Reading with iPads – the difference makes a difference

Dale Sheppard

The aim of our eBook project was to explore the use of an iPad as an eBook reader within the context of a primary school classroom. While many schools have embraced iPads, their use in schools is still in its infancy and this study was frustrated in some ways by the lack of resources and technological support available.

Although the students participating in the study reported an increase in engagement when using the iPad, there was not a corresponding rise in achievement. In fact, among young "low" readers, their comprehension scores actually decreased. Teachers also reported "mixed feelings" about the use of the eBook reader. At times it served as a distracter and it also frustrated attempts to engage the students in "offline" discussion, suggesting there are strong implications for pedagogy. Teachers will be required to adapt the way they teach to accommodate this new technology.

Introducing the iPad

The introduction of the iPad in 2010 heralded a new age in technological convergence and promised to bring mobile technologies into every home and classroom. With its instant access to resources, books, magazines and purpose built apps, the iPad was heralded as the affordable alternative to existing educational technologies. While the iPad had the features of an eBook reader, it also allowed access to the myriad resources of the internet; allowing users to seamlessly switch from one text to another or to delve beyond the text itself.

However, the iPad is new technology to classrooms and the introduction of anything new brings with it considerations for learning and pedagogy. As well, at the time this research project was undertaken, the iPad, only just on the market, was predicted to be a 'big iPod touch'; essentially a gaming/entertainment device. We wanted to explore the implications for this in a classroom.

Obviously at the time of the study, which took place a few months after the first iPad release, there was no real scholarly communication about the benefits of using the iPad in the classroom. There was anecdotal information and opinion coming from trials across the globe but little of this was around the specific use of the iPad as an eBook reader.

Studies of the eBook reader predominately looked at its use with textbooks and higher education. The past two Horizon Reports (New Media Consortium, 2010 & 2011) have identified electronic books as an emerging technology to watch. The authors of the 2010 report rated them as having an adoption horizon of two to three years out; in 2011, this adoption horizon became one year or less. However, the K–12 edition of the Horizon report has yet to include (as of 2011) electronic books as key to primary and secondary education.

Reading electronically impacts on the way an individual comprehends what is read. "Web text reading is different from print text reading because web text has additional features." (Sutherland Smith, 2002) It has also been noted that reading weeb text for inquiry leads to less thought and evaluation (Eagleton, cited in Corio, 2003). While our project was not using web text, we had chosen to use the eBook format of ePub. This format provided us with more than print text, as, for example, each word is hyperlinked to an inbuilt dictionary. As well, this format allowed for organised annotations. The RAND Reading study (2002) states "electronic texts that incorporate hyperlinks... introduce some complications in defining comprehension because they require skills and abilities beyond those required for comprehension of conventional, linear print".

This research project collected data from two class groups of Year Six students before and after they read two prescribed texts. Both groups read the same texts, with one group using the iPad and the other a print text. We

sought to understand:

- how the features of an electronic book would make a difference to the level of student engagement and if this would improve their understanding of a text
- if there was a significant change in the way students process content when reading an electronic book

These questions are significant for schools that intend to use iPads in all classes across the curriculum. The trend of early adoption of iPads is one that developed as this project was being undertaken and has continued to grow this year, with the perception that many schools started 2011 as 'iPad schools'. This project aimed to provide information for teachers using or considering using iPads in their classroom.

Methodology

A total of 43 Year 6 students (boys aged 11–13) were involved in the eBook trial. These were in two classes of 21 and 22. Initially, Class 1 read the text using a traditional book; Class 2 read the same text on the iPad in ePub format. Then Class 1 read a second text using the iPad, while Class 2 read the same book in the traditional format.

Sessions were 45 to 60 minutes in duration and comprised instruction, reading and activities. Three of these sessions were run each week. Students were each assigned a numbered iPad for the duration of the project. This allowed them to make their own annotations, which they could refer back to at any time they were reading the book. The project made use of qualitative data collection methods including formal and informal interviews and attitudinal surveys. Pre- and post-testing was done to determine existing ability and comprehension of the texts. Quantitative methods were used for statistical analysis.

This teacher was enthusiastic about being involved in the project but nervous about having to use technology with a familiar classroom task

Before starting the work with students, the teachers were interviewed to determine their attitudes towards the use of the iPads. One had used an iPad in a store; the other teacher had not yet had the opportunity to use one. This teacher was enthusiastic about being involved in the project but nervous about having to use technology with a familiar classroom task. Both teachers had the opportunity to take the iPads home to trial reading with the ePub format.

The choice of which texts to use was problematic. While there were a large number of public domain books available, the vast majority of these were not suitable for our Year 6 students. Likewise, our commitment to using the ePub format meant that many appropriate texts were not available. At the time of the project, publishers were still exploring methods for content delivery; most seemed to use web based systems that did not allow for the annotation available in ePub format. We aimed to use texts that fit into existing curriculum, or texts that would have been used anyway. The texts we used in the study were *The Adventures of Tom Sawyer* by Mark Twain, a public domain text from Project Gutenberg and *The Doublecross* by Chris Bell, a book from the BluePrint series published by Pearson Education.

The boys were given an attitudinal survey prior to reading to gauge their attitudes to reading, as well as gather information about their general reading habits. We also administered the fourth edition of the Comprehension Progressive Achievement Tests in Reading (PAT-R) produced by the Australian Council for Educational Research (ACER, 2008). This normed test allowed us to group the students in three separate groups (low, middle and high) based on their achievement in reading comprehension.

After each text the students were given a comprehension test. The 15-question test was created to reflect the first three levels of Bloom's Taxonomy (Knowledge, Comprehension, Application).

	Low				Middle				High			
	Strongly disagree	Disagree	Agree	Strongly agree	Strongly disagree	Disagree	Agree	Strongly agree	Strongly disagree	Disagree	Agree	Strongly agree
Reason for reading: These were negative statements (e.g. 'Reading is a waste of time.'	10	63.3	10	16.7	31.1	62.2	4.4	2.2	50.0	40.7	7.4	1.9
Reading behaviours: These were negative statements (e.g. 'I find it difficult to finish a book.')	55	25	10	10	56.7	36.7	6.7	0	58.3	36.1	2.8	2.8
Reading choice: These were positive statements (e.g. 'One of my favourite pastimes is reading.')	30	30	26.7	13.3	6.7	26.7	55.6	11.1	16.7	16.7	37	29.6
Social reading: These were positive statements (e.g. 'I like talking about the books I read.')	30	40	23.3	6.7	22.2	48.9	24.4	4.4	18.5	38.9	37	5.6

Table 1: Attitudinal data organised by achievement level (%)

	Low	Middle	High
Knowledge	0.05299	0.09131	0.44016
Comprehension	0.17753	0.46531	0.42036
Analysis	0.22616	0.074	0.10885

Table 2: Statistical data for significance (P-values) Statistical data for significance (P-values)

Attitudes to reading

The group had a generally positive attitude to reading, with only 16% of the total group reporting they spent no time reading for enjoyment. Differences were seen between the three levels and these were consistent with other studies that have shown positive attitudes to reading tend to be reflected in achievement.

Questions that focussed on the purpose of reading showed that, while reading may not have been a favourite hobby, the majority of the group were able to read when it was needed and believed strongly that reading was important. This positive attitude did not extend to sharing books or information about books. There was reluctance to express opinions or talk about the books read.

The attitudinal study showed that many of the boys read frequently online. They engaged with email, online chat (e.g. MSN) and online messages (e.g. Tweets) on a weekly rather than daily basis. Surprisingly, a large number (40%) reported they never or almost never use online chat or online messages. Searching online for information was a regular activity, while reading online news was less so.

In every area of online reading, with the exception of online messages, the low group read more regularly than the other two groups. The high group read more online messages than the other two groups, with one-third reporting they read messages several times a day. The middle group tended to search more for information than the other two groups.

There was a strong correlation between higher levels of achievement and a more favourable attitude to reading, as can be seen in Table 1. The categories were organised from the specific items asked. 'Reason for reading' included questions about the reasons participants chose to read. 'Reading behaviours' referred to the types of behaviours participants felt they exhibited while reading. The category 'reading choice' asked participants about reading as a hobby. 'Social reading' referred to the social activities associated with reading such as discussion and the sharing of books.

Achievement

At the end of each text, an achievement test was administered to the two classes. This was a single word or short answer test with 15 items based on the first three levels of Bloom's taxonomy. The items were written using question stems that corresponded to Knowledge, Comprehension and Application. Each item was given a value of 1.0 and the test was scored accordingly.

Results from each test were compared to determine if there were significant differences. A comparison of variances using the *f*-distribution was conducted to determine if there was a significant difference in the variances of the two populations. A *t*-test was then used to determine if there were significant differences in the means of the populations (depending upon the outcome of the *f*-test, a *t*-test assuming constant variance or differing variance was used). A 5% significance level was deemed to be suitable given the reasonably small sample size in the study.

The results of these tests showed little difference between the ability levels, with the exception of the low group's responses to the "Knowledge" category. When using the iPad, the scores of the students in this group were lower than when they were reading a traditional text (Table 2).

The percentage change between the two comprehension tests was calculated for each participant. In both the Knowledge and Comprehension categories Graph 1, 2 almost two-thirds of the students recorded negative or no growth when using the iPad. This was the same for a little over 50% of the Analysis category Graph 3. When broken down by ability levels, the only group that showed majority positive growth was the Low group in the Analysis category. The other categories for all three ability groups recorded negative or no growth when using the iPad.

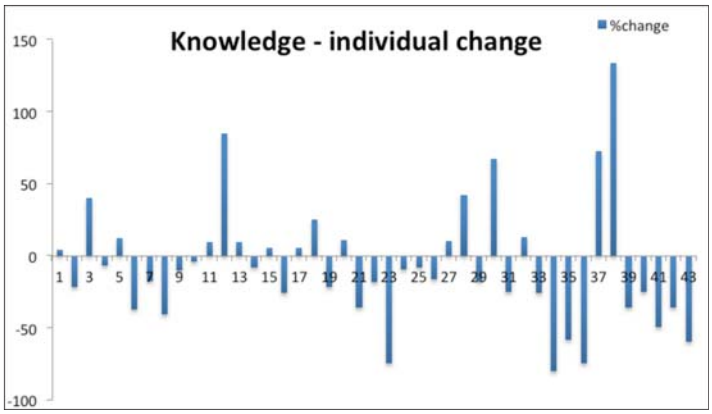
The differences in the pedagogy of the teachers involved in the study were observed. While our study was not large enough to draw definite conclusions, there was a significant difference between the percentage changes of the two classes.

Discussion

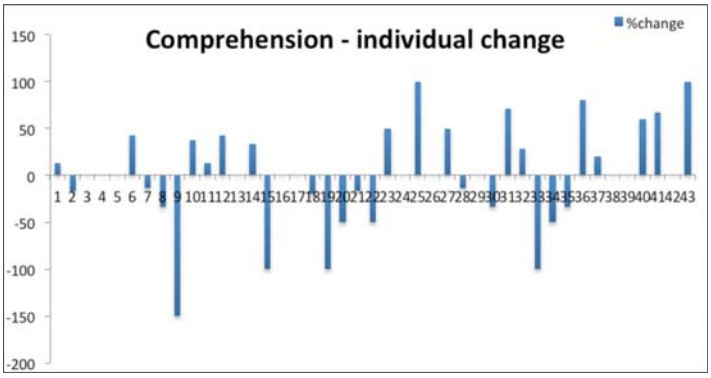
The quantitative tests did not produce much indication of statistically significant change, yet there were interesting indications of possible trends. This study has demonstrated the large number of possible variables impacting upon student learning and highlighted the problems in isolating just one of these factors.

There is no doubt that the use of the iPad was hugely engaging for the students in our project. At the time, only six of the students in the project owned an iPad (although 25 had iPhones or an iPod Touch). While the teachers allowed time for instruction in the use of the iPad, it was quickly obvious the students needed little or no instruction irrespective of whether they had used an iPad before.

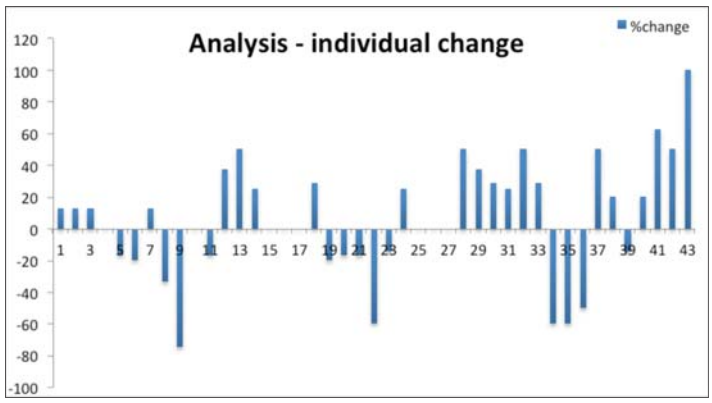
The iPad was, at times, a distraction to the lesson. This was possibly the reason for the large percentages of negative change in the Comprehension



Graph 1: KNOWLEDGE: % change between iPad & non-iPad



Graph 2: COMPREHENSION: % change between iPad & non-iPad



Graph 3: ANALYSIS: % change between iPad & non-iPad

scores for the participants. While our sample group was too small to make definite conclusions, it was interesting to note how frequently the low group reported they used technology for reading. This must raise questions as to how beneficial this electronic reading is for these students. Questions about the effectiveness of the iPad as an eBook reader, and how reading changes for those using an iPad should also be explored.

The fact that students were able to modify settings was also a distracter for those in the project. Other students in other classes, including our English as Second Language students, also used the iPads and, on occasion, time was needed at the beginning of a session to undo changes other users had made. This was especially necessary when the changes related to the language settings, as the students were unable to read the menus for annotation.

The teachers involved in the project were conscious of using a new technology and at times, this lead them to teach in a way they would not have normally. This was especially true for one teacher who was frustrated by the lack of discussion. He found that once the students stopped reading, they wanted to explore the other features of the iPad rather than discuss the book. In his regular reading program, discussions occurred when students had arranged chairs in a circle. The teacher initially felt using the iPad locked the class into being at their desks; on reflection, he arranged the boys in discussion circles as if they had not been using iPads.

It is an important point to note that as new touch screen technologies are introduced, individual teachers will vary in their ability to adapt their existing pedagogies and routines.

The features of the ePub format suited themselves to the style of study the teachers did for the books, making annotation and highlighting easier than when using a traditional text. One of the teachers developed with his students a system of colour coding so annotations were on different coloured notes depending on the type of annotation they were making (e.g. blue for character, green for setting). This made it easy for teacher and student to review specific aspects of the book.

The ability to change font and text and font size, another of the features of the ePub format, caused problems initially, as each time text size was changed, page numbers also changed. This made referring back to earlier pages difficult. As the students and teachers became more used to annotation methods this problem mattered less. One class made the decision to always use the same font and font size.

One of the most challenging aspects of the project was finding appropriate content, and this will continue to be a challenge for schools using iPads for reading. While the definition of 'book' is likely to shift significantly over the next few years (see *The Future of the Book* produced by design firm IDEO at http://vimeo.com/15142335), Australian publishers were not prepared for the release of the iPad at even the most basic of levels. This was reflected by the fact that it took eight months for major publishers to release titles through the iTunes bookstore. While a number of online delivery systems existed at the time of the project we had a very limited selection of books in ePub format suitable for the curriculum and students involved.

There was also an issue with the wireless connectivity, as we only discovered after the project had started that our wireless infrastructure was not powerful enough to connect the entire class of iPads at one time. This made significant changes to the way in which the project progressed. Schools looking to make investment in tablet technology need first to ensure that they have a robust infrastructure that will support simultaneous multiple users.

The iPad is essentially a device for an individual. While not part of the project itself, there were many issues around having a class set of iPads. Synchronising content and charging a set of machines were just two of these and schools will need to make decisions around how they assign these devices to best effect. The Apple model is a closed one; it may be that the Android open-source model better suits schools who wish to use class sets but control the content.

References

Australian Council for Educational Research. (2008) Progressive Achievement Tests in Reading (PAT-R): Comprehension Test 6, Hawthorn, Vic: Australian Council for Educational Research.

Coiro, J. (2003). Reading Comprehension on the Internet: Expanding our understanding of reading comprehension to encompass new literacies. *The Reading Teacher*, 56, 458–464.

Johnson, L., Levine, A., Smith, R., & Stone, S. (2010). The 2010 Horizon Report. Austin, Texas: The New Media Consortium.

Johnson, L., Smith, R., Willis, H., Levine, A., and Haywood, K., (2011). The 2011 Horizon Report. Austin, Texas: The New Media Consortium.

Johnson, L., Adams, S., and Haywood, K., (2011). The NMC Horizon Report: 2011 K–12 Edition. Austin, Texas: The New Media Consortium.

RAND Reading Study Group. (2002). Reading for understanding: Toward an R&D program in reading comprehension. Santa Monica, CA: RAND.

Sutherland-Smith, W. (2002). Weaving the literacy Web: Changes in reading from page to screen. *The Reading Teacher*, 55, 662–669.

Dale Sheppard (M. Ed ICT) is a member of the Crowther Centre, Brighton Grammar School's research and partnership arm.