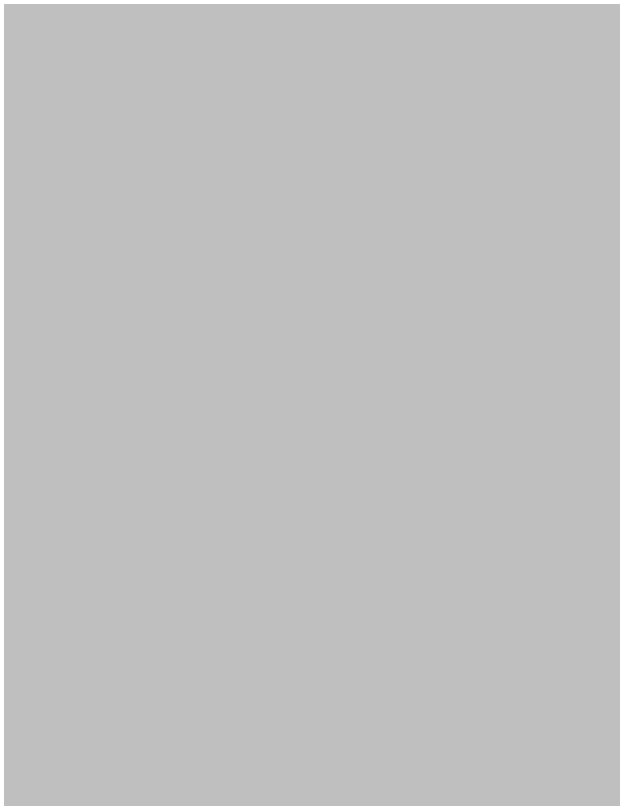
Condition 1 involved the participants reading their print book for fifteen minutes in a quiet room. Conditions 2 and 3 involved the participants reading the same book, in the same room, for the same period, but utilising an iPad. The features utilised in conditions 2 and 3 are outlined below:

Condition 2 'standard' iPad features utilised	**Condition 3 'advanced' iPad features utilised**
The touchscreen, to turn the pages.	The touchscreen, to activate other features and turn the pages.
A 'middle' setting for brightness.	The brightest setting.
Landscape orientation, with two pages visible at a time.	Portrait orientation, with one page visible at a time.
Font: Times New Roman.	Font: Iowan.
Size of the text: 4th largest font (out of eleven).	Size of the text: 8th largest font (out of eleven).
Theme: normal (black writing on a white screen).	Theme: sepia (black writing on an off white screen).
Full screen: off	Full screen: on
	The use of the dictionary was encouraged.
	The use of the narration was encouraged.

Table 19 – iPad features activated for conditions 2 and 3.

Screenshots of conditions 2 and 3 are included below:

Figure 9 – screenshot of condition 2



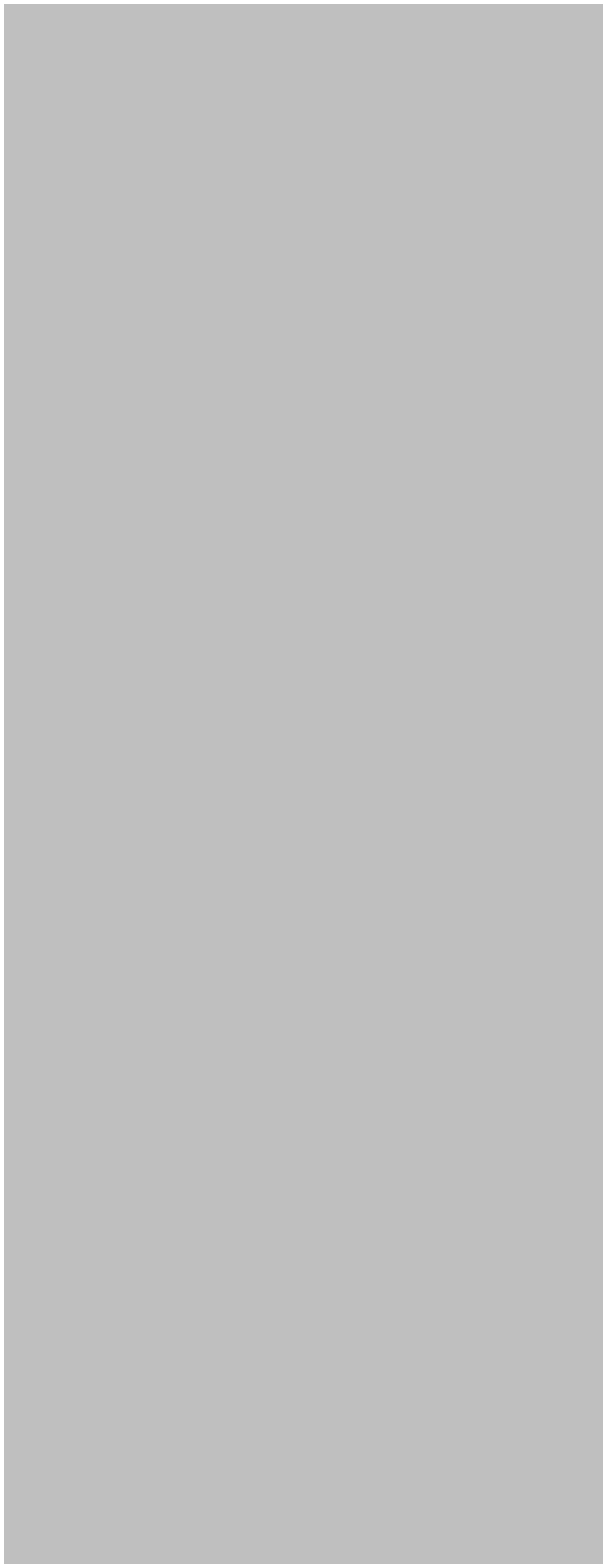


Figure 10 – screenshots of condition 3 (with dictionary and narration)

The 'advanced' features activated in condition 3

The set up for the 'advanced' features in condition 3 was based upon research outlined in the literature review, summarised below.

Condition 3 feature	Rationale
A different font	• Of the fonts available on the iPad, the 'Iowan' font has the lowest mean peak and is the font most conducive to higher reading speed and comprehension (Wilkins, 2011a). Analysis of the 1,000 most common English words (completed by Wilkins, 2011a) showed that the mean peak of 'Iowan' font was 0.34753468 (standard deviation: 0.086766939) vs. the 'Times New Roman' font, which had a mean peak of 0.388571612 (standard deviation: 0.094222294). • 'Generally, fonts with the larger first peak were read more slowly. Times New Roman … [was] among the fonts with high first peak (Wilkins et al., 2009; p. 407)
A bigger font (along with a portrait orientation and the full screen)	• Text in children's books gets too small too quickly (Hughes and Wilkins, 2000). • Bigger text has been associated with fewer crowding effects (Hughes and Wilkins, 2002), less visual stress (Wilkins and Nimmo-Smith, 1987), quicker comprehension and reading speed (Wilkins et al., 2009), greater accuracy (Wilkins et al., 2009) and a higher reading age (Allen et al., 2009). • Reading from an e-book (Maynard and McKnight, 2001) and reading from an iPad (Nielsen, 2010) have been found to reduce reading speed. • Preference for portrait orientation (Schcolnik, 2001),
A brighter screen	• Positive polarity (dark on light) eases reading (Muter, 1996).
Black writing on an off white screen	• Whilst there has been no specific research on background / brighteners and how they affect reading, Wilkins (2011b) suggests that the sepia background may ease eyestrain.

Condition 3 feature	Rationale
The use of the dictionary and narration.	• Dictionaries aid comprehension (Horney et al., 1999) and word recognition. • Narration has been shown to remove the effort from decoding individual words (Lewin, 2000), aid phonological awareness (Catts et al., 1999), bolster word recognition skills (McKenna, 1998; McKenna et al., 2003), enhance fluency (Dalton and Strangman, 2000), and help children derive both phonetic rules (Carbo, 1978) and correct pronunciation of irregular words (Reitsma, 1988).

Table 20 – The rationale behind the condition 3 'advanced' features.

Groupings

The thirty participants were allocated into six groups as they arrived to participate. This introduced a control for an infinite number of plausible rival hypotheses without specifying what any of them were (De Vaus, 2001). Each of the six groups experienced the conditions in a different order. With three conditions there are six different possible orders of the conditions, and this design ensured that the thirty participants were distributed across the groups (the conditions were counterbalanced). The original design intended for the participants to be allocated between groups equally, but a mis-assignment meant that group F had two extra participants (at the expense of Groups B and C):

Group	Number of participants	1st condition experienced	2nd condition experienced	3rd condition experienced
A	5	1	2	3
B	4	2	3	1
C	4	3	1	2
D	5	1	3	2
E	5	2	1	3
F	7	3	2	1

Table 21 – Counterbalancing structure for the groupings and conditions.

3.5 Methods

3.5.1 Questionnaire

Introduction

The level of state enjoyment derived from the reading experience was measured by a questionnaire administered immediately after the completion of each of the fifteen minute conditions.

Questionnaires are used as they rely directly on the views of those being questioned (Pring, 2004). They produce structured, often numerical, data that can be easily analysed ('usable knowledge', according to Lindblom and Cohen, 1979). They are simple, versatile and cheap to set up and administer (Breakwell et al., 2007).

The central challenges associated with questionnaires surround the unsophisticated and limited scope of the data that is collected (Cohen et al., 2007), and the inability of the researcher to control the level of understanding or degree of involvement of the respondents (Robson, 2002).

Questionnaire design

The design of the questionnaire followed the staged sequence of development outlined by Cohen et al. (2007):

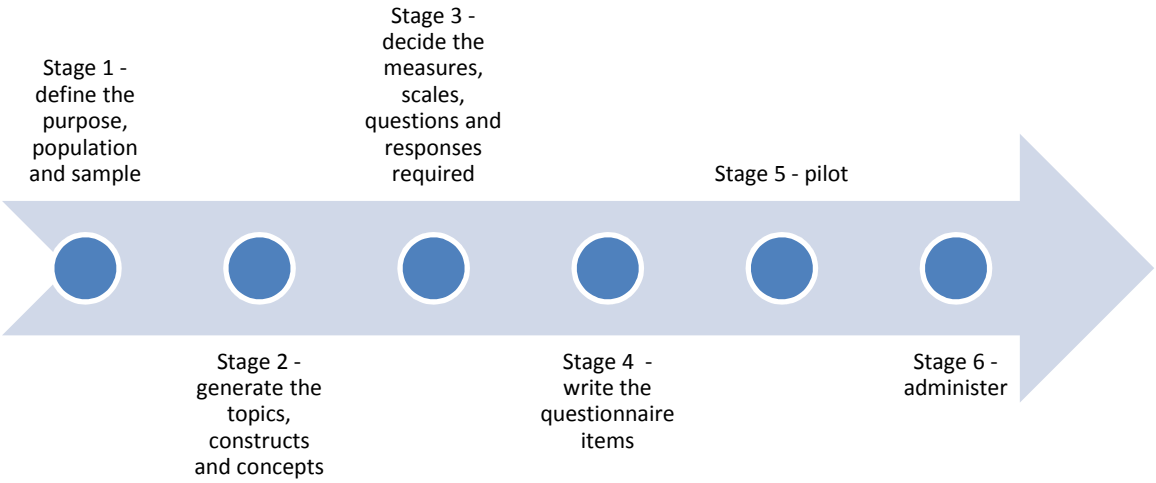


Figure 11 – The staged process of questionnaire development (Cohen et al., 2007).

Stage 1 has been outlined above, with the central purpose of the questionnaire to establish the level of state enjoyment experienced by each of the participants immediately after each condition. Stages 2, 3 and 4 were undertaken with reference to a scale developed to measure the enjoyment of web experiences (Lin et al., 2008). This scale went through three stages of its own development: initial pooling of items from pre-existing scales, exploratory analysis (using eighty five participants) and confirmatory analysis (using 111 participants). As part of the scale development, Lin et al. (2008) evaluated their findings against the six measurement properties for construct reliability and validity defined by Lewis et al. (2005):

Measurement property	**Indicator from the Lin et al. (2008) scale to measure enjoyment of web experiences**
Content validity	This was achieved through consultation with domain experts and a thorough literature review.
Factorial validity	Strong evidence available.
Reliability	For all factors the reliability was 0.94 – 0.98, which suggests the scale is reliable and stable.

Measurement property	Indicator from the Lin et al. (2008) scale to measure enjoyment of web experiences
Convergent validity	The loadings of each factor were higher than the specified threshold (0.45).
Discriminant validity	There was no cross loading.
Nomological validity	Higher enjoyment scores were reported for the website they expected to be enjoyed

Table 22 – Reliability and validity indicators for a scale to measure the enjoyment of web experiences (Lin et al., 2008).

Lin et al. (2008) were confident that the breadth of theoretical input they sought meant they had developed a sound instrument for measuring enjoyment. For the purposes of the scale, enjoyment was conceptualised based on the three dimensions of enjoyment outlined earlier (first identified by Warner, 1980): fulfilment (satisfaction of a need or desire), engagement (focused attention) and positive affect (positive attitude / good feelings). The only stated concerns with the scale related to the limited population (students) and number of websites (two) that the scale had been constructed based upon.

The scale from Lin et al. (2008) formed the basis for the central twelve questions in the questionnaire. Whilst retaining the integrity of the questions, some subtle modifications were made to ensure the questionnaire was suitable for this study. For example, 'Visiting the Web pages…' was changed to 'Reading the book…', and the more complex words were changed ('fulfilment' to 'feel good inside', 'absorbed intently' to 'my mind was fixed' and 'deeply engaged' to 'my mind was occupied').

The requirement to collect additional data meant adding elements of the questionnaire, and that was done whilst ensuring the layout was easy to understand, attractive and included examples of how the response should be recorded (Cohen et al., 2007).

The questionnaire (appendix 5) included a mixture of open and closed questions:

Focus	Number of questions	Open or closed question?	Answered once, or after every condition?
Identifiers	2	Closed	Once (at start)
Overall level of trait enjoyment of reading	1	Closed	Once (at start)
Level of state enjoyment	12	Closed	After every condition
Number of pages read	1	Closed	After every condition
Amount features used	1	Closed	Once (after condition 3)
The features used	1	Open	Once (at end)

Table 23 – Questionnaire structure

The design of the questionnaire kept in mind the recommendations of De Vaus (1991), with simple language to avoid ambiguity, short questions and a limitation expectation regarding the amount of information expected from open questions. The balance of the questionnaire included closed questions, to reduce ambiguity and ease analysis (Breakwell et al., 2007). However, closed questions assume the participant has a view to share and places greater emphasis on accessibility of the language (Cohen et al., 2007). Only one open question was included as a qualitative element of the study was to follow (the focus groups), and they were likely to have acted as a deterrent for completion (Cohen et al., 2007).

The scale in the questionnaire

For each of the twelve questions that focused on state enjoyment, a uni-dimensional semantic differential scale was utilised (Osgood et al., 1957). The interval scale had 6-points, and each end (but not throughout) was anchored with an 'agreement' / 'disagreement' term.

Such scales are commonly used for collecting data on emotions, attitudes and opinions as they reflect a degree of sensitivity and differentiation of response (Punch, 2009). A 6-point scale was chosen to increase reliability (Nunnally, 1978) whilst recognising that, with more than seven points, the returns diminish and respondents struggle to discriminate between the points (Lissitz and Green, 1975). To limit the central-tendency bias, there were no mid-points to revert to. However, respondents have been shown to be less likely to answer at the ends of the scale (Cohen et al., 2007). Lastly, '6' was always at the positive end of the scale, so there was no control for acquiescence bias.

(Stage 5) The pilot

The experimental element of the study, including completion of the questionnaire, was piloted with five students (two students away from SVC and three at SVC), at different times. The aim of the pilot was to increase the reliability, validity and predictability of the questionnaire (Oppenheim, 1992).

Following the pilot, a number of changes were made to the experimental element of the study. These included:

- Adding in synonyms for terms that were still unclear in the questionnaire questions (such as 'OK' for 'satisfied').
- More directly identifying the conditions in the questionnaire.
- Moving from five to six points on the semantic differential scale.
- Deciding to read out the questions in the questionnaire to aid understanding.
- Inserting guidance on the response required (a '✓') and where it was to go.

(Stage 6) Administration

The questions in the questionnaire were collectively read out loud with the participants to aid their understanding, and they were given an opportunity to ask questions about the content if they were unsure as to what they were being asked.

The participants completed the questionnaires in my presence, which is likely to have improved the quality and control of the responses, as well as the response rate (Robson et al., 2002). However, there may have been a social pressure for the participants to complete the questionnaires (Cohen et al., 2007), and this may have altered their responses.

3.5.2 Focus groups

Introduction

The focus groups in this study most closely represented 'a carefully planned discussion designed to obtain perceptions on a defined area of interest in a permissive non-threatening environment' (Krueger, 1994). The purpose of the focus group was to facilitate the interpretation of previously obtained quantitative results (Stewart et al., 2006), and it is common for focus groups to represent a supplementary data collection method (Breakwell et al., 2007), particularly alongside questionnaires (Sloan, 1999).

Focus groups provide a means to obtain 'tiny glimpses of the world' (Hollander, 204; p. 605) as they seek to capture the feelings, ideas, attitudes and perceptions of participants (Ottewill and Brown, 1999). Based on the constructionist perspective of reality, they elicit the experiences of people in social contexts (Kaehne and O'Connell, 2010). In exploring topics about which little is known (Stewart and Shamdasani, 1990), a

facilitator aims to maximise disclosure and minimise group biases and status dynamics (Breakwell et al., 2007).

Focus groups rest on four underlying assumptions:

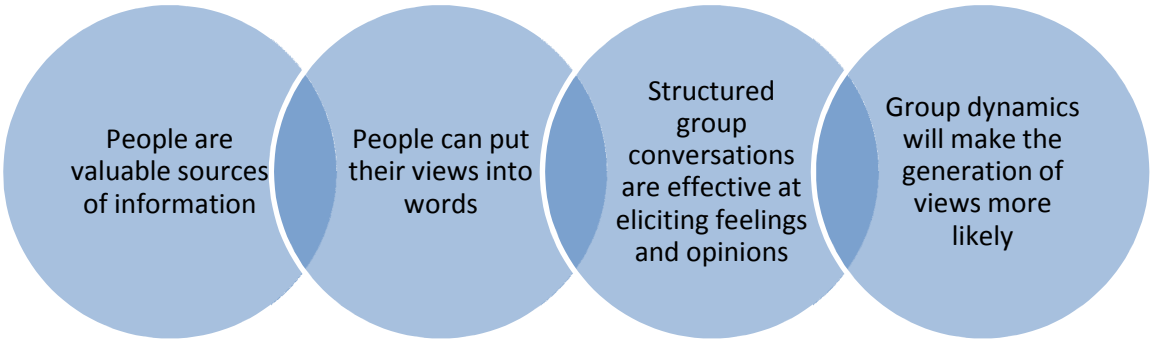


Figure 12 – Assumptions that underlie focus groups (adapted from Lederman, 1990).

The commonly recognised advantages and disadvantages of focus groups are outlined below:

Advantage	**Disadvantage**
An enjoyable method of data collection for participants to engage in.	Participants may find representing their views stressful.
Participants are able to speak for themselves due to the direct nature of the interaction between the researcher and the participants.	The 'live' nature of the interaction may place undue credibility on the data.
A quick, efficient and relatively cheap way to access a large, rich amount of data.	The amount of information that can be covered is restricted, and the findings are limited in their generalisability.
Participants react to, and build on, responses of others.	There is a risk of dominance from certain members, with individual views interpreted as being representative.

Advantage	Disadvantage
	Focus group participants tend to reproduce normative discussions.
A flexible approach that can be adapted for those with less verbal skills.	There is an element of unpredictability.
Elicit data that are easy to understand.	Summarisation and interpretation of the data are difficult.
Hard-to-reach members of society can be empowered as participants.	The researcher's attributes often impact on the discourse, and it is easy for the moderator to bias the findings.

Table 24 – Advantages and disadvantages of focus groups (adapted from Pring, 2004; Stewart et al., 2006; Vaughn et al., 1996; Barbour, 2005).

Focus group design

Three focus groups were run, one for each year group. Their composition is per Table 18, and comprised 7, 17 & 6 mixed-sex participants that were acquainted to each other. Per Table 25, there is some disagreement as to the ideal number of participants in a focus group, but it seems that two of the focus groups (Y7 & Y9) aligned with the recommended size.

Ideal number of participants in a focus group	Author
5	Punch (2009)
6 – 12	Breakwell et al. (2007)
No more than 8	Christensen and James (2000)
8 – 10	Wells (1974)

Table 25 – Ideal number of focus group participants.

Focus groups with a large number of participants (such as the Y8 focus group) are harder to moderate and manage, and it is difficult to ensure everyone contributes (Stewart et al., 2006). They are also more likely to fragment and make recording the dialogue difficult (Breakwell et al., 2007).

Equally, there is little consensus on whether mixed or single sex focus groups are more effective. Punch (2002) argues that the experiences of sexes may differ, whereas Vaughn

et al. (1996) and Scott (2000) advocate single sex (and same age) groups to elicit more information.

That the participants were acquainted with each other is argued to offer participants a relatively safe environment to share as the group is able to take advantage of the naturally occurring peer group to dilute the power imbalance between the researcher and the researched (Barbour, 2005). Their common background and experience is hypothesised to facilitate communication (Brown, 1999). However, other studies also show that homogenous groups comprising friends are more likely to impair the formation of a group (Templeton, 1987) and engender group think (Brown, 1999). Stewart and Shamdasani (1990) conclude that any 'acquaintance effect' is 'modest at best' (p. 35).

Focus group structure

The focus groups were conducted in a classroom at SVC, which was convenient, comfortable and familiar (all important location considerations, according to Wilson, 1997). Seating arrangements were designed to promote equity, and the sessions lasted no longer than forty five minutes (Morgan et al., 2002).

Details of the focus group structure are contained in appendix 6. The main sections of the focus group, and the logic for their inclusion, are outlined below:

Section	**Logic for inclusion**
Introduction.	• Served as a reminder of the research and the researcher. • Confirmed the participant's consent.

Section	Logic for inclusion
Warm up exercise: participants were asked to draw how they felt about reading.	• Drawing and using charts help establish effective communication as they assist in transforming the power relations when children are describing their own reality (O'Kane, 2000). • Visual representations help those with limited literacy (O'Kane, 2000). • It is recommended that focus groups with children start with something fun (Stewart et al., 2006) to reduce hierarchical inequality (Morgan et al., 2002)
Participants were asked, in groups, to create two spider charts based on the differences between the conditions 1 and 2, and 2 and 3 (pictures of the conditions were shared as a reminder). The stimulus material is in appendix 7.	• As above. • Stimulus materials provide concrete, visual reminders, encourage discussion and are good for memory-prodding (Punch, 2002). • Discussion on the outcomes from this task provided an opportunity to pose open questions to encourage universal participation (Parker and Tritter, 2006) • There was also the opportunity to probe responses to ensure the participant's perspectives were understood (Morgan et al., 2002). • The exercises harnessed the dynamism, energy, spontaneity and commitment of the group (Ottewill and Brown, 1999).
Participants were asked, in groups, to complete a forced-ranking exercise on ten features introduced in condition 3. The stimulus material is in appendix 8.	• As above.

Table 26 – Focus group outline.

The structure outlined above was developed with the expected requirements of the participants – potentially low literacy levels, communication skills and attention threshold – in mind. The participative techniques position children as active participants (O'Kane, 2000). They were successful in eliciting the children's views (Morgan et al., 2002) as they:

- were innovative routes to accessing understanding (Kefyalew, 1996);
- broke the sessions up to help quieter children (Morgan et al., 2002); and
- reduced any barriers to expressive communication (Kiernan, 1999).

The central limitation of introducing such participative techniques is that they can make recognising and recording a consensus difficult, and they heighten the level of conceptual understanding required to contribute to the task (O'Kane, 2000).

Lastly, the focus groups were recorded (but not transcribed) to enable reflection, recreate nuances and provide examples (Schreier, 2012). Justification for this decision is included in Table 27.

3.6 Data analysis

3.6.1 Analysis of the quantitative data elicited from the questionnaires

Field (2009) contends that the assumptions of parametric data and tests are that:

- The data are normally distributed.
- Data is measured at least at the interval level.
- There is a homogeneity of variance.

These were proven.

The Kolmogorov–Smirnov test (K–S test) for normality was used to compare the average scores from each condition to a normally distributed set of scores with the same mean and standard deviation (Field, 2009). The outcome for each of the average scores was non-significant, indicating the distribution of the sample for all the conditions was not significantly different from a normal distribution:

The average score from condition 1, D (30) = 0.094, ns.

The average score from condition 2, D (30) = 0.144, ns.

The average score from condition 3, D (30) = 0.113, ns.

Figure 13 – The Kolmogorov-Smirnov test.

Levene's test for homogeneity of variance was used to establish whether the variances in the groups were equal (Field, 2009). The outcome for each of the average scores was non-significant, indicating the variances were not significantly different (and the assumption of homogeneity had not been violated):

The variances in scores from condition 1, F (1, 28) = 0.211, ns.

The variances in scores from condition 2, F (1, 28) = 3.308, ns.

The variances in scores from condition 3, F (1, 28) = 0.056, ns.

Figure 14 – Levene's test.

A repeated measures analysis of variance (ANOVA) statistical test was completed to analyse the results between conditions. The accuracy of such a test depends on the assumption that scores in different conditions are independent. When repeated measure designs are employed, this assumption is violated as scores under different conditions may be related as they are from the same participants. An assumption of using an ANOVA between groups is therefore that the variance across conditions will be the same and that no two conditions are any more dependent than the other two. This is known as the assumption of sphericity. Sphericity refers to the equality of variances of the differences between treatment levels (Field, 2009).

Mauchly's test assesses the hypothesis that the variances of the differences between conditions are equal (Field, 2009). Mauchly's test of sphericity for the current data produced non-significant results, indicating that the variances of differences were not significant and the condition of sphericity was met:

Mauchley's test of sphericity, X^2 (2) = 0.895, ns.

Figure 15 – Mauchley's test.

3.6.2 Analysis of the qualitative data elicited from the focus groups

The goal of this element of data analysis was to create theoretical generalisability, described by Sim (1998) as creating 'theoretical insights which possess a sufficient degree of generality or universality to allow their projection to other contexts or situations' (p. 350).

Qualitative content analysis (Schreier, 2012) was used to analyse the data from the open question in the questionnaire and the focus groups. Whilst Breakwell et al. (2007) recognise a distinction between qualitative and quantitative content analysis, other authors (such as Schreier, 2012) believe the distinction to be arbitrary and indistinct, and more relevant to how the data is presented than the approach itself.

Qualitative content analysis is a method for systematically describing the meaning of qualitative material (Schreier, 2012), and it can be utilised with a range of material (such as data collected from the focus groups).

The step-by-step approach to completing qualitative content analysis slightly differs across authors. Figure 16 represents the approach to content analysis that was followed in this study:

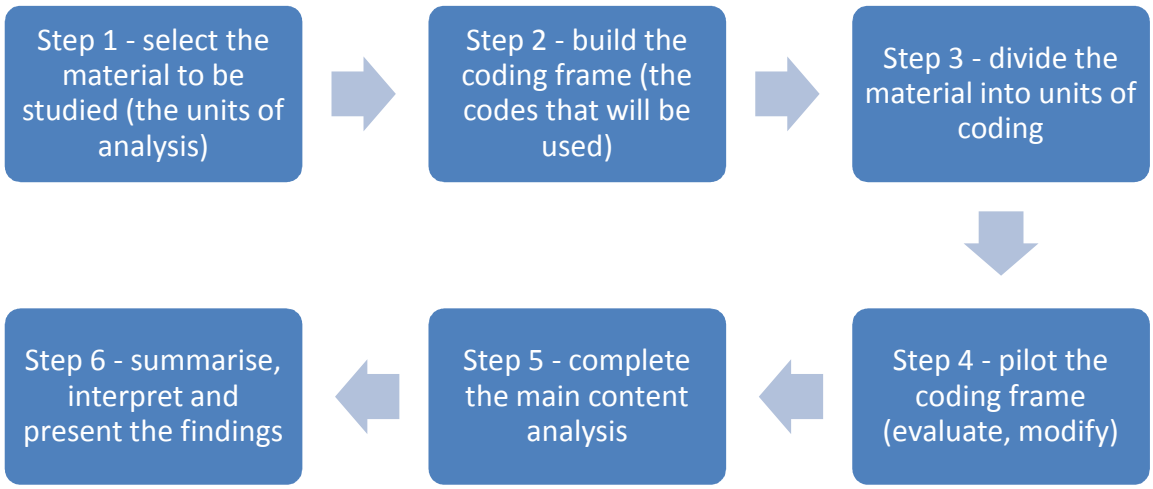


Figure 16 – Approach to qualitative content analysis, adapted from Schreier (2012), Cohen at al., (2007) and Neuendorf (2002).

The table below identifies the key implementation decisions made regarding the 6-stage process outlined above:

Step	Decisions
1	• The single open ended question in the questionnaire and the focus groups were identified as the units of analysis. • The focus groups were not transcribed. As a result, the content analysis was completed on the outcomes from the spider chart and forced-ranking exercises, as well as the audio recording from the focus groups. • Halcomb and Davidson (2006) argue that it is important that transcription decisions are congruent with the theoretical underpinnings of a specific investigation. Accordingly, a mixed-method design that introduces focus groups to elicit ideas does not, necessarily, need to base its analysis on transcribed data. • Further, the process of transcription is open to human errors and inaccuracy (Poland, 1995), the costs associated with transcription – time, physical and human – are significant (Britten, 1995) and transcription is complex and fraught with technical dilemmas (Fasick, 2001).

Step	Decisions
2	• As advocated by Fruh (2007), a combination of a concept and data-driven approach to developing the coding frame was used. Initially, important topics (main categories) were identified based on the literature review (concept-driven). Following this, the subcategories were identified based on the data (data-driven). Berry (1990) advocated that emic units (related to knowledge and / or experience) 'must be discovered, not predicted' (p. 85). • Per the guidance from Schreier (2012), the coding frame was uni-dimensional (each dimension captured only one aspect of the material; Fruh, 2007), mutually exclusive (a unit of coding was assigned to one of the subcategories only), exhaustive (each unit of coding was able to be assigned to at least one subcategory in the coding frame) and saturated (each subcategory was used at least once during the analysis).
3	• Answers to the open question in the questionnaire, individual written contributions to the focus group exercises and individual statements / utterances in the focus group discussions were identified as the units for coding. • Gottschalk (1995) found the verbal clause to be a suitable unit for coding when analysing verbal data.
4	• During the pilot of the coding frame (completed with a subset of the data), the content analysis was reviewed for reliability and validity. • As only one researcher was involved in the coding, a modified concept of reliability was deployed. Steinke (2004) argued that content analysis completed in a systematic way (all the steps completed, with clarity provided on how conclusions were reached) constituted reliable analysis. • The pilot enabled an 'a priori' (before the fact) design to be used for the coding frame, which is a key quality indicator in content analysis (Neuendorf, 2002). • Face validity was used to assess the validity of data-driven coding frames. This has been identified as the most useful form of validity (Schreier, 2012). Two warning signs for low validity were paid particular attention during the course of the pilot - a high number of units assigned to residual categories, and an imbalance in the assignment of material to categories and subcategories.

Table 27 – Key content analysis implementation decisions.

The content analysis was implemented in a rigorous, disciplined, transparent and systematic fashion (Coffey and Atkinson, 1996; Schreier, 2012). A reflexive approach was taken, with efforts made to make the grounds for the co-produced interpretation

transparent (Schreier, 2012). Lastly, exceptions, regularities and sequences were closely tracked in order to generate meaning in the drawing of conclusions (Robson, 2002).

Central to the limitations of this approach to data analysis is the reliance on the coding decisions of a single researcher (Breakwell et al., 2006). In addition, content analysis does not seek to generate a holistic perspective (Schreier, 2012), and it is likely that nuanced (Cohen et al., 2007), non-verbal (Neuendorf, 2002) forms of communication are excluded from the analysis. As a result, this analysis focuses on manifest content (content that is 'physically presented and countable'; Gray and Densten, 1998; p. 420), at the expense of latent content.

3.7 Ethical considerations

The Code of Ethics and Conduct (British Psychological Society; BPS, 2009), The Ethical Guidelines for Educational Research (British Educational Research Association; BERA, 2011) and The University of Birmingham's Code of Practice for Research (University of Birmingham, 2011 - 2012) were used as guidelines when addressing ethical issues within the context of the current research. An application of ethical review (appendix 9) was submitted to the Research Committee at The University of Birmingham who approved the application. The most prominent ethical considerations for the purposes of this research are outlined below.

3.7.1 Privacy, confidentiality and anonymity

In order to comply with item 1.2 (Standard of privacy and confidentiality) from the BPS Code of Ethics and Conduct, information gathered was anonymised at each stage of data collection through the use of a participant identification number. The participants were

reminded that anonymity in the focus groups could not be guaranteed, due to the presence of other participants.

Item 1.2 also requires confidential information to be recorded, processed and stored in a fashion designed to avoid inadvertent disclosure. To that end, data was kept and stored in accordance with the Data Protection Act (1998, modified 2003). Whilst the data was active, it was stored in its original form in a locked cabinet in the Educational Psychology Service office (in accordance with the Service's confidential file procedures). Only authorised personnel had access to the raw data.

The data will be kept for a minimum of ten years, in accordance with University Guidelines and guidance from the UK Research Council. Data will be stored in its original form for the duration of this period. After this period, the data will be destroyed in accordance with current Service guidelines on how to safely dispose of such information.

3.7.2 Informed consent

In order to comply with item 1.3 (Standard of informed consent) from the BPS Code of Ethics and Conduct, participants, and their parents, were given ample opportunity to understand the nature, purpose, and anticipated consequences of their research participation (in writing). Written consent forms (appendix 3) were collected and retained, and they were accompanied by information sheets for the participants (appendix 1) and their parents (appendix 2).

Participation was confirmed on an opt-in basis, and participants were made aware of their right to withdraw (and for any data collected from them to be excluded) at any

time from the research. Their right to withdraw was reaffirmed at each stage of data collection, and participants were not placed under duress at any point (BERA, 2011).

CHAPTER 4 - RESULTS

4.1 Research questions and overview

Table 28 details the research questions and where they are addressed in chapter 4:

Section	Questions
4.2.1, 4.2.2 & 4.2.4	What is the impact on the state enjoyment of struggling adolescent readers when reading with an iPad vs. a print book?
4.2.3	Is any impact on the state enjoyment of struggling adolescent readers when reading with an iPad vs. a print book mediated by their existing level of trait enjoyment for reading?
4.3	Do struggling adolescent readers read more quickly with an iPad vs. a print book?
4.4 & 4.5	What iPad features are most important in shaping the state enjoyment of struggling adolescent readers?

Table 28 – Research questions.

4.2 Changes in levels of state enjoyment

4.2.1 Descriptive statistics

Table 29 shows the level of state enjoyment after each condition, as reported by the thirty participants in the questionnaire:

Condition	Mean	Standard deviation
1 (book)	3.82	0.97
2 (standard iPad features)	4.10	0.88
3 (advanced iPad features)	4.39	0.94

Table 29 – Mean and standard deviation, by condition.

On the six point scale, the average level of state enjoyment progressed through the conditions as shown in Figure 17.

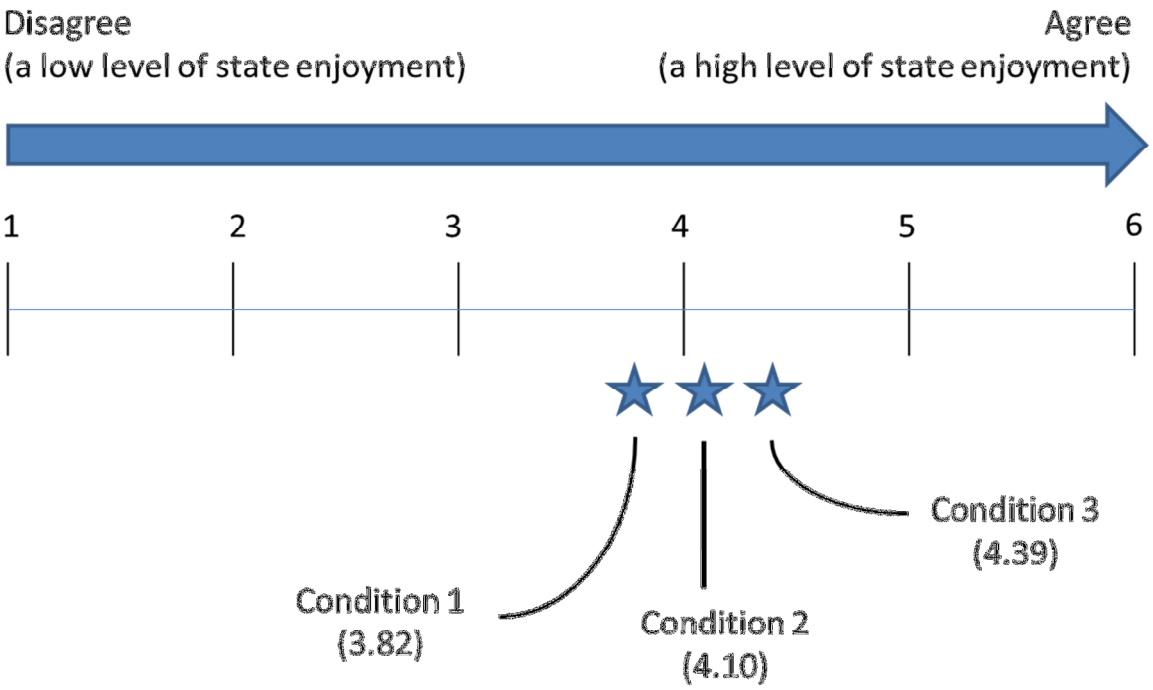


Figure 17 – Level of state enjoyment in conditions 1, 2 and 3.

Whilst the increase in state enjoyment between conditions 1 and 2 may be attributable to a novelty or acquiescence effect (purely based on the use of the iPad), the further increase in state enjoyment evident in condition 3 is more likely to be as a result of the advanced iPad features. This is further discussed in chapter 5.

4.2.2 ANOVA

Having confirmed the assumptions related to normality, homogeneity of variance and sphericity (section 3.6.1), a repeated-measures ANOVA was conducted. The results from the test of within-subjects effects show that there was a significant change in state enjoyment through the conditions.

The differences in condition means as determined by repeated-measures ANOVA were statistically significant, $F(2, 58) = 4.625$, $p<0.05$.

Figure 18 – Repeated-measures ANOVA.

Figure 18 indicates there is an overall significant difference in means but it does not show where those differences occurred. Figure 19 presents the results of the Bonferroni post-hoc test which indicates that the only significant difference is between conditions 1 and 3, (not 1 and 2, or 2 and 3):

The comparison between condition 1 (3.82 ± 0.97) and 2 (4.10 ± 0.88) was not statistically significant (p = 0.373).

The comparison between condition 1 (3.82 ± 0.97) and 3 (4.39 ± 0.94) was statistically significant (p = 0.039).

The comparison between condition 2 (4.10 ± 0.88) and 3 (4.39 ± 0.94) was not statistically significant (p = 0.277).

Figure 19 – Bonferroni post-hoc test.

In section 3.1, it was predicted that the state enjoyment of struggling adolescent readers would increase when reading with an iPad vs. a print book, and this prediction was proven accurate.

The effectiveness of the counterbalancing design of the study (described in section 3.4.2) was established by introducing the groups (groups A – F experienced the conditions in different orders) as a between-subject factor in the repeated-measures ANOVA. The results from the test of within-subjects effects show that there was not a significant difference between the groups, which suggests the counterbalancing design was effective.

The differences in condition means between groups as determined by repeated-

measures ANOVA were not statistically significant, F (10, 48) = 0.854, p>0.05.

Figure 20 – Repeated-measures ANOVA, with groups introduced.

4.2.3 Exploratory analysis in relation to additional variables

The impact of existing level of trait enjoyment of reading

In section 3.1, it was predicted that struggling adolescent readers with the lowest levels of trait enjoyment for reading would experience greater gains in their state enjoyment when reading with an iPad vs. a print book.

Within the questionnaire, the participants were asked whether they enjoyed reading 'a lot', 'a little' or 'not at all'. Table 30 shows that two-thirds of the participants indicated they liked reading 'a little'.

Trait level of enjoyment	N
A lot (1)	5
A little (2)	20
Not at all (3)	5

Table 30 – Trait level of enjoyment results.

Figure 21 illustrates how the level of state enjoyment in each condition differed between the existing levels of trait enjoyment.

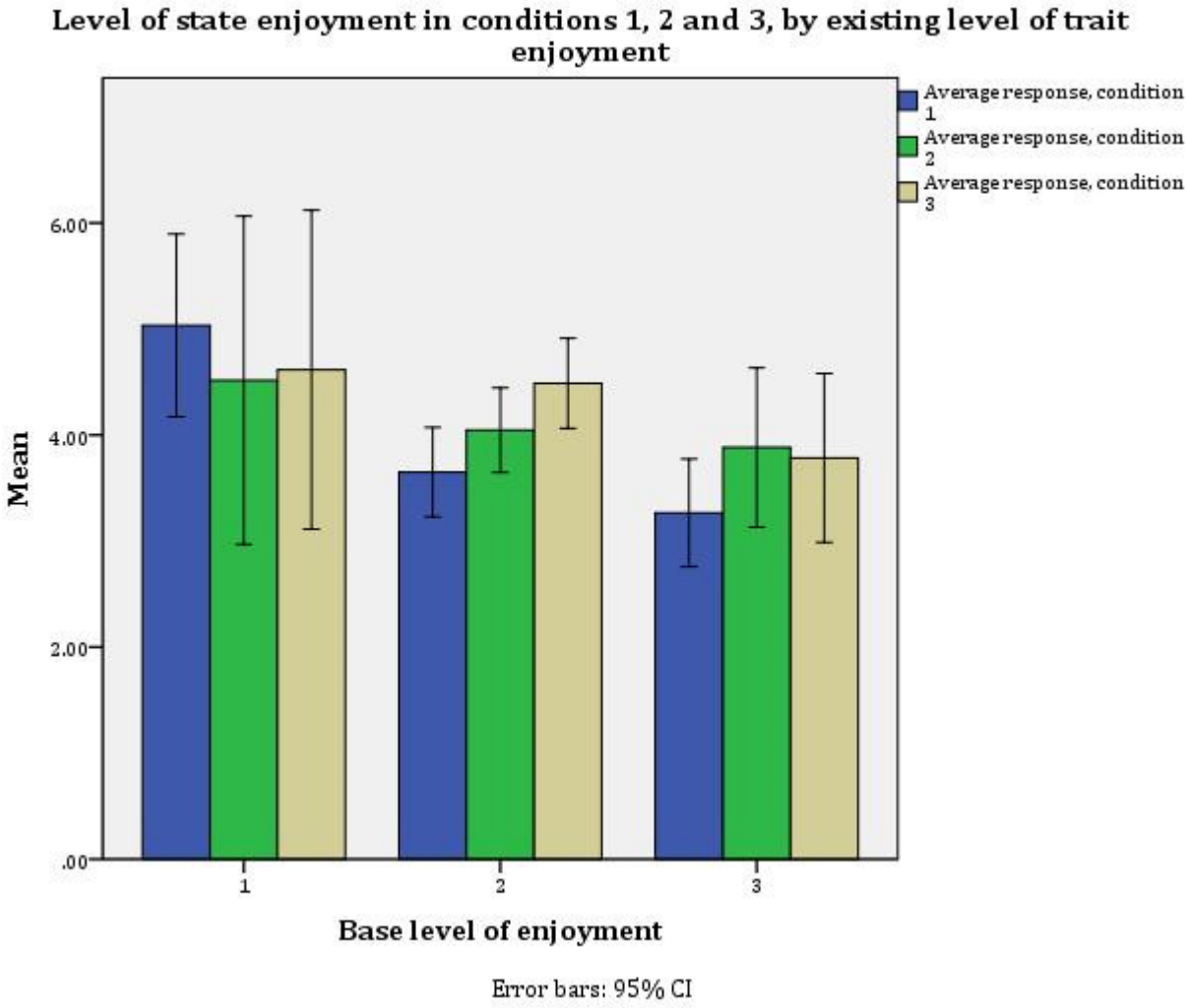


Figure 21 – Level of state enjoyment in conditions 1, 2 and 3, by existing level of trait enjoyment.

Whether the existing level of trait enjoyment of reading had a significant impact on the levels of state enjoyment through the conditions was established by introducing the existing level of trait enjoyment as a between-subject factor in the repeated-measures ANOVA. The results from the test of within-subjects effects show that there was not a significant difference between the existing levels of train enjoyment of reading.

The differences in condition means between participants with differing levels of trait

enjoyment of reading, as determined by repeated-measures ANOVA, were not statistically significant, F (4, 54) = 1.939, p>0.05.

Figure 22 – Repeated-measures ANOVA, with groups introduced.

Gender effects

As illustrated in Table 18, there was an imbalance in male and female participants in the study (23 male, 7 female). Figure 23 illustrates how the level of state enjoyment in each condition differed between the genders.

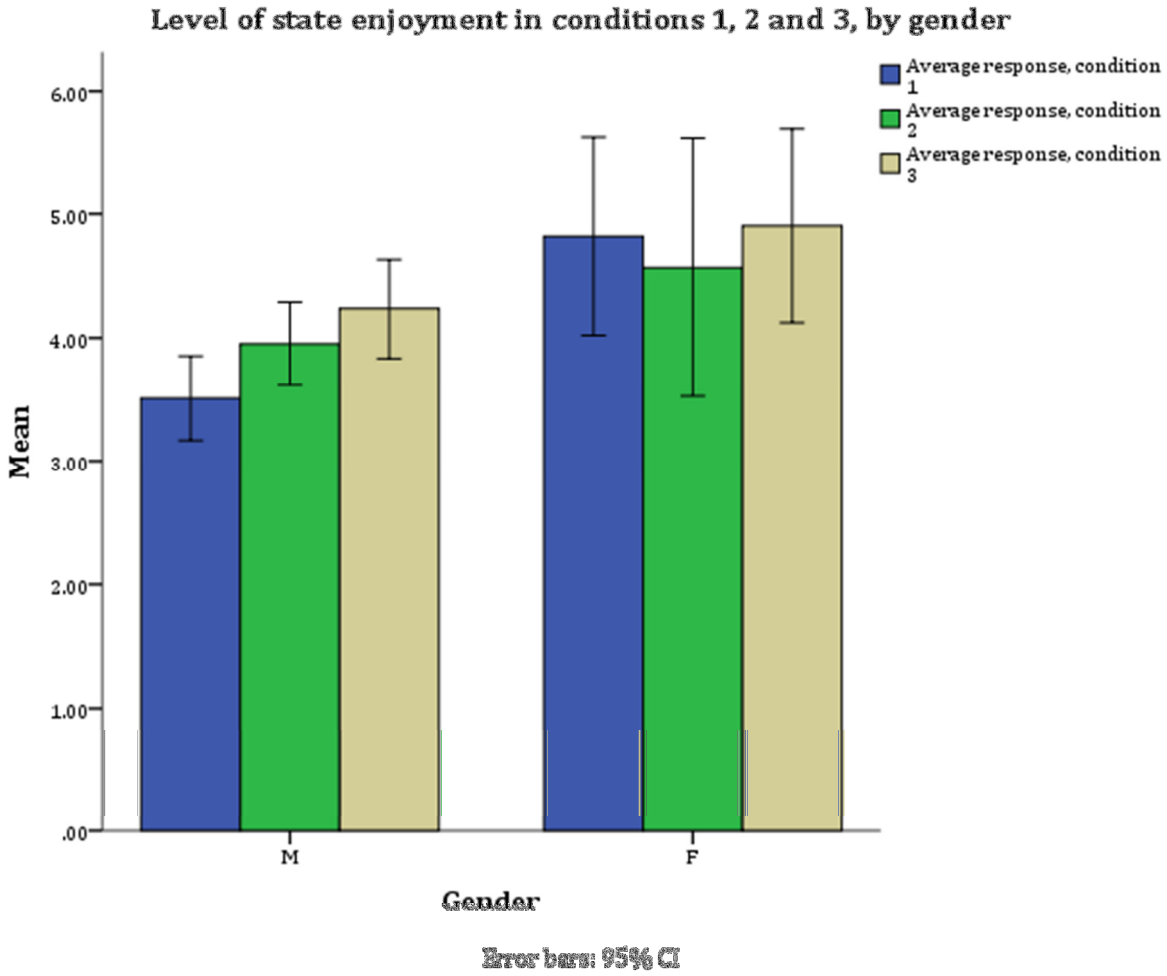


Figure 23 – Level of state enjoyment in conditions 1, 2 and 3, by gender.

Whether the gender of the participant had a significant impact on the levels of state enjoyment through the conditions was established by introducing the gender of the participant as a between-subject factor in the repeated-measures ANOVA. The results from the test of within-subjects effects show that there was not a significant difference between the genders.

The differences in condition means between gender, as determined by repeated-measures ANOVA, were not statistically significant, $F(2, 56) = 1.515$, $p>0.05$.

Figure 24 – Repeated-measures ANOVA, with gender introduced.

Age effects

As illustrated in Table 18, there was an imbalance in representation from year groups in the study (Y7 = 7, Y8 = 17, Y9 = 6). Figure 25 illustrates how the level of state enjoyment in each condition differed between the year groups.

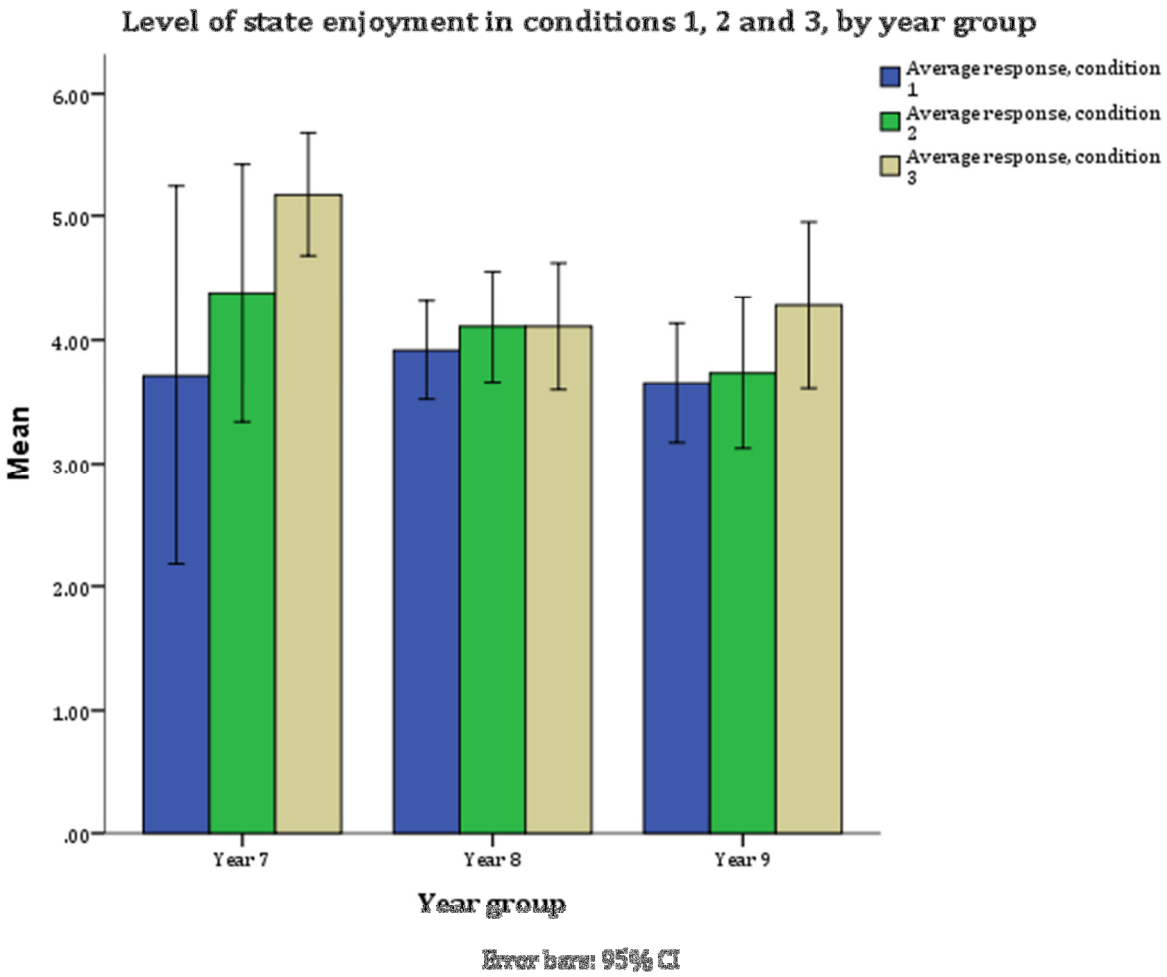


Figure 25 – Level of state enjoyment in conditions 1, 2 and 3, by year group.

Whether the year group of the participant had a significant impact on the levels of state enjoyment through the conditions was established by introducing the year group of the participant as a between-subject factor in the repeated-measures ANOVA. The results from the test of within-subjects effects show that there was not a significant difference between the year groups.

The differences in condition means between year groups, as determined by repeated-measures ANOVA, were not statistically significant, $F(4, 54) = 2.201$, $p>0.05$.

Figure 26 – Repeated-measures ANOVA, with gender introduced.

A correlation between the age of the participants (in months) and the difference between the participant's level of state enjoyment in conditions 1 and 3 also indicates a weak relationship.

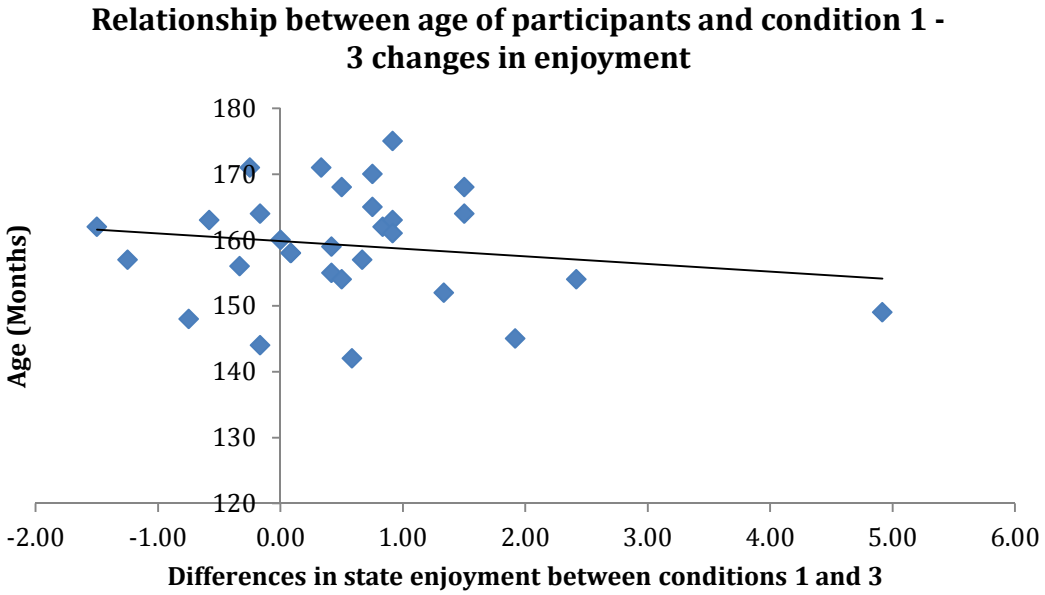


Figure 27 – Relationship between participant age and the difference between enjoyment in conditions 1 and 3.

The Pearson correlation coefficient is -0.164, indicating a very low (Cohen and Holliday, 1982) negative correlation. In other words, as the age of the participants increased, the difference between enjoyment in conditions 1 and 3 decreased (marginally).

4.2.4 Breaking down state enjoyment

As stated in section 3.5.1, the questions in the questionnaire were based upon three dimensions of enjoyment: fulfilment, engagement and positive affect. Table 31 summarises the average responses for each of these dimensions across the conditions.

Condition	Mean	Standard deviation
Average response (fulfilment), condition 1	3.5583	1.07013
Average response (engagement), condition 1	4.1000	1.21165

Condition	Mean	Standard deviation
Average response (affect), condition 1	3.7917	0.97176
Average response (fulfilment), condition 2	3.9250	0.93806
Average response (engagement), condition 2	4.3333	1.07746
Average response (affect), condition 2	4.0333	1.00373
Average response (fulfilment), condition 3	4.2083	1.01727
Average response (engagement), condition 2	4.5667	1.20690
Average response (affect), condition 3	4.4000	0.93449

Table 31 – Mean and standard deviations for each dimension of enjoyment (per condition).

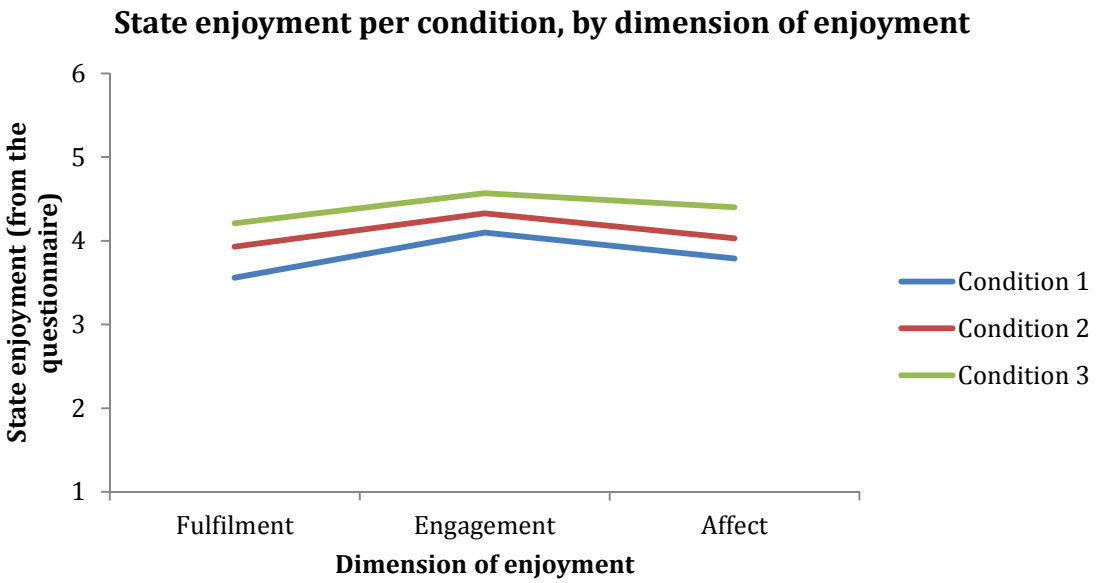


Figure 28 – Breakdown of state enjoyment per condition, by dimension of enjoyment.

Figure 28 shows that, in all conditions, engagement (focused attention) was the biggest contributor to the enjoyment of reading for this sample (average 4.33 across conditions), with positive affect (positive attitude / good feelings) second (average 4.07 across conditions) and fulfilment (satisfaction of a need or desire) the smallest contributor (average 3.90 across conditions).

Analysis of the range of scores for each dimension (Table 32) shows that the introduction of the iPad for condition 3 made a relatively larger impact on the fulfilment

and affect dimensions of enjoyment for the participants, compared to the engagement dimension. As stated above, however, the fulfilment and affect dimensions had lower starting points in condition 1.

Dimension	Lowest score (Condition 1)	Highest score (Condition 3)	Range (Condition 3 impact)
Fulfilment	3.56	4.21	0.65
Engagement	4.10	4.57	0.47
Affect	3.79	4.40	0.61

Table 32 – Condition 3 impact, by dimension of enjoyment.

4.3 Reading speed

4.3.1 Descriptive statistics

The number of pages read in each condition was recorded to assess whether this changed between conditions. In section 3.1, it was predicted that struggling adolescent readers would read more quickly with an iPad vs. a print book.

Each book had a different layout and a different number of words per page. As a result, the comparison between conditions and between participants was completed based on the number of pages read in each condition as a percentage of the total number of pages read in all conditions. Some examples, for illustrative purposes, are below:

Participant	Pages read in condition 1	Pages read in condition 2	Pages read in condition 3	Total number of pages read
4	44 (45%)	25 (26%)	28 (29%)	97
10	11 (39%)	9 (32%)	8 (29%)	28

Table 33 – Illustrative example of pages read, and the percentages by condition.

Across all of the participants, the largest percentage of pages was read in condition 1 (38%), then condition 2 (34%), then condition 3 (28%):

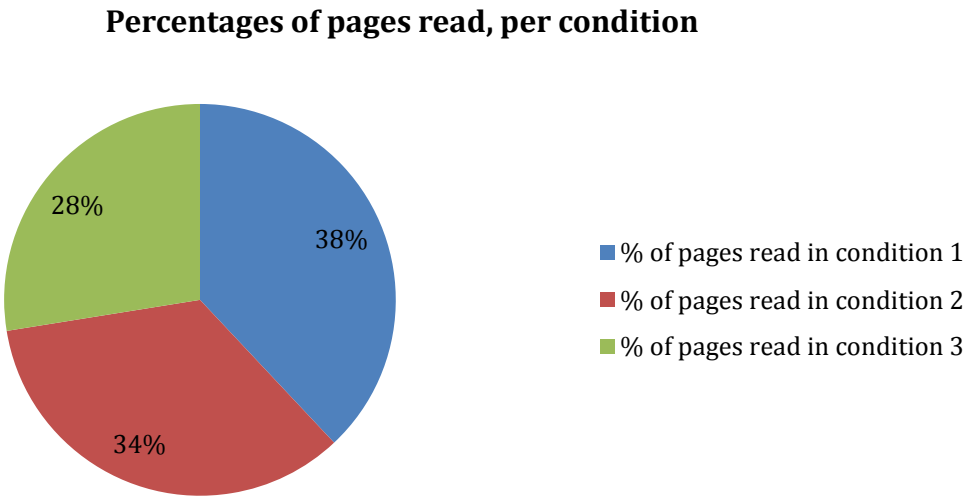


Figure 29 – Percentage of pages read, per condition.

The prediction outlined above was, therefore, proven to be incorrect. Use of the iPad (condition 2), and introduction of the advanced features (condition 3) did not speed up the reading of the participants. The effect was the opposite.

4.3.2 Relationship between the percentages of pages read in condition 3 and the difference in state enjoyment between conditions 1 and 3

The data was also used to consider whether there was a relationship between the amount of reading the participants completed in condition 3 (the speed of their reading with the advanced features of the iPad) and the difference between their level of state enjoyment in conditions 1 and 3. An analysis of the relationship between the percentage of pages read in condition 3 and the difference between the participant's level of state enjoyment in conditions 1 and 3 did not find a correlation between the two:

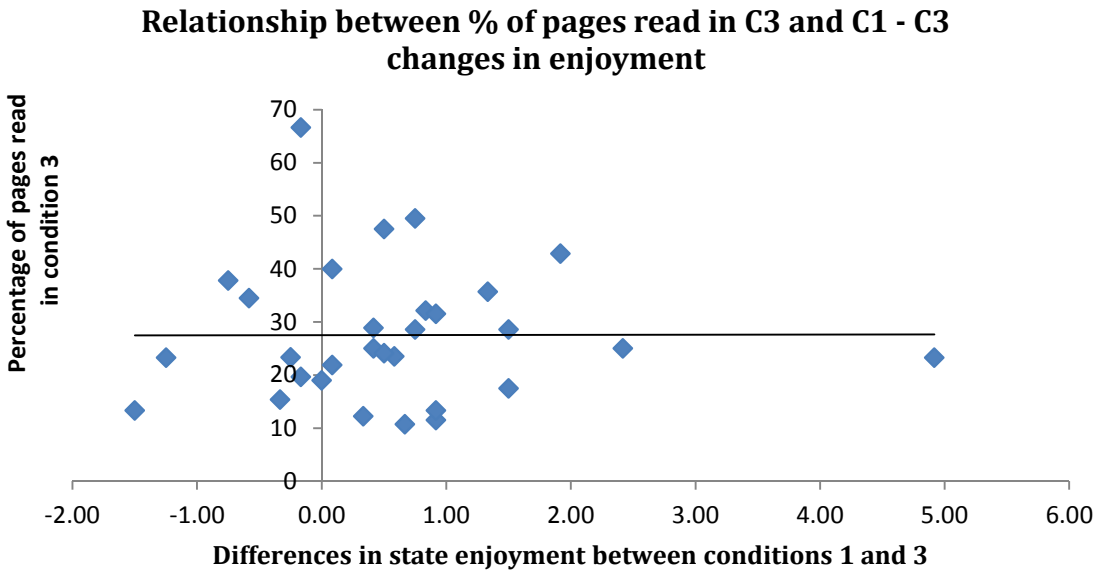


Figure 30 – Relationship between percentage of pages read in condition 3 and the difference between enjoyment in conditions 1 and 3.

The Pearson correlation coefficient is 0.002, indicating the absence of a relationship. This is perhaps unsurprising given that the participants read more slowly in conditions 2 and 3 than condition 1, and there was no relationship between the size of gain in enjoyment between conditions 1 and 3 and the number of pages read during condition 3. The prediction outlined in 3.1 was therefore disproved.

4.4 The identification of features used

4.4.1 Use of the dictionary and narration

The number of times the dictionary and narration was used in condition 3 was recorded (in the questionnaire) to assess whether there was a relationship between this and the difference between the participant's level of state enjoyment in conditions 1 and 3. On average, the dictionary and narration was accessed 3.97 times (± 3.011) in the fifteen minutes of condition 3.

An analysis of the relationship between the frequency the dictionary and narration were accessed in condition 3 and the difference between the participant's level of state enjoyment in conditions 1 and 3 did not find a correlation between the two:

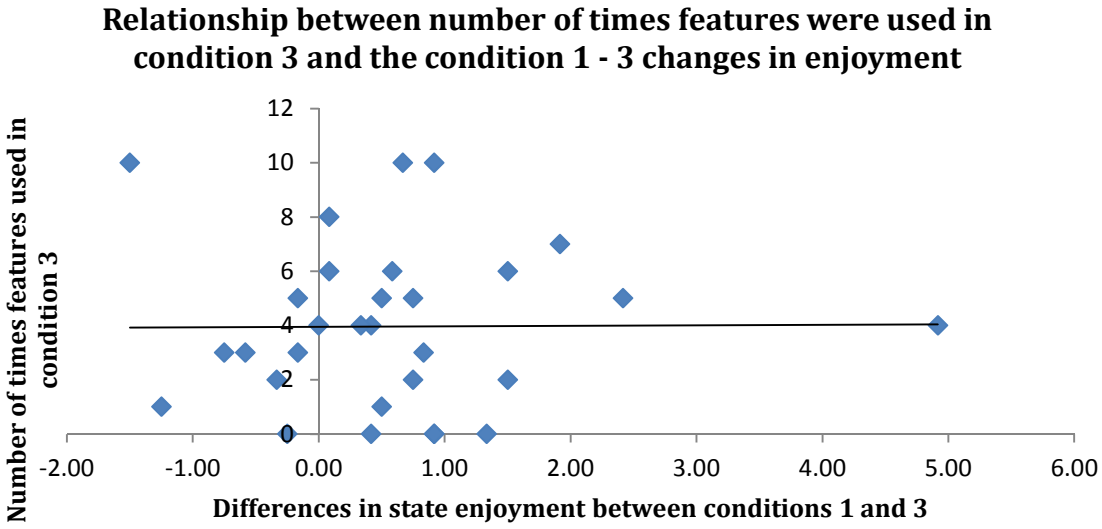


Figure 31 – Relationship between the number of time the features were used in condition 3 and the difference between enjoyment in conditions 1 and 3.

The Pearson correlation coefficient is 0.007, indicating the absence of a relationship.

4.4.2 Features identified by the participants

In order to answer the question 'what iPad features are most important in shaping the state enjoyment of struggling adolescent readers?', the initial analysis considered the features identified by the participants through the study. As explained in sections 3.5.1 (Table 23) and 3.5.2 (Table 26), the participants were given three opportunities to identify the features they considered the iPad to have introduced:

- In the questionnaire, they were invited to write a response to the question 'What were the biggest differences you noticed between the conditions?' (example, appendix 10).

- In the first focus group exercise, they were asked 'What were the differences between the book and the iPad?' and 'What were the differences between the iPads in conditions 2 and 3?' The response was drawn onto spider charts (examples, appendices 11 and 12).
- Following the first focus group exercise, they were asked to share (verbally, with the group) the elements of their spider charts they thought most important / relevant.

As stated in section 3.6.2 (Table 27), answers to the open question in the questionnaire, individual written contributions to the focus group exercises and individual statements / utterances in the focus group discussions were the units for coding. In total, 300 units were identified, over half of which were from the written focus group exercises:

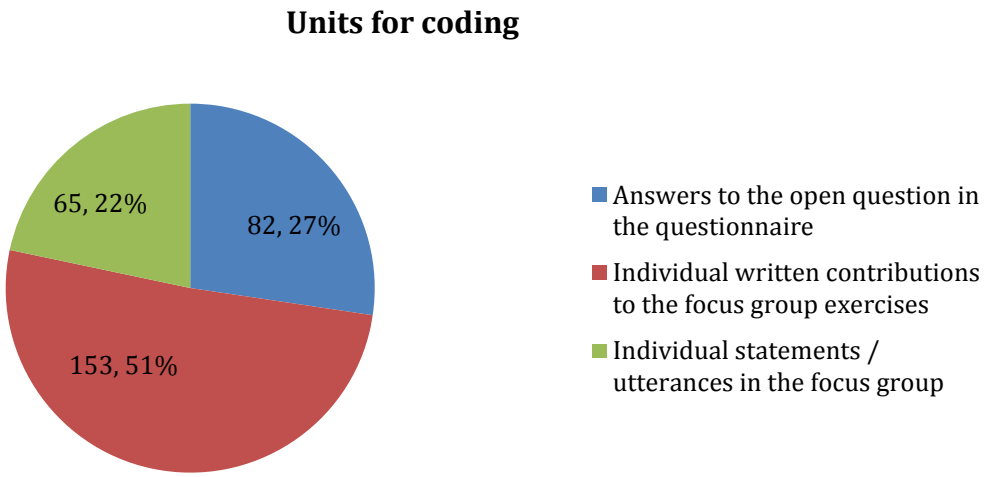


Figure 32 – Units for coding.

The coding frame (appendix 13) comprised twenty six categories (and ninety eight subcategories). Approximately a third of the categories were concept-driven, based on the features identified in section 2.7.4 (Table 11). Unsurprisingly, however, the participants chose to interpret the questions in different ways, which meant the remaining 17 categories were data-driven. The remaining categories related to:

- Factors that may influence the use of an iPad for reading.
- Qualities associated with iPads (section 2.7.3, Table 10).
- Evaluative comments on the impact of iPads on academic / non-academic outcomes (sections 2.7.6 and 2.7.7).

Table 34 summarises the categories and subcategories in the coding frame:

Area	Number of categories	List of categories	Number of subcategories	Number (% of total) units coded
The features of iPads when reading	9	• Font • Screen orientation • Screen size • Screen brightness • Screen colours • Screen, other • Reading supports • Page turning • Navigation	44	169 (56%)
Factors that may influence the use of an iPad for reading	4	• Purchasing considerations • Purpose of use • Size of text • Image	8	19 (6%)
Qualities associated with iPads	6	• Comfort • Fragility • Physical characteristics • Power • Reading options • Portability	27	70 (23%)

Area	Number of categories	List of categories	Number of subcategories	Number (% of total) units coded
Evaluative comments on the impact of iPads on academic / non-academic outcomes	7	• Sense of reality • Impact on attention • General comments on ease of reading • General comments on enjoyment of reading • General comments on preference • Impact on reading speed • General comments on interest of reading	19	42 (14%)
TOTAL	**26**		**98**	**300**

Table 34 – The coding frame.

17 of the categories cannot, by the definitions used in chapter 2, be defined as 'features' of iPads when reading (which was what was originally set out to be identified). However, consistent with the constructivist leanings shared in section 3.2, the analysis was completed using these additional categories as they were relevant in the eyes of the participants.

Table 35 summarises how the coding completed is documented in the appendices:

Unit of coding	Appendices that illustrate the coding	Example used in previous appendices
Answers to the open question in the questionnaire	Appendix 14	Participant 1 in appendix 10
Individual written contributions to the focus group exercises	Appendix 15	Year 7, Group 1 (exercise one) in appendix 11 Year 7, Group 2 (exercise two) in appendix 12

Unit of coding	Appendices that illustrate the coding	Example used in previous appendices
Individual statements / utterances in the focus group	Appendix 16	Not applicable

Table 35 – Coding illustrations in the appendices.

The features of iPads when reading (area one of four)

The 9 categories specific to the features of iPads made up 6 of the top 10 categories in terms of how frequently units were coded to them. As Figure 33 shows, for example, 52 of the units were coded to the reading supports category.

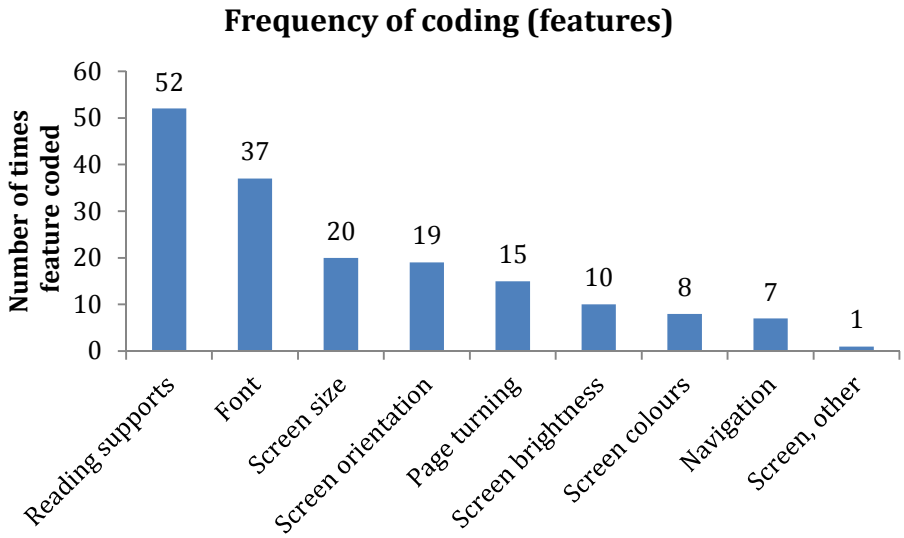


Figure 33 – Frequency of coding (features).

Almost 85% (44/52) of the 'reading supports' features identified by the participants related to the use of the dictionary or narration, suggesting these features were relatively visible and well recognised. A sixth of all units

'I found [the iPad] easier to read and understand 'cos if you got, like, to a word and you couldn't read it you can get the speech or the definition'.

In response to the question 'what makes reading more enjoyable?' 'Pictures. [Why?] 'Cos they explain complicated words'.

'If there is a complicated word you can search up what it means.'

for coding related to the 'reading support' features.

The remainder of the features identified were the ability to track progress through the book or highlight words (4/52). In this category, some dissatisfaction with the reading support features was identified. Examples include the lack of images or photos on the iPad (where those same images or photos may have been present in the book), difficulty with highlighting and dislike of the narrator's voice.

Font-related features were identified 37 times, of which 24 instances related to the font (type and size) being modifiable. 11 further references were made to the fact that this feature was helpful.

> *'It's more clearer. It is more spread out and it has a bigger font'.*
>
> *'[Condition 3] was easier to read. Lighter and bigger writing'.*
>
> *'Bigger font. See writing clearer'.*

Changes in the screen size were identified as a feature of the iPad 20 times, with 14/20 of the instances referring to how the iPad differed in the page layout in condition 2 (landscape orientation with 2 pages visible) and condition 3 (portrait orientation with 1 page visible). Only 2/20 units referenced a bigger / full screen.

> *'The iPad [in condition 2] looks like a book, whereas the iPad (in condition 3) looks a bit like a piece of paper'.*
>
> *'In condition 3 there is just one page on the screen, but in condition 2 there are two pages on the screen'.*

The variations in orientation were identified on 19 occasions, with most (14/19) referencing that the orientation could be changed between landscape and portrait on the iPad, and that it will sometimes change automatically if you alter the way you hold the iPad. In 3 instances, preference was expressed for the landscape orientation,

although there was disagreement (1 reference each) as to which orientation made reading quicker.

The ability to turn a page by drawing your finger across the screen was identified as a feature 15 times. On a number of occasions the touchscreen was referenced as easier to use than turning a page. It should also be noted that on 5 occasions, the participants highlighted that it is difficult to flick through 'chunks' of a book on the iPad. The participants also identified that the larger the text, the more page-turning required.

'Touchscreen is easier'.

'You can flick the page on the iPad'.

'You can't flick through pages on an iPad'.

Other features, that were coded less than 10 times, included:

Feature	Frequency of coding	Comment	Sample quote(s)
Screen brightness	10	The capacity to change the brightness the most commonly identified (7/10). The iPad screen was identified as reflective (1/10) and there was disagreement (1 reference each) as to whether the brighter screen aided reading.	*'iPad can be brighter / dimmer'.*

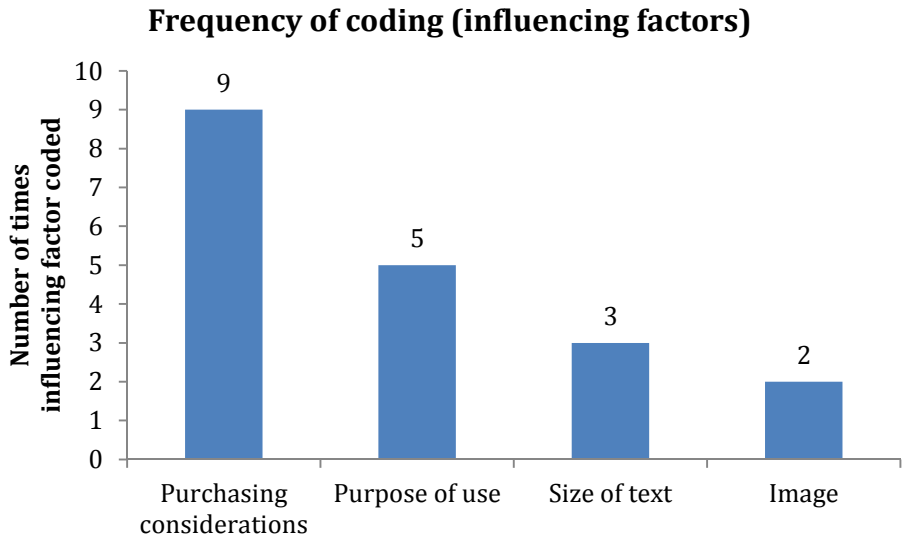
Feature	Frequency of coding	Comment	Sample quote(s)
Screen colours	8	This focused on the ability to change the colour of the text and the background. 2 of the references were to the theme being changeable (a different route to the same outcome), whilst the other 6 references commented on the greater clarity experienced with the iPad screen.	*'iPads are easier to read on because books can be, like, black and white, and iPads have got more colour in and you can read it properly'.* *'The words were clearer on the iPad than looking on the book'.*
Navigation	7	4 references were made to the automatic bookmark within the iPad, which allows an e-book to reopen where it was left. The search capability was referenced once, even though this feature was not explored in this study. One participant indicated that they believed it was easier to 'get going' with a book (there was no device to turn on and app to find).	Not applicable.
Screen, other	1	Refers to a participant identifying the presence of a screensaver in their questionnaire response. If anything, this highlights how the questions asked may have been misconstrued on occasion.	Not applicable.

Table 36 – Features identified / coded less than 10 times.

Factors that may influence the use of an iPad for reading (area two of four)

The second grouping of categories (comprising 4 categories) were not features of an e-book or the iPad, per se, but were identified by the participants as such. The categories

may not represent features of an e-book or the iPad, but they are likely to be influential in the decision a struggling adolescent reader makes to decide whether to read or not. It is likely these categories were elicited as a result of the way the questions were posed ('what is the difference between…?'), as all of the references were from the focus groups, not the questionnaire. These categories were identified less than other categories, and there were fewer associated subcategories.



The factors, all coded less than 10 times, included:

Figure 34 – Frequency of coding (influencing factors).

Influencing factor	Frequency of coding	Comment	Sample quote(s)

Influencing factor	Frequency of coding	Comment	Sample quote(s)
Purchasing considerations	9	Two-thirds (6/9) of the units related to the purchasing considerations expressed concern about the price of iPads. Whilst there was some (facilitator-led) discussion in the focus groups regarding the trade-off between a more expensive device holding a larger number of less expensive books, the participants were generally more focused on the 'up-front' cost. The other 3/9 references were to the absence of 'blurb' on the back of a book on an iPad, which is an important factor in helping people choose which book to read.	*'An iPad costs more than book'.* *'No blurb on the iPad'.*
Purpose of use	5	Whilst only 5 units were coded to the 'purpose of use' category, they illustrate an interesting, if generally unrecognised, dilemma the participants face. 4/5 of the references were to the fact that iPads had a wider functionality than books and were, therefore, likely to be more distracting for readers. The other reference was related, in that one of the Y9 groups indicated books were for work, with perhaps the unspoken implication that an iPad had wider applicability.	*'A book is just a book, and then an iPad is more so you can get distracted'.* *'If you're reading the iPad and you get bored you can just go and play a game'.*

Influencing factor	Frequency of coding	Comment	Sample quote(s)
Size of text	3	Whilst there were few references to this category, the size of a book (its depth, which participants seemed to equate with difficulty), is an important consideration for readers, especially those that may struggle to read.	*'With the book you can see how big the book is but with the iPad you can't see how many pages there are'.* *'[A book] doesn't look so big on the iPad, so, like, you're not worried about the size of the book'.*
Image	2	Lastly, the 'image' category was created as the same participant, twice, referenced that iPads were deemed to be 'cool'. Whilst the majority of the participants did not identify this as a 'feature', it is nevertheless likely to bear a degree of significance when struggling adolescent readers are choosing whether to read or not. Indeed, this may be a more significant factor than all those detailed previously.	Not applicable.

Table 37 – Factors identified / coded less than 10 times.

Qualities associated with iPads (area three of four)

There were 3 categories specific to the qualities iPads that were present in the top 10 of categories in terms of how frequently units were coded to them.

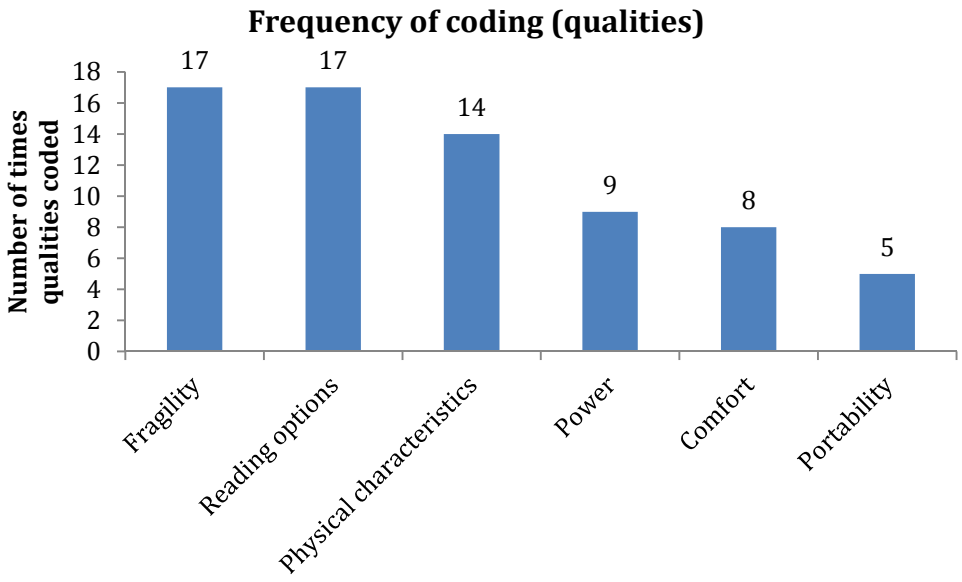


Figure 35 – Frequency of coding (qualities).

The fragility of an e-reader (iPad) in comparison to a book was referenced on 17 occasions, always in the focus groups. 7 of the instances were comments specific to books (that they can be torn but they cannot be smashed). The remainder of the comments (10/17), however, were related to the (perceived) fragility of the iPad – that they are more likely to smash, break, freeze and lose their memory.

> *'[On the iPad] magnetic things wipe out the memory'.*
>
> *'iPads can smash'.*

There were also 17 references to the wider range of books available on an iPad compared to a single book. That an iPad can hold more than one book was referenced 10 times, and that a selection from the choices was easy was mentioned a further 5 times. The large memory and the up-to-date selection of book were both

> *'If you couldn't decide what book you wanted, you can shuffle up the books [in the iPad library] and pick what one you want'.*
>
> *'On the iPad there is different books'.*
>
> *'You can store loads of books at home.' 'But it takes up lots of space'.*

identified as a feature (once each). This category was sometimes linked to discussions about the expense of an iPad and the fragility of the memory.

The physical characteristics (differences) of an iPad were identified as features on 14 occasions. Half of those references were focused on the paper vs. electrical distinction between an iPad and a book. 3 further references were made to the different sizes of books against the uniform size of an iPad. The apple logo on the iPad was referenced twice. Finally, one written comment was submitted on the 'feel' of the book, and the buttons on the iPad were observed. Interestingly, again, these comments may possess much more significance than a count of how frequently they were mentioned suggests.

> *'Books feel nice'.*

Other qualities, that were coded less than 10 times, included:

Quality	Frequency of coding	Comment	Sample quote(s)
Power	9	All 9 of the units coded to the power category related to the need to charge an iPad but not a book.	*'Books don't run out of power'.*
Comfort	8	Three-quarters (6/8) of the comments coded to the 'comfort' category referenced the fact that iPads were deemed easier to hold and keep open than books, and therefore more comfortable. One participant noted in the questionnaire that 'It [the iPad] didn't hurt your eyes'. That books can lead to paper cuts was also noted.	*'It [the iPad] was more comfortable'.* *'It's hard to keep the book open'.* *'iPads are easier to hold'.*

Quality	Frequency of coding	Comment	Sample quote(s)
Portability	5	All of the comments related to the weight of an iPad (1 referenced they were heavy, 1 that they were light, 3 references were made to the fact that iPads could be carried around more easily than multiple books).	*'You can carry an iPad anywhere whereas you can't carry a book everywhere'.*

Table 38 – Qualities identified / coded less than 10 times.

Evaluative comments on the impact of iPads on academic / non-academic outcomes (area four of four)

42 units were coded to 7 categories where the participants made comment regarding the impact of using the iPad. In most of these situations the comments were not tied to a specific feature or quality, but a general perspective shared on the iPad.

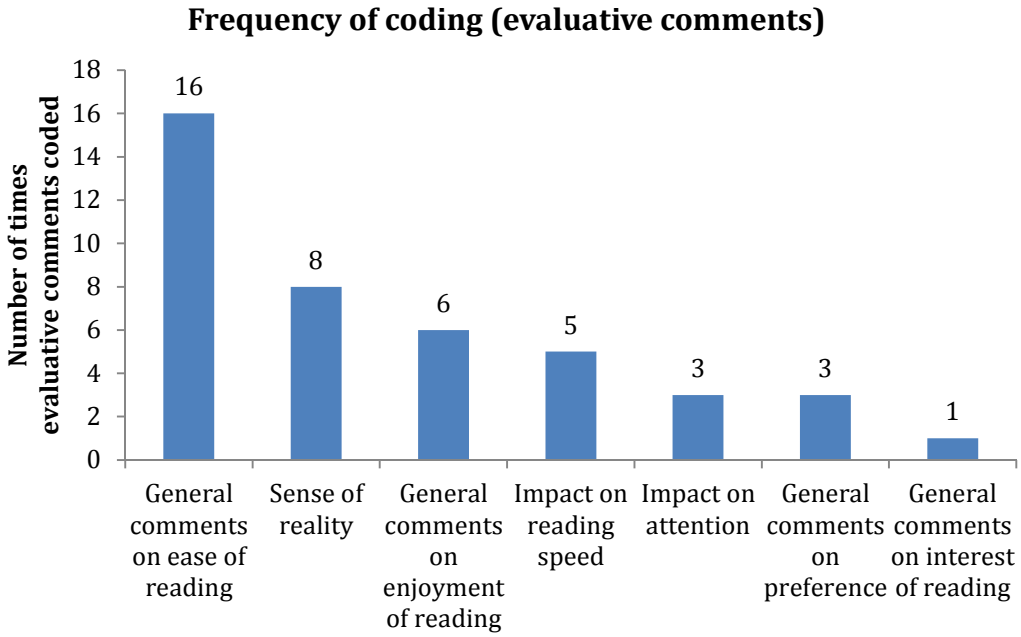


Figure 36 – Frequency of coding (evaluative comments).

15/16 of the comments regarding the ease of reading stated that the iPad was easier to read than the book. This was consistent in the questionnaire (where 9 of the 30 participants made a related comment), the written element of the focus group and the verbal reports in the focus group. There was a lone dissenting voice (1/16) who stated that the book was easier to read. As stated on a number of occasions previously, an acquiescence bias should not be ruled out.

> *'I found it [condition 3] the best option. The font, colours and position of the text made it very easy to read'.*
>
> *'[Condition 3] was easy to read with the speaker who read out the words'.*

Other comments, that were coded less than 10 times, included:

Evaluative comment	Frequency of coding	Comment	Sample quote(s)
Sense of reality	8	A number of the participants observed how the iPad could be made to look like a book (6/8 units). The other 2 references were both linked to the familiarity of the book, and how it was more 'real'.	*'The book felt 'real'.* *'The book made me feel like I am at home with a book in my hands'.* *'[Condition 2] looked more like a book'.* *'One [condition 2] looks like a book, but the other one [condition 3] doesn't'.*

Evaluative comment	Frequency of coding	Comment	Sample quote(s)
General comments on enjoyment of reading	6	In response to the questionnaire, there were 6 general references to how the conditions impacted the participants enjoyment of reading, likely as the participants had had the purpose of the study explained to them fairly recently. In most cases the comments were generalised to the iPad, rather than condition 2 or 3. 5/6 of the references stated the iPad conditions enhanced their enjoyment, with 1/6 finding the book condition more enjoyable.	*'Condition 3 was fun to read'.* *'I really enjoyed reading on the iPad'.* *'I enjoyed the iPad more'.* *'The iPad was more enjoyable than the book'.* *'I liked the iPad most'.*
Impact on reading speed	5	In the questionnaire answers (4/5), it was deemed slower to read the book and quicker to read on the iPad, even though that was not borne out by results elsewhere (section 4.2). There was a solitary reference to it taking longer to read in condition 3.	*'You can read faster on the iPad'.* *'The book felt longer to read'.* *'I read the most [in condition 3]'.*
Impact on attention	3	On 3 occasions the impact on the participant's attention was highlighted. Condition 3 was believed to help attention (2/3 references), with condition 2 hard to follow and concentrate on (1/3 references).	*'I found it hard to follow and concentrate on the story [in condition 2]'.* *'[In condition 2] I had to focus'.* *'I was focused more looking at the iPad than looking at the book'.*

Evaluative comment	Frequency of coding	Comment	Sample quote(s)
General comments on preference	3	These were general comments stating a preference for the iPad over the book. They did not further elaborate on why that might be the case.	Not applicable.
General comments on interest	1	One group referenced a higher level of interest in the e-book than the print book. They did not further elaborate on why that might be the case.	*'It is more interesting to read from an iPad'.*

Table 39 – Evaluative comments identified / coded less than 10 times.

4.5 The importance of features

4.5.1 Outcomes of the forced ranking exercise

The final ancillary question of this research (section 3.1) aimed to establish the iPad features that were the most important in shaping the state enjoyment of struggling adolescent readers. Using a list of the 10 features that had been manipulated in conditions 2 and 3 (section 3.4.2), the participants were asked to force rank the features based on whether they felt they were the most or least important for their enjoyment of the reading experience. Each group had to discuss and agree where the 10 features would be placed on the chart included in appendix 8 (example output: appendix 17).

Table 40 summarises the average results from across the 10 groups (results by group are in appendix 18). The features with the lowest average were identified as the most important across the groups.

Feature	Average
Having the iPad read a word out	2.3
Having the iPad tell you what a word means	2.3

Feature	Average
Making the font bigger	2.6
Using a full screen	2.9
Turning the page with your finger	3.1
Knowing where you are in the book because of the progress indicator at the bottom	3.2
Changing the background colour	3.3
Using a different font	3.3
Making the screen brighter	3.4
Holding the iPad upways vs. sideways	3.6

Table 40 – Results from the forced-ranking exercise.

The results varied across groups significantly (with little patterns apparent), and the participants found it difficult to reach a consensus on the relative importance of the features or to justify their decisions to the group. As a result, whilst the outcomes from the forced-ranking exercises were captured, there was limited justification or debate recorded. The justification, debate and outcomes recorded often seemed to reflect an individually held opinion, rather than a group consensus.

The top two features ('Having the iPad read a word out' and 'Having the iPad tell you what a word means') featured in the top row or the second row for 8 out of the 10 groups. Interestingly, the two groups that did not place these features so highly were the Y9 groups. Perhaps most importantly given the averaging of the scores from across groups, these two features were very rarely placed on the least important row.

Only two of the features ('Having the iPad tell you what a word means' and 'Using a full screen') were identified as the most important feature by two of the groups. That so many features were chosen as the most important feature only once underlines the variability in the findings.

Various other (seemingly personal) justifications were recorded in the focus groups:

In relation to	Sample quote(s)
… having the iPad tell you what a word means.	*'… Cos, if you get stuck on a word and you don't know what it means and it's really important and it ties the whole story together….' 'Yeah, but you can always go and ask your Mum what it means.' 'But if your Mum is not around, then you could just [get help]'.*
… making the font bigger and using a different font.	*'If you forget your glasses, you can make the font bigger and still read it'.* *'Because some people find it hard to read'.*
… using a full screen.	*'A full screen is important as you get more words on the page'.* *'It helps you to read it more easily'.*
… changing the background colour.	*'I find the white background more difficult. It was too bright and hard to read'.*
… turning the page with your finger.	*'It makes reading a bit easier'.*
… knowing where you are in the book because of the progress indicator at the bottom.	*'It helps to know where you are'.* *'You should know where you are…'*

Table 41 – Sample quotes from the forced-ranking exercise.

CHAPTER 5 - DISCUSSION

5.1 Overview

Table 42 summarises the research questions, predictions and results detailed previously.

Question	Prediction	Result
What is the impact on the state enjoyment of struggling adolescent readers when reading with an iPad vs. a print book?	The state enjoyment of struggling adolescent readers will increase when reading with an iPad vs. a print book.	There was a significant increase in the state enjoyment of struggling adolescent readers between condition 1 (book) and condition 3 (advanced iPad features).
Is any impact on the state enjoyment of struggling adolescent readers when reading with an iPad vs. a print book mediated by their existing level of trait enjoyment for reading?	Struggling adolescent readers with the lowest levels of trait enjoyment for reading will experience greater gains in their state enjoyment when reading with an iPad vs. a print book.	There was no significant difference in the increase in state enjoyment experienced based on existing levels of trait enjoyment.
Do struggling adolescent readers read more quickly with an iPad vs. a print book?	Struggling adolescent readers will read more quickly with an iPad vs. a print book.	Struggling adolescent readers read more slowly with an iPad than with a print book.
What iPad features are most important in shaping the state enjoyment of struggling adolescent readers?	Not applicable.	Use of the dictionary or narration (reading supports) and the ability to change the size and type of font were the most identified features. 'Having the iPad read a word out' and 'Having the iPad tell you what a word means' were the features deemed to be most important.

Table 42 – Summary of the research questions, predictions and results.

The discussion initially sets out to explore the main findings in more detail. It will then turn to a consideration of the main threats to objectivity, reliability and validity, as well as introducing a range of methodological reflections. Finally, the implications for educational psychology and educational practice more widely are considered.

5.2 Main findings

5.2.1 The impact of the iPad on state enjoyment

The results in sections 4.2.1 and 4.2.2 illustrate the increase in state enjoyment the participants experienced in conditions 1, 2 and 3. The difference in state enjoyment was significant between conditions 1 and 3, which suggests that the participants enjoyed the reading experience in condition 3 significantly more than they enjoyed the equivalent in condition 1. This was as predicted.

However, it should be noted that at least some of the increase in state enjoyment between conditions 1 and 3 seems to be attributable to the novelty of the iPad (condition 2) as well as the introduction of the advanced features (condition 3). Section 2.7.8 introduced a number of potential reasons as to why the iPad was anticipated to impact on the state enjoyment experiences of the struggling adolescent readers, and these will be elaborated on later in the discussion.

Alternative explanations for this result will also be considered later in the discussion. However, it should be noted that condition 2 was introduced (the use of the iPad, but with 'standard' features) solely to control for a novelty effect. The counterbalancing structure (where each of the six groups experienced the conditions in different orders) was introduced to control for an order effect.

Gender effects

No significant difference in the level of state enjoyment between conditions was found when comparing the gender of the participants in the study. The literature review summarised research that suggests boys enjoy reading less than girls, are more utilitarian about why they read and are less intrinsically motivated (Clark and Foster, 2005). They are more likely to be defined as 'struggling readers' who experience a range of issues related to their reading (summarised in Table 7). As a result, the introduction of an iPad could be expected to make a bigger difference for boys than girls, as boys have more to gain (they have lower expectations of reading).

Whilst the difference in state enjoyment between girls and boys was not statistically significant (likely because of the small sample size and the imbalance between genders), the pattern of results evident in Figure 23 is consistent with this expectation. Boys showed lower overall levels of state enjoyment within the study, but the state enjoyment they experienced increased through conditions 1, 2 and 3. Girls, on the other hand, experienced higher overall levels of state enjoyment, but no increase was evident through the conditions. As a result, it could be argued that the gender effects were characteristic of what we expected to see, albeit not in a statistically significant sense.

Age effects

Much the same could be said to be the case when considering the changes in state enjoyment across year groups. As outlined in the literature review, when considering age effects, older children enjoy reading less (Clarkson and Betts, 2009), and they are more likely to engage in peer interactions over solitary activities (Nippold et al., 2005). They are also more likely to be defined as 'struggling readers'. Younger children, on the

other hand, are likely to be at an earlier stage of their reading development, and therefore may be expected to benefit more from features that support their reading.

Likely for the same reasons as outlined above (the small sample size and the imbalance between year groups), the difference in state enjoyment between year groups was not significant. However, Figure 25 again illustrates a pattern of results that could be interpreted (with care) to align with expectations. The Y7 participants illustrated the most significant gains in state enjoyment between conditions, and this may be as they particularly benefited from the dictionary and narration (to help their relatively less advanced reading skills). Indeed, they reported these features to be more important than their older peers. The Y9 participants, however, illustrated smaller gains overall but a gain in state enjoyment specific to condition 3. It could be hypothesised that their feelings (such as a lack of enjoyment) regarding reading are more deeply embedded than the younger participants, and therefore condition 3 had a more significant impact on their affective response.

The dimensions of state enjoyment

State enjoyment was measured in this study using a conceptualisation of enjoyment outlined by Lin and Gregor (2006). In this conceptualisation, enjoyment comprises engagement (focused attention), positive affect (positive attitude / good feelings) and fulfilment (satisfaction of a need or desire). As noted in section 4.2.4, the questions related to engagement in the questionnaire were scored the most highly by the participants, regardless of the condition, suggesting that reading necessitates focused attention as a priority. Positive affect was the second highest scoring dimension.

Consistent with this finding, the four-phase model of interest development (Hidi and Renninger, 2006), outlined in section 5.5.2, describes the early phases of interest development as primarily consisting of focused attention (engagement) and positive feelings (affect). Ainley (2006) further draws out the relationship between affect and engagement by contending that interest, when undertaking a new task, represents an 'affective state that involves feelings of arousal, alertness, attention and concentration' (p. 399). She concludes that 'triggering interest activates a system that generates positive feelings… [and] focuses attention' (p. 402). That the participants identified the primary contributors to state enjoyment as engagement and positive affect is consistent with this position.

5.2.2 How existing levels of trait enjoyment of reading impact on state enjoyment

As with the year group and gender characteristics of the participants, an imbalance in how participants reported their existing level of trait enjoyment of reading (with over two-thirds occupying the middle of the three options) may have impacted the significance calculation. Accordingly, no significant difference in the level of state enjoyment between conditions was found when comparing the existing level of trait enjoyment of the participants.

It was hypothesised that those with the lowest level of trait enjoyment of reading would be most significantly influenced by the introduction of the iPad. As it was, per Figure 21, those who reported they enjoyed reading 'not at all' (5/30) did report lower state enjoyment overall, but any increases in state enjoyment were reported during the introduction of the iPad (not the advanced features). Those who reported they enjoyed reading 'a little' (20/30) represented the overall picture found (increasing state enjoyment through the conditions). Interestingly, those who reported they enjoyed

reading ‘a lot’ duly indicated their level of state enjoyment declined when the iPad was introduced. This is consistent with a reversal of the prediction that was made: those with the highest levels of trait enjoyment for reading will experience fewest (or no) gains in their state enjoyment when reading with an iPad vs. a print book.

The analysis above refers to how trait emotions impact on state emotions, and whether there was a predictive relationship between the two evident for this population. Later, the discussion will turn to considering how changes in state emotions may impact on trait emotions, which may be more relevant to educators considering how to reengage struggling adolescent readers with reading.

5.2.3 The impact of the iPad on reading speed

As stated in section 4.3.1, the introduction of the iPad (condition 2) and the advanced features (condition 3), slowed down the reading of the participants. As condition 1 (a book, with two pages in landscape) and condition 2 (the iPad, with two pages on a landscape screen, per Figure 9) were set up in the same way, it could be hypothesised that the introduction of the iPad itself caused the participants to read more slowly. Furthermore, the introduction of condition 3 (with one page on a portrait screen, per Figure 10) further slowed reading speeds.

This finding is at odds with the conclusions of Wilkins et al. (2009), who argued that bigger text and certain fonts lessened visual demands and perceptual distortions, and therefore increased reading speed (and accuracy). Wilkins et al. (2009), however, were not using e-books in their study. The findings are, however, consistent with those from the readability study conducted by Nielsen (2010) and a print book / e-book comparison completed by Maynard and McKnight (2001). The findings from this study

suggests that that the advanced features of the iPad (including the dictionary and narration, that were accessed just under four times in the fifteen minutes of condition 3), and the iPad itself, had a cumulative effect of decreasing reading speeds.

In section 5.2.5 there is discussion about the process by which the iPad may impact the state enjoyment of struggling adolescent readers. It seems conceivable that slower reading (allied to the use of the dictionary and narration) will result in the reader taking more time on each word and understanding more of the content. It is reasonable to assume that an increase in understanding is likely to improve the reading experience and enjoyment of the text.

5.2.4 iPad features

Almost a third of all items identified by the participants as a 'feature' of the iPad related to the use of the dictionary, narration and the font changing capabilities. Interestingly, however, the number of times the dictionary and narration were accessed did not correlate with an increase in enjoyment. Based on the premise that the iPad features make reading easier (discussed in section 5.2.5), it is reasonable to suggest that as the features are used more there would be a related increase in enjoyment. This was not evident, however. It may be that there is a methodological explanation for this (the number of times the dictionary and narration was used was self-reported).

Alternatively, the dictionary and narration may make reading more enjoyable, but not increasingly so the more they were accessed. The dictionary and narration were accessed, on average, just under four times in the fifteen minutes of condition 3. It is conceivable that the use of the dictionary and narration contributed to the increase in enjoyment, even in the absence of a correlational relationship. Lastly, as highlighted by

Grimshaw et al. (2007), the language in the dictionary was not always age appropriate, and this may have impacted the use extracted from this feature. In two cases, participants started to use the narration continuously, underlining the possibility that a text-to-speech capability can become a crutch (Rinkel, 2012).

Additional comments made specific to the dictionary and narration indicated the participants felt these features aided comprehension. As argued by Cremin (2007) this is likely to help the pursuit of meaning in reading.

Commentary regarding the font changes suggests that the ability to change the size of the font was recognised by participants more than the ability to change the type of the font. Their comments, as predicted, suggested that the bigger text made for easier reading, which may be attributable to lessened crowding effects and visual stress (Hughes and Wilkins, 2002).

Other features were identified with less regularity by the participants. The orientation of the screen (landscape to portrait), the number of pages visible (two to one) and the use of a full screen all attracted comment, but with limited preference expressed. Various authors (Davidson et al., 1997; Landoni et al., 2000) have outlined the importance of respecting the book metaphor, but the participant's responses suggest that if this was important to them, it was unconsciously so. This appears also to be the case for features such as the brightness of the screen and the colour of the text and background. Lastly, it may be that participants took for granted the presence of features such as the touchscreen. For digital natives already familiar with iPad capabilities, such a feature may be of 'assumed' relevance. Alternatively, it may be that the form of questioning led the participants away from identifying such an 'obvious' difference between the book and the iPad.

As stated in section 4.4.2, the participants identified a number of other 'features', that were not features as defined in the literature review. Nonetheless, these additional factors represent valid considerations for struggling adolescent readers. Whilst the e-books read on the iPad did not offer opportunities for incongruent distractions (such as hotspots linking to external websites), participants recognised that the additional capabilities of the iPad (surfing the internet, accessing email, communicating face-to-face, using apps) represent potential distractions to reading. Equally, two blogs (Jenna Scribbles blog, 2011 and Aimee Daniells blog, 2011) and research specific to the aesthetic relevance of books (Reuter, 2007) support the view articulated by some of the participants that e-books mean struggling readers are less likely to be intimidated by thick print books.

A range of qualities were identified by the participants, including that iPads are likely to hold a number of e-books at once and are portable. As iPads, and such devices, become more commonplace, issues related to power supply and their fragility may become more relevant (to educators, if not children).

The outcomes of the forced-ranking exercise mirrored the first focus group exercise, as the features identified most often were also identified as more important. Interestingly, however, the dictionary and narration were not identified as so important by the Y9 groups (compared to the Y7 and Y8 groups). This suggests that reading aids may become less relevant as reading age increases.

5.2.5 The impact of the iPad on reading enjoyment

Figure 6 introduced a number of potential routes through which the iPad may have influenced the state enjoyment of the participants. Certainly the balance of 'preference-

based' comments collected from participants through the study suggested that participants felt the iPad was easier to read than the print book. That the dictionary and narration were identified most often and felt to be most important suggests that their support to help make reading easier was recognised by the participants. It should be noted that the e-books used (on an iPad rather than a computer) did not feature as many interactive features or multi-modal forms of presentation as previous studies may have been based upon. This brings into question which features (dictionary, narration, graphics, hotspots etc.) it is that 'make reading easier' by lessening the decoding burden.

The participants, however, referenced the psychological impact of the iPad on a number of occasions through the focus groups. Indeed, it seems likely that the reassurance the participants may have gained from being able to access 'clues' to meaning on their own terms would go under reported by a population recognised to have low self-confidence and self-efficacy (Wigfield et al., 1998).

In alignment with the arguments outlined in section 2.7.8, the control-value theory of achievement emotions (motivation) (Pekrun, 2006) contends that fostering the perceptions of competence and control of students is central to positively influencing their emotional reaction to tasks. This, he suggests, is achieved by influencing the control appraisals (such as 'can this task be done?') that happen, often unconsciously, when faced with an activity. His paper states that 'the crucial question concerning control is whether success can be attained or failure avoided' (p. 319). It seems plausible that the introduction of an environmental aid, such as an iPad (with features that positively affect the reading experience), can influence control appraisals and the subsequent affective response.

Lastly, there is no reason to suggest the introduction of the iPad did not impact on the sensory reading experience of the participants, by reducing visual demands, perceptual distortions and eyestrain (Wilkins et al., 2009; Allen et al., 2009) and by increasing susceptibility to distractions as a result of haptic interference (Mangen, 2011). As stated previously, the participants found articulating the changes they experienced as a result of introducing the iPad difficult. Accordingly, whilst they may have referenced reading to be easier on the iPad, they were unable to link any changes in ease of reading to visual or haptic related factors. Equally, the fifteen minutes per condition may not have been a long enough period to interrupt the immersion and flow associated with deep engagement. In both respects, the study was not advanced enough to test these causal relationships, and, as a result, a link between the improved experience and sensory changes can only be hypothesised.

5.3 Threats to the interpretation of the findings

5.3.1 Threats to objectivity

Objectivity refers to the researcher's independence from the research to support the drawing of conclusions that can be commonly shared (Robson, 2002). Any research conducted by a single researcher, as in this case, is open to researcher bias. Most often this manifests as a personal bias (Kennedy, 1976), where only views consonant with those of the researcher are recorded. The Kuhnian critique states that this may result in flawed inferences about causes and its generalisation (Shadish et al., 2002). Awareness of this risk, and the risk-laden elements of the research (such as interactions with the participants, and completion of the qualitative content analysis) meant that particular care was taken to follow pre-defined procedures in a rigorous manner. Nevertheless, as stated previously, the critical realist position taken in this research lends itself to

drawing probabilistic and equivocal conclusions based on the recognition of this threat to objectivity.

Finally, regardless of the consistently deployed information sharing procedures, it is possible that some of the participants understood the research design and an acquiescence effect coloured their questionnaire responses.

5.3.2 Threats to reliability

Reliability refers to research tools being standardised, neutral and non-biased to produce results that are accurate and stable over time (Mason, 2002).

The source questionnaire used in this study had high reliability (Lin et al., 2008) and changes to the questionnaire were rigorously piloted. One area that may have impacted on the reliability of the findings was the time period (fifteen minutes) used for each of the conditions. Whilst this period was selected based on the views of teachers and students as to what was a reasonable time for a struggling reader to read independently for, other studies have found that a longer exposure to an e-book increases the reliability of the results. Johnston (1997) found that exposure to an e-book of less than 300 minutes produced erratic findings, and that may be the reading was not significantly 'immersive' (Colombo et al., 2012) in such as short period. Pattuelli and Rabina (2010) concluded that one of the study limitations related to 'the short time allowed for device use' (p. 242), and their participants had exposure to the Kindle for a week. It should be noted that neither of these studies focused on measuring state enjoyment of the reading experience.

The focus group structures were also designed to ensure the participants views were honestly elicited, and data recording and analysis was completed in a systematic and accurate manner (Mason, 2002).

5.3.3 Threats to internal validity

Internal validity refers to the extent the structure of a research design enables unambiguous conclusions to be drawn from the results (De Vaus, 2001).

A relatively small sample size of thirty participants lessens the validity of the conclusions drawn within the study. Breaking down the sample even further (to consider age and gender effects, for example) further limits the validity of the findings. As a result, only tentative suggestions are made regarding age and gender effects, and these areas form the basis of suggestions for further research (contained in chapter 6).

A central question in the study relates to whether the state enjoyment experienced in each condition represents a valid indicator of 'reading experience'. It became clear in the focus groups that conceptualising enjoyment was challenging for the participants, and enjoyment of reading was frequently conflated with ease of reading. On a couple of occasions, participants referred to what may be characterised as a positive reading experience, and the factors they referred to (feeling comfortable when reading, being at home) were external influences outside the scope of this study.

As outlined in section 3.5.1 there was a relatively high degree of confidence that the questionnaire had high validity. Part of the reason the mixed methods approach was used was in an effort to boost the validity of the findings (Mason, 2002), and the data gathered in the focus groups was triangulated with the questionnaire data where possible.

It seems likely that the introduction of an e-book represents one factor usually required for an increase in state enjoyment to occur, but other factors (and how they relate to each other) remain unclear. The causal relationship between the two is accordingly represented as probabilistic not deterministic (Eells, 1991), whilst being recognised as time and context dependent (Shadish et al., 2002). This is one of the ontological assumptions detailed in Table 16.

Plausible rival hypotheses

Gorard (2001) argues that an important part of drawing convincing conclusions from research is to consider alternative explanations, a process Shadish et al. (2002) refer to as fallible falsification.

As stated previously, the counterbalancing structure was introduced to control for the possibility that any state enjoyment reported in condition 3 was as a result of prior conditions (an order effect). The mis-assignment of participants into their groups is not believed to have impacted on the effectiveness of the counterbalancing design. Condition 2 (the iPad with standard features deployed) was introduced to control for the possibility that the introduction of the iPad, regardless of its features, would result in an increase in state enjoyment. The results indicate that an increase in state enjoyment can partly (but not fully) be explained by a novelty effect (the increase in enjoyment from condition 1 to condition 2), as there was also an increase in state enjoyment from condition 2 to condition 3.

There is a possibility that an increase in enjoyment came at the expense of the reader's comprehension, and the readers enjoyed conditions 2 and 3 more as they were able to 'swipe' through pages in the e-book irrespective of whether they understood the

content. If this is the case, the enjoyment gains may be attributable to a sense of progress and achievement, not the features deployed. The pilot questionnaire included two 'dummy' questions to assess comprehension in order to 'keep the readers honest', but it was deemed impractical (and unreliable) to sustain this within the main study. As a result, it cannot be discounted that the increase in enjoyment came at the expense of comprehension.

Finally, the internal validity of a study rests on how specifically the causal relationships have been investigated. In the focus groups the participants were asked to identify relevant and important features of the iPad when reading. The number of generic comments regarding tangential (at least to the focus of the research) considerations as well as stated preferences without associated rationale suggests that a proportion of the features were hard to identify for the participants. It is conceivable that some of the features influenced the reading experience so subtly that the participants were not consciously aware of them. If this is the case, then it is possible that no single isolated facet of an electronic reading experience is important on its own, but only alongside the other features of the iPad.

5.3.4 Threats to external validity

External validity refers to the extent the results from a study can be generalised beyond the particular study (De Vaus, 2001). Concerns regarding the external validity of social science research often relate to participants as individual agents who are capable of unpredictable behaviour (Thomas, 2007). As a result, Thomas (2007) introduced the concept of 'pure contingency' to account for the myriad happenings in everyday life that cannot be factored into any social situation. Generalisation here, therefore, represents a

best estimate of trustworthiness in an attempt to provide theoretical, rather than statistical, generalisability (Sim, 1998).

As stated previously, some of the significant difference in state enjoyment experienced by the participants between conditions 1 and 3 was attributable to a novelty associated with the use of an iPad (condition 2) and the remainder to the deployment of the advanced features (condition 3). As a result, it is impossible to definitively state to what extent the novelty of the iPad vs. the generic e-reader features were responsible for the significant changes in state enjoyment. However, the focus group findings suggest that the results gathered in this study should be generalisable to other e-books, as long as the e-books possess the features the participants identified as important to their reading experience. One of the strengths of the iPad is its wider functionality (surfing the internet, accessing email, communicating face-to-face, using apps), although this may serve as a distraction to struggling adolescent readers. Later in the discussion the future of e-books as hubs of multi-modal collaboration is discussed, and the presence of wider iPad functionality may ease this transition. Lastly, mindful of the comments made earlier about the totality of the reading experience, it seems likely that the wider features of the iPad that enhance its usability (the touchscreen, the options for screen orientation) may well be important for readers, even if the participants in this study did not recognise them as so (Lund et al., 2011).

The central limitation of this study, however, was that only the state (immediate) enjoyment associated with the conditions was investigated. As a result, there is no data to support the temporal generality of the findings (Pekrun, 2006) and whether changes in state enjoyment in the short-term are likely to impact on longer-term enjoyment, attitudes and habits regarding reading.

Section 2.3.3 introduced state and trait emotions, indicating that they can primarily be differentiated according to the generality of the situation they refer to (Goetz et al., 2006). Rosenberg (1998) delineated these levels of affect (traits, moods and emotions) and stated that traits were likely to last longer, be more pervasive in terms of how conscious people are of them and be broader in their impact. Emotions (states) were likely to be shorter lasting, less pervasive and narrower in their impact.

Ainley (2006) highlighted the importance of acknowledging the range of possible relations between trait and state affect, and most authors assume a bi-directional relationship between the two (Goetz et al., 2006). Whilst there is certainly evidence for a top-down influence of trait on state affect (Plattner et al., 2007; Rosenberg, 1998), the interest in this study rests on any evidence of a bottom-up influence. Based on their study, Goetz et al. (2006) concluded that 'trait emotions may be conceptualised as cumulative state emotional experiences' (p. 325) and their hierarchical conceptualisation of enjoyment in students has activity-specific experiences of enjoyment exerting a significant effect on situation-specific experiences of enjoyment. This builds on Rosenberg's original work to organise levels of affect, which had emotions exerting an influence on moods. Rosenberg (1998) concludes that 'stability in certain types of emotional states across similar situations makes sense as a way of defining an affective trait' (p. 254). In conclusion, it is with a sense of tentative confidence that we can hypothesise that an improvement in state enjoyment is likely to increase trait enjoyment of reading. Of course, once readers choose to read for pleasure, the benefits then begin to accrue (Clark and De Zoysa, 2011).

5.4 Methodological reflections

5.4.1 The questionnaire

It was important to read the questionnaire items out loud with the participants to ensure they understood them, and this was especially the case for those with a lower reading age. However, it became clear that asking the participants to complete the same questions on three occasions was a somewhat repetitive activity for them. Identifying the number of pages read in each condition was also a complicated exercise (that required comparison between the e-book and the print book) in which the participants needed help.

The central concern with the questionnaire, however, was that asking the participants to provide a retrospective rating on how much they enjoyed a condition was not guaranteed to accurately reflect the state they experienced while doing the task (as noted by Ainley, 2006). However, the majority of state affect measurement techniques are self-report based as there are fewer more sophisticated (real-time) alternatives.

5.4.2 The focus groups

The Y8 focus group had too many participants, and this affected the quality of the written and audio outputs. Logistical factors led to this larger focus group, but two smaller groups would have been preferable. The size of this group may also have violated the fourth of the Lederman (1990) focus group assumptions: that group dynamics will make the generation of views more likely. There was also the risk present that the group dynamics in all the focus groups, and the associated recording / analysis process, overemphasised the consensus in the groups. As Sim (1998) stated, 'an apparent conformity of view is an emergent property of the group interaction, not a reflection of individual participants opinions' (p. 345).

The activities introduced in the focus groups were important as the participants, generally, struggled to verbalise their views, and the activities offered a non-verbal alternative to meeting the second of the Lederman (1990) focus group assumptions (that participant's views can be put into words). The activities helped reveal the range and nature of views, but it was more problematic understanding the relative strength of views (as noticed by Sim, 1998).

Breaking down each of the focus groups to work on the activities in smaller groups lowered a number of barriers to involvement (per Table 26), but it also meant that some of the small group debate went unrecorded. Recording of all of these small group discussions was not feasible, and it was decided that the written and audio outputs were an accurate reflection of the group discussions and subsequently worthy of analysis. Some of the participants found working collaboratively difficult, and discerning collective vs. individually-held views was a challenge during the analysis.

As a result of the procedural decisions made regarding the use of activities, the focus groups emphasised the content over the group process (Breakwell et al., 2006). Focus groups, by their very nature, provide interrelating forms of evidence, and Kitzinger and Barbour (1999) recommend paying greater attention on the group dynamics over the content. Wilson (1997) would contend that the form of data collection used in this study was more a group interview than a focus group.

Lastly, various authors (Sim, 1998) comment on the significance of the moderator in shaping the quality and usefulness of the data collected from focus groups. Whilst there were various successes evident in gently drawing the participants into sharing, refining and explaining their views, the presence of only one moderator is likely to mean that opportunities for better understanding the participant's views were missed. A second

researcher would have served to enrich the data by taking additional notes and recording non-verbal interactions, as well as providing feedback on the moderator and the process.

5.5 Professional implications

5.5.1 The role for EPs in supporting struggling adolescent readers

O'Brien (1997) identified struggling adolescent readers as 'at-risk' students for whom the literacy curriculum represents an inflexible system that they have failed for many years. This research introduces possibilities for intervention to break the prevalent cycle of disengagement, where struggling adolescent readers lack confidence and competence, and therefore avoid reading ('the Matthew effect'; Stanovich, 1986).

Given the transformational capacity of reading, supporting the implementation of interventions that encourage struggling adolescent readers to read for pleasure is a significant opportunity for EPs. Acting as a 'critical friend' to schools (Stenhouse, 1975), EPs are able to interrogate commonly held values and assumptions about reading, challenge conventional social structures and initiate social action (Crotty, 1998). Clark and De Zoysa (2011) contend that actions that facilitate a greater enjoyment of reading are likely to lead to increases in reading behaviour and attainment (a priority for schools).

EPs have a clearly defined role in intervening 'at an organisational level, indirectly through teachers' (Department for Education; DfE, 2011; p. 5). The models outlined in sections 2.3 and 5.5.2, and the recommendations included in sections 5.5.3 – 5.5.6 should form the basis of the content made available to school leaders and teachers to increase reading for pleasure (and indirectly reading attainment). As EPs 'give

psychology away' (Macleod et al., 2007), they are able to build capacity in schools by embedding evidence-based practice and evaluating the impact of changes (Farrell et al., 2006). The letter to participants (appendix 19) and the presentation to the English department at SVC (appendix 20) represent the first steps of work in this area.

5.5.2 The four-phase model of interest development (Hidi and Renninger, 2006)

Clark and De Zoysa (2011) believe that a significant event (such as the introduction of an e-book that is accessible and enjoyable) is needed in order to kick-start changes to attitudes, behaviour and attainment. The external influence acts to break the vicious, self-perpetuating circle (Juel, 1988) to 'start the ball rolling' towards reading more frequently and improving reading attainment as a result. Based on this premise, educators are able to effect environmental changes to the reading experience of struggling adolescent readers in the belief that a reluctance to read is not insurmountable (Earl and Maynard, 2006) and reading identity is not fixed (Usherwood and Toyne, 2002).

The four-phase model of interest development illustrates how a significant event can initiate a more substantive interest in an activity. In this model, interest refers to 'the psychological state of engaging (or the predisposition to reengage) with particular classes of objects, events, or ideas over time' (Hidi and Renninger, 2006; p. 112). Ainley et al. (2002) contend that interest is important as it mediates the way in which individuals engage content, and it impacts whether individuals choose to reengage that content over time. Central to the model is the distinction between situational and individual interest, which parallels the classical trait-state differentiation in psychology (Hidi, 2001). Individual interest represents a relatively stable predisposition which emerges over time (Hidi, 2001). It contrasts with situational interest, the transitory

state of focused attention and the affective reaction that is triggered in the moment by environmental stimuli (Hidi, 2001).

The model (Figure 37) has four phases – two related to situational interest and two related to individual interest. The four phases are considered to be sequential and distinct, and represent a form of cumulative, progressive development (Hidi and Renninger, 2006). In the absence of appropriate external supports, Renninger (2000) argues that a phase can become dormant, regress or disappear.

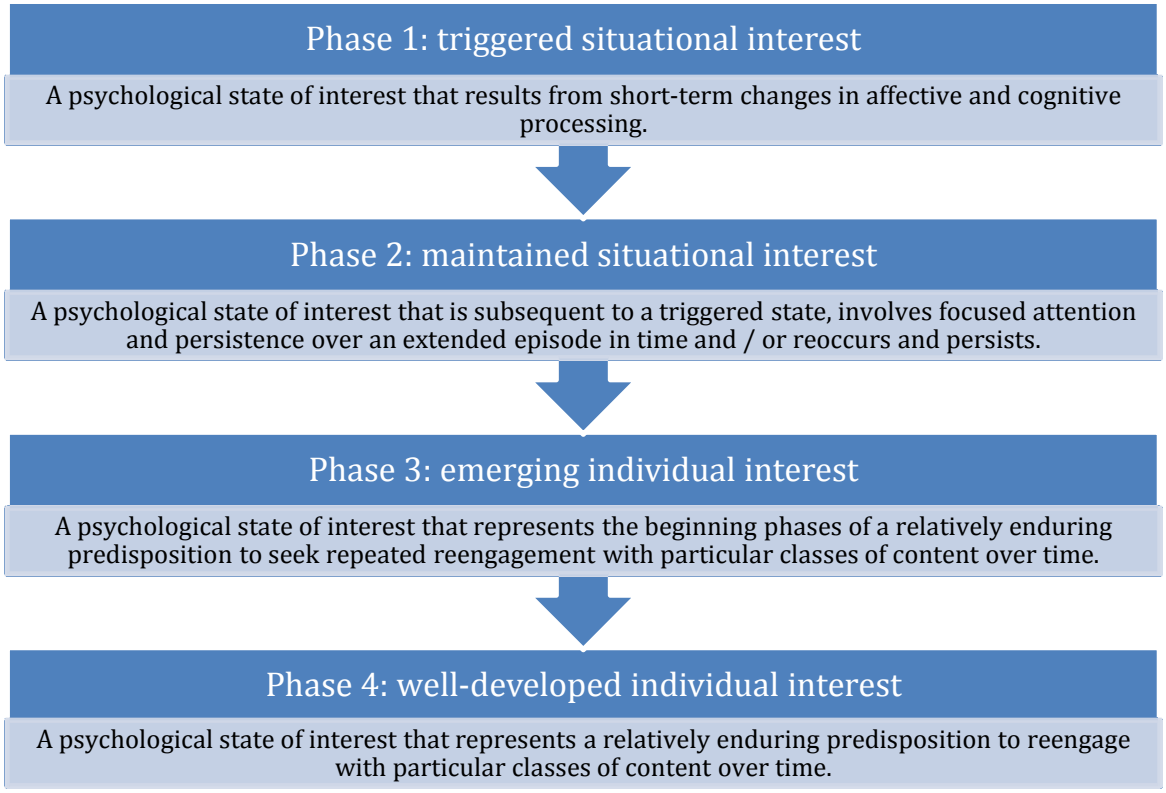


Figure 37 – The four-phase model of interest development (Hidi and Renninger, 2006).

Much as earlier it was argued that changes in state affect have the capacity to influence trait affect, this research is specifically interested in the relationship between phase 1 and the subsequent phases. The results from this study illustrate a short-term change in enjoyment (and affect) as a result of the introduction of an iPad, and this is of importance as the four-phase model contends that 'triggered situational interest may be

a precursor to the predisposition to reengage particular content over time as in more developed phases of interest' (Hidi and Renninger, 2006). The model goes onto argue that triggered situational interest is necessary in order to connect with content, which is necessary for individuals to engage in reading for pleasure (Cremin, 2007).

The sequential, progressive nature of the four-phase model of interest development supports the conclusions of Retelsdorf et al. (2011) that 'enhancing students' interest might be fruitful in terms of nurturing reading performance' (p. 550). However, Hidi and Renninger (2006) also considered alternative theories of interest development, and concluded there are no data suggesting that individual interest emerges without first being experienced as situational interest. Considering the triggering of situational learning in computer-based learning environments, Magner et al. (2012) summarised multiple studies in concluding situational learning leads to immediate learning through involvement in the task and increased comprehension and recall. They went onto underline the role of situational interest in fostering further learning, engagement, self-regulated learning, elaboration and effort.

5.5.3 The role of learning materials

In the four-phase model of interest development, the first phase is also the most externally oriented of the four. The model argues that situational interest can be triggered by environmental changes, such as the introduction of alternative media.

The studies in this area, however, whilst showing the importance of personalisation and choice (Cordova and Lepper, 1996) and independence (Mitchell, 1993) have either been unrelated to reading (Magner et al., 2012; Hidi et al. 1998; Cordova and Lepper, 1996;

Sloboda and Davidson, 1995; Mitchell, 1993) or did not have access to the technological capabilities available today (Hidi and Baird, 1988).

Lepper and Cordova (1992) utilised early generation desktop computers to investigate whether 'appropriately designed motivational embellishments to a learning activity' (p. 192), that meant activities were more fun for the participants, would result in corresponding increase in learning, retention and interest. They concluded that, as long as the changes to aid motivation were congruent with the learning required, 'significant educational benefits' (p. 206) could be expected. More latterly, Ainley (2006) concurred, indicating that 'presenting new learning tasks in novel ways such as using new computer technologies triggers immediate student interest' (p. 401).

5.5.4 Introducing e-books into schools

This research has identified a number of features that appear to be important for struggling adolescent readers in order for them to access, and enjoy, e-books. For e-books to be effective, the results from this study would suggest that they must be supported by a dictionary and narration, and have various font (size and type) options. As discussed previously, it is unclear whether some of the features specific to the iPad (such as a touchscreen) are of 'assumed' importance for struggling adolescent readers, and they would only have been referenced in their absence.

There are many portable e-reader devices available to schools, and the shire county's Education ICT team offer advice and guidance about deploying new technologies into educational settings. As stated previously, iPads are more affordable to schools than previously, especially with the Apple educational discount and 'try before you buy' arrangements available. Of course, important practicalities related to breakages,

insurance and child protection all require forethought, and schools must introduce e-reader device related considerations into existing technology policies.

Nevertheless, research such as this provides an opportunity to inform and influence school procurement activities. However, it is clear that the presence of the technology on its own is insufficient to effect change and the external support and facilitative structures outlined in section 5.5.5 represent important considerations.

Mindful of the transformative potential of technology outlined in the developmental framework for integrating digital literacy (Reinking et al., 2000), it seems important not to limit our ambition for e-books and reading for pleasure. Reinking et al. (2000) identify the potential of technology to fundamentally alter the existing environment as traditional page-based literacies that respect the book metaphor are disregarded in favour of new narratives. Warren (2010) expects these new narratives to involve a wholesale revision of what constitutes a book, with e-books not only integrating definitions and narration, but also wider information from the internet as well as photos, images and three dimensional representations. E-books will exhibit enhanced links in to and out of the content, through multi-modal platforms that utilise print, images and sounds simultaneously (Unsworth, 2006). Everything about the e-book will be customisable, as readers get used to selecting the features and settings they find conducive to reading for pleasure (Warren, 2010).

It also seems likely that e-books will increasingly permit and encourage digital collaboration between readers and authors, with options to contribute to a 'global book club' (Johnson, 2009). In this capacity, e-books will not only satisfy a desire to read for pleasure (on the readers terms), but more basic desires related to feeling part of a

(digital) community and finding friendship. As Warren (2010) noted, 'the future of e-books is clearly just beginning' (p. 50).

5.5.5 The role of external support and facilitative structures

Progression through the four-phase model of interest development outlined earlier is likely to be accompanied by a shift from reliance on external support (such as peers and experts) at the early stages of interest development to internal support (Hidi and Renninger, 2006). As argued in section 2.7.10, interest in reading for pleasure is unlikely to be developed in the absence of positive adult role models and facilitative structures.

Research suggests there are a range of requirements at school and home in order to engender reading for pleasure, irrespective of whether an e-book has triggered situational interest. The first is to provide opportunities (and time) for children to read for pleasure (Nippold et al., 2005). At school, this is likely to mean balancing the importance of reading for pleasure with the national requirements related to phonics development (DfE, 2012). Time set aside for reading should be in a conducive environment (Allington, 2001), so reading can be completed silently, independently and in comfort.

Secondly, access to a variety of quality texts is crucial (Allington, 2001), whether the texts are held electronically or in print. In homes where books are scarce, children should be encouraged and allowed to take books home (Nippold et al., 2005) as children that have books of their own enjoy reading more and read more frequently (Clark and Poulton, 2011). Having a range of books is important as reading for pleasure rests on children having the freedom to choose what they want to read (Stauffer, 2007). Implicit

in this is a rejection of the practice whereby books are allocated based on their level of difficulty and the use of reading schemes (where books can only be read at certain levels). The choice of books, made by the reader, should be dependent on which books are deemed to be interesting, enjoyable and appealing (Solity and Vousden, 2009). This involves a concurrent shift in emphasis from selecting books which are perceived to be matched to children's skill levels to selecting books that they most want to read or would engage, motivate and interest them (Solity and Vousden, 2009). Earl and Maynard (2006) characterise this as a shift from reading-centred approaches to person-centred approaches as preferred reading materials are noted and encouraged (Nippold et al., 2005). A charity called Quick Reads commissions well known authors to write short books that are easy to read, and these would often be suitable for the participants in this study.

Thirdly, educators must recognise the role of extrinsic motivators to reading. These may take the form of incentives and rewards to increase the volume of reading (Nippold et al., 2005), and may be facilitated through a heightened profile across the school (Government of South Australia, 2010). It is, of course, important that extrinsic motivators are only introduced alongside intrinsic motivators as, introduced on their own, they can do more harm than good (Krashen, 2004). 'Booked up' (Booktrust, 2012) and 'Rooted in reading' (Centre for British Teachers Education Trust, 2012) are example reading promotion projects.

Lastly, Nippold et al. (2005) stress the importance of encouraging parental support and coordinating approaches and opportunities between home and school. This is because, independent to the text and the environment, central to developing an interest in reading for pleasure is being read to and experiencing shared reading (Allington, 2001).

Reading for pleasure is strongly influenced by relationships (Cremin et al., 2009), and Stauffer (2007) argues that alongside the availability of books, it is critical 'to provide an ethnically, sexually, and socially diverse group of adult role models who read' (p. 418). Most models that outline how children develop independent reading skills (such as Guppy and Hughes, 1999) stress the importance of adults fading the use of cues (clues or signals) as children become more proficient in their reading. Progressively, the balance of shared reading is done by the child as they move towards independent reading for pleasure. Reading also provides an opportunity for peers to collaborate supportively, and for role models to positively influence practice through discussion groups and buddy schemes (Stauffer, 2007).

5.5.6 The importance of reading for pleasure

Almost irrespective of the role of e-books in triggering situational interest, it seems important to underscore how central an enjoyment of reading is to reading attainment. The only comprehensive study of reading interrelationships concluded that an enjoyment of reading relates to reading attainment directly, and also indirectly through reading behaviour (Clark and De Zoysa, 2011). Readers can be coerced or forced to read, but if the experience is not enjoyable, the behaviour change is likely to be unsustainable and the associated increase in attainment will not materialise. Equally, good attitudes to reading may increase the frequency of reading, but it has no direct relationship with increases in attainment.

As well as increasing reading frequency and attainment, Table 4 details a number of the not insignificant non-academic factors associated with reading for pleasure (increases in general knowledge, self-confidence as a reader, cultural understanding, community participation and insight into human nature and decision-making). Duncan (2010)

refers to reading as helping to 'tell the stories of who we are' (p. 15), and the fundamental role reading can play in developing a more positive self-identity.

Both Clark and Rumbold (2006) and Cremin (2007) detail a worrying decline in reading for pleasure, and it seems possible that any short-term attainment gains evident come at the expense of the long-term benefits associated with reading for pleasure. Whilst mindful, of course, of the attainment targets that shape most educational landscapes, there is no evidence available to suggest that the pursuit of short-term attainment gains in literacy at the expense of reading for pleasure is a worthwhile trade-off. Sheldrick-Ross et al. (2005) suggested that it is never too late to start reading for pleasure; introducing struggling adolescent readers to e-books that they can access and enjoy represents, therefore, an important, and relevant, opportunity.

CHAPTER 6 - CONCLUSION

6.1 Key conclusions

This study has shown that, for this population of struggling adolescent readers, the introduction of an iPad had a significant impact on their level of state enjoyment of reading. Whilst this effect did not hold statistical significance when breaking down the population by trait enjoyment of reading, age or gender, each of these areas showed expected emergent patterns that have shaped the suggestions made for further research. The introduction of the iPad and the advanced features also caused the participants to read more slowly. The participants identified the reading support features (the dictionary and narration) as well as being able to change the size of the font as the most important features.

The features that the participants identified as important suggest that the introduction of an iPad for reading may ease reading demands for struggling adolescent readers. The reading support features are hypothesised to aid comprehension, and the enhanced size of the font is suggested to reduce visual stress, binocular instability and accommodative anomalies. The introduction of these features may serve to influence the beliefs (expectancy-value model of achievement motivation; Wigfield and Eccles, 2000) or control appraisals (control-value theory of achievement emotions; Pekrun, 2006) of struggling adolescent readers. As a result, they may be expected to become more motivated (Mercer et al., 2003), engaged (Karemaker et al., 2010) and self-confident (Mioduser et al., 2000) about reading. Further, the four-phase model of interest development (Hidi and Renninger, 2006) suggests that a positive affective reaction to an external trigger may initiate the development of situational, then individual, interest. Those with an individual interest in an activity are likely to return to it.

6.2 Suggestions for further research

In this study, boys, those from Y7 and Y9 and those with a lower level of trait enjoyment of reading seemed to evidence the largest gains in state enjoyment (albeit gains that were not statistically significant). This suggests that there is further research to do to understand which population may benefit most from the introduction of an e-book. A larger population with additional controls would allow for further comparison between groups to understand whether there are sub-groups of the struggling adolescent reader population that may justify the investment in reading aids. Research outlined in chapter 2 suggests a relationship between how various genders and age combinations may respond to introduction of an e-book (based on the extent they enjoy, and engage in, reading), but these were unproven in this study.

Further, it would be helpful to more definitively characterise the impact of the device (the iPad in this case) vs. the features that are common to most e-books (the dictionary, the narration, the ability to change the size of the font). The sample size in this study compromised the delineation of the cause and effect of the iPad vs. the features, and further investigation might replicate this study with alternative matched devices (such as those marketed by Amazon, Google, Kobo, Nook and Sony). In the absence of a comparison, it is impossible to establish whether any of the features of the iPad had an unrecognised, or assumed, role in the increase in state enjoyment.

Lastly, the long-term impact of the introduction of an e-book on reading enjoyment, behaviour and attainment is hypothesised based on a number of theoretical models outlined in chapter 2 (such as Clark and De Zoysa, 2011). Whilst the models all have their own empirical grounding, it would be helpful to test their generalisability to the increases in reading enjoyment based on the introduction of e-books.

6.3 The future of e-books, and educational technology

It seems likely that e-books, and other technological enhancements in the classroom, suit the learning preferences of digital natives. That said, critical to the understanding of generational theories of learning is a rejection of the homogeneity of the population. Accordingly, each advance has to be judged on its merit, as features and functions differ dramatically (Dungworth et al., 2004). As argued by the NLT (2013), researchers and practitioners would be naïve to think that all advances will have a positive impact, or that all students will benefit from the same features.

Understandably, there is also concern that some of the risks associated with technological advances are as yet unforeseen. With e-books specifically, these risks comprise the presence of incongruent features and wider capabilities that serve as a distraction to reading (especially for struggling adolescent readers). There is also the possibility that some features, such as text to speech, become a crutch for struggling readers who seek to find ways of making reading easier for themselves, at the expense of their long-term reading attainment. Technological advances often risk being of interest in the short-term yet incapable of sustaining change, and the technology investigated in this study is no exception.

Lastly, it seems sensible to reflect on the developmental framework for integrating digital literacy (Reinking et al., 2000), as introduced in chapter 2. Today's generation of e-books predominantly remain faithful to the book metaphor, and represent development in the assimilation stage. Indeed, this research, for the most part, resides in the assimilation stage as it assumes new media operates in tandem with, rather than replacing, older forms of media (Roberts and Foehr, 2008). As Unsworth (2006) argues, this technology exhibits synergistic complementaries to existing books, as e-books

extend and enhance (rather than replace) traditional stories. The accommodation stage, however, argues for a more transformational approach to digital literacy. Arguably, as second generation multi-ability tablets become more widely available, this phase is already upon us, and with it is likely to come a fundamental redefinition of digital literacy, and how individuals choose to read for pleasure.

6.4 The enjoyment of reading

This paper starts and ends underscoring the importance of reading. As Buckingham (1999) concluded, 'we need to move beyond the idea that technology has consequences in and of itself' (p. 10). With technology as merely an enabler of innovative practices (Luckin et al., 2012), e-books should be viewed as a plausible route to breaking the vicious circle associated with the Matthew effects for struggling readers. The control-value theory of achievement emotions (Pekrun, 2006) outlines how emotions are linked to their antecedents and effects by reciprocal causation over time. E-books can serve as a trigger for a positive feedback loop of reciprocal causation, where the enjoyment of reading and mastery at reading begin to reinforce each other. This is important as reading can change lives in a world where literacy is both power (Freire and Macedo, 1987) and currency (Kirsch et al., 1993).

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15	Coding for the individual written contributions to the focus group exercises
16	**Coding for individual statements / utterances in the focus group**
17	Example output from the forced-ranking exercise
18	Overall responses from the forced-ranking exercise
19	Results letter to participants
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