Study Skills Tip for March

Impact of reading from a screen versus from printed material

by Dr Prue Salter

Students now spend a lot of time reading from a screen: computers, kindle, mobile devices. The research into the implications of this is still in the early stages, however current evidence indicates that, at this point in time, print may be slightly superior to the screen in relation to comprehension, learning, retention and ease of use. However, as screen technology continues to advance, interfaces become increasingly intuitive and personal preferences change from early exposure to reading on a screen. This may change – and may have already changed for some individuals. Technology is here to stay so the key pieces of advice for students (and parents) are listed below. One of the best articles to read on this debate is by Jabr (2013) "The Reading Brain in the Digital Age: The Science of Paper versus Screens" http://www.scientificamerican.com/article.cfm?id=reading-paper-screens.

Advice for Students and Parents:

1. **DEVELOP BOTH PAPER AND DIGITAL LITERACY SKILLS**
   Students need to develop their reading, comprehension and learning skills in both arenas. They need to develop one set of skills to build their competence in reading and learning from paper but they also need to develop a completely different set of skills: digital literacy and navigation skills. Some parents are critical of the use of technology in schools and fearful that students' handwriting and learning will be affected (Salter, 2013) however, in an increasingly digital world, it would be irresponsible of schools to neglect developing students' digital literacy skills. Two of the units that are useful in this area on www.studyskillshandbook.com.au are the **Reading Skills** unit and **Technology Tools** unit.

2. **CREATE OPPORTUNITIES TO MAINTAIN HANDWRITING SKILLS**
   Finland has long been known as a leader in many educational aspects. Recently it was announced that Finland will no longer teach cursive handwriting in schools. They will continue to teach printing, however, when students would normally transition to 'running writing' they will learn keyboarding skills instead. This signals a change in the traditional approach. In Australia there is comprehensive testing being undertaken to look at holding both NAPLAN and final Year 12 examinations online. There are no indications as to when this will take place. At this point in time, as tests and examinations are still handwritten, students are advised that when it comes to exam time, they should handwrite their study notes or, if typed, then print them out when they are learning them. They should also actively create opportunities to maintain their handwriting skills, consciously choosing to handwrite at times when they might normally type. Visit the **Writing Skills** unit for tips on improving handwriting as well as some special pens that will assist.

3. **LEARN TO TOUCH TYPE**
   While we have had the ability to dictate into a device for some time, this is still not in common usage. Learning to touch type is a skill that definitely pays off in the senior years in terms of saving huge amounts of time. There are links to free learning to touch type websites in the **Technology Tools** unit.

On a personal note, I believe we are all on a journey of finding a balance between reading on paper and reading online. When I did my first degrees at uni there were no computers and I would handwrite my essays. Later when computers arrived I could not imagine writing directly onto a computer, but instead would create my essay on paper then type it up when I finished. Now the thought of having to write an essay on paper like our Year 12 students do horrifies me, I can now think and plan an essay solely in digital space and am much more comfortable working this way than planning an essay on paper. I never thought either that I would switch away from paper reading. As a life-long avid reader, I actually rent a second apartment to keep my 3000+ books. However in the last two years I have completely transitioned to reading books for pleasure solely on my iPhone (yes I know the screen is small, and it is much better if you are at the beach to be reading a paperback you can leave it without fear of theft when you go for a swim). In fact I have not read physical fiction books for over a year now and am slowly giving my paper books away.

However even though I have tried, I still find it very difficult to take in information from a screen if I am trying to absorb, learn and remember information. I still order my non-fiction texts as a paper copy from Amazon. I printed out my 300+ journal articles for my PhD as I found it impossible to get my head around them when

they were filed as PDFs on my computer. We are all at different stages on the journey of being comfortable with learning online. The concept of 'digital natives' has been debunked (Bennett, Maton & Kervin, 2008) and we cannot assume that all students are comfortable with technology. Instead, it is true that different students will be at different points along this path. Students need to keep both skill sets. In you have to write essays in an exam without the aid of a computer, then you need lots of practice in this area! If you find it hard to remember what you are learning on the screen then make notes on paper, but at the same time also look to improve and develop your digital learning literacy skills as well. In many ways it is a matter of attitude; be open to learning in many different ways and look for opportunities to improve the ways you learn in all mediums.

If you are interested in learning more about what the current research says about the impact of reading on a screen versus printed material, continue reading below:

Personal Experience / Ease of Reading

- Many people who have grown up reading printed material feel that their reading is more effective if they read from paper rather than from a screen. When describing why they feel this way, they refer not just to the visual sense, but also the way paper feels and is manipulated, which supports their comprehension. For example, the ability to highlight or jot notes or to judge where they are in a document based on the number of pages left to go. The discomfort that people feel when reading from a screen, rather than paper, is described by Gerlach and Buxmann (2011) as "haptic dissonance".

- Many studies such as Mangen, Walgermo and Brønnick (2013) suggest that the ability to identify your passage through a text in a tactile way is important to the learning. So too, is the ability to easily navigate through the text in a non-linear fashion. The opportunity to quickly move back and forward whole pages and chapters at a time is considered by many as invaluable in placing the learnings of any particular passage within the context of the overall text.

- Currently the technology of e-readers is unable to replicate this in an intuitive manner. Many have the ability to quickly search and scroll through pages, but the instant, subconscious nature of this feature in the printed material is unparalleled in screen technology.

- Even today's students, who have grown up using technology on a daily basis, seem to experience this. A recent study conducted by Wu and Chen (2011) concluded that a majority of tertiary students will begin their research using screen-based text, benefiting from advanced search functions and the like. Upon choosing the appropriate text, however, they will often print it to be able to better digest the text. This suggests that these students have an intuitive understanding of how best to find, comprehend and retain the text.

Comprehension

- Many years ago in 1992, Dillon reviewed numerous studies conducted in the late 1980s and early 1990s and determined that reading from screens was less effective than print. Most results indicated that reading from screens caused comprehension to be 20-30% less effective than reading from paper. However, a more recent study conducted by Noyes and Garland (2008) suggests that results are inconclusive in determining a preference for print or screens in retention and that there is only a slight majority of results that support the earlier findings of print having 20-30% faster comprehension. Other studies published have produced inconsistent results, with many finding few significant comprehension differences between reading on a screen or on paper.

- Other studies (Ackerman & Goldsmith, 2011) have looked deeper in to the subconscious expectations of reading that allows factors such as tactile and olfactory feedback to have such great impact on the retention and comprehension of reading. They found that these subtle expectations and familiarities greatly impacted how much they were able to retain. When they were asked to read on a time limit, the results for screen and print did not differ significantly. When participants were asked to read a text at their own pace, their retention was significantly different when reading on screens as opposed to paper.

- Ackerman and Goldsmith concluded that the difference is therefore not in the presentation of the material itself, but relates to a more intuitive or subconscious feeling that makes the brain more

conducive to learning when reading from a more familiar source, such as print, and less ready to learn when reading from a more unfamiliar source such as a screen.

Learning versus Remembering

- A British study (Garland & Noyes, 2003) found that when comparing learning from a screen versus printed text, the students recalling information acquired from print were able to access the information much faster and were deemed to have "learned" the material. By comparison, the students who read from screens had to mentally search for information in response to questions and were judged to be "remembering" the material.

- Obviously in this case the print is superior in terms of learning, but this is an effect that was not considered in many other studies. The long-term retention of knowledge from screen or print has not yet been studied in as much depth as other factors in this debate.

- Reading from screens may create more stress for the brain than reading from paper and study participants have grown tired more rapidly when reading from screens (Wästlund, Reinikka, Norlander & Archer, 2005). These studies do not identify the cause of this stress. Conclusions drawn are that when reading for long periods of time, paper reading can achieve much greater stamina.

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