Public submission made to the Review to Achieve Educational Excellence in Australian Schools

Submitter: Accessible Publishing Systems Pty Ltd
Submitting as a: Other (Accessible Format Publisher)
State: NSW

Summary

If the Australian education system is to be optimized, then every step of the education process should be optimized. Learning by reading is a critical part of the learning process, and anything that can improve the comprehension of students when reading should be pursued.

It is well known that reducing the cognitive load of students improves their learning outcomes. A common example: if a reader tries to read a poorly printed document, or a document that is in too small type, the reader has to devote considerable effort to read (decode) the text. However, if the document is well printed with the right sized type, it is much easier to read the document and nearly all the reader's concentration can be used to understand the meaning of the document.

The presentation of documents can now be cost effectively optimized individually so that each student can have a document that is presented in their individual format of choice. This means that each student can concentrate more fully on comprehending what they are reading because they do not have to devote much concentration to decoding the sound of words in the document.

Main submission

To optimize Australian education outcomes, every process within the education sector should be examined and optimized, and therefore optimized for accessibility. Some students find traditional publishers' document formats hard to read. One process that can be readily optimized is the format of documents to make these documents as easy as possible for individual students to read.

To do this, students must be able to choose to read in whatever format is the easiest for them to decode, so that the mental concentration they spend on decoding the words in minimized, allowing nearly all their concentration to be focused on understanding what is being read.

It is clear that many students need accessible formats: print disabled, blind and vision impaired students, and students with learning difficulties. A few years ago, a member of the Round Table on Print Disabilities estimated that less than 2% of published materials were in accessible formats. The Australian Publishers Association has a working assumption that no more than 5% of published materials are in accessible formats.

Students needing accessible information need to receive it in a timely manner e.g. start of term. One visually impaired student told us that her Braille text book was delivered less than 4 weeks before the exam, and did not contain an index.

Many people do now know the number of people with disabilities and the extent of their disabilities. A recent document circulated by the Australian Publishers Association for the Treaty of Marrakesh discussion group states:

"Whilst this medical model of disability does not give us the complete picture on disability, the statistics based on this definition are still quite compelling:

- Over 4 million people in Australia have some form of disability. That's 1 in 5 people.

- 18.6% of females and 18.0% of males in Australia have disability.

- The likelihood of living with disability increases with age. 2 in 5 people with disability are 65 years or older.

- 1.8 million or 50.7 % of Australians aged 65 and over have disability, compared to 1 in 8 (12.5 %) aged under 65.

- The likelihood of living with disability increases with age; 31% of 55-64 year olds are living with disability. Almost nine in ten people aged 90 and over (88%) have a disability.

- 2.1 million Australians of working age (15 – 64 years) have disability.

- An estimated 10% of the population has dyslexia. That's more than two million Australians.

https://www.and.org.au/pages/disability-statistics.html

Whilst the primary focus of the committee is school children, it should be noted that formats that help children with print disabilities will also assist older Australians.

We submit the following facilities should be provided to students to give them access to the information they need to learn:

1. There should be a national online accessible format library for students so they:

    a. Can access all school textbooks and other curriculum and school documents available in accessible formats

b. Are encouraged to practice reading, so the library will need to have a collection of books that students want to read. It is suggested that teachers would be able to monitor students reading practice.

2. There should be a facility for students, parents and teachers to convert materials into accessible formats themselves, quickly and easily which can involve uploading scanned images, copying and pasting text and taking photos of text with their smart phones or tablets and having these documents converted automatically or largely automatically into properly formatted accessible documents. This will allow teachers to provide any document to students, and allow students to read documents that they want to read, and so encourage reading practice.

3. The layout of the documents should be optimized according to the experimentally established principles of Cognitive Load Theory

4. All printed and bound accessible books should be printed on demand in Australia and shipped to the student as soon as possible after submitting the order. (Griffin Press currently prints on demand thousands of Large Print editions written by Australian authors.)

Technology, developed in Australia, allows for the conversion of documents into an XML file and then the automatic generation of the accessible format from the XML file. This significantly reduces cost: there is only one conversion cost into XML and the technology enables many more accessible formats to be cost effectively provided to students. We submit that the following accessible formats should be provided to Australian students:

1. Braille for the blind – the Royal Institute for Blind and Deaf Children estimates about 1 in 2500 children are in this category. Vision Australia estimates there are currently 357,000 people in Australia who are blind or have low vision. They project that the number of Australians who are blind or have low vision will grow to 564,000 by 2030. (Refractive error not included).

2. Large Print and super Large Print for people with poor vision

3. DAISY – Digital Audio Information System that provides audio files with the same sort of navigation available in a book for blind students, students with poor vision, students who find it hard to decode written text (there are 10-15% of the population with dyslexia which equates to between 2.4 and 3.6 million Australians) or who have other problems such as eye tracking problems where their eyes skip lines. Some students with poor vision also have poor hearing and they will need to be able to select the voice that they can hear best and they will need to be able to select the speed of the recording – people with poor vision can learn to hear text read to them very quickly.

1. Dyslexie format is a format for dyslexics with perceptual problems: they have difficulty accurately recognizing the characters they are looking at. An example is where students confuse characters such letter that are mirror images of each other such as "b" and "d". 10-15% of the population has dyslexia.

2. Syllabification: adding syllable breaks to words – there is strong anecdotal evidence that students will learn word attack skills without being taught if they are presented with words displayed with syllable breaks. This should be scientifically tested. We believe this will work for everybody.

3. Use a Readable English format, where a phonetic pronunciation guide is added to all English words in a document. The phonetic pronunciation guide comprises syllable breaks, greyed out silent characters and glyphs or visual cues are added to characters to tell the reader what sound the character makes when it does not make its usual sound. This enables students to accurately sound out a non phonetic English word character by character with no rules or exceptions. This is of use for students learning to read, struggling readers, including those with reading difficulties, English as a Second Language students and students who want to quickly expand the number of words they can read by sight. Readable English appears to work with everybody.

4. Breaking sentences into phrases. We pronounce words syllable by syllable. We read for sense phrase by phrase. There is strong anecdotal evidence that breaking sentences into phrases helps students to learn to read for comprehension more quickly. This should be scientifically tested. We believe that this will work for everybody.

5. Select or Design your own print or PDF format. Readers have the choice of designing their own document format to suit their specific reading issues. Initial tests conducted some years ago showed that some people were helped by shorter lines and larger type. There is evidence that students in the US transitioning from short lines and large type to smaller type and longer lines suffer a marked falling off of literacy which appears to be avoidable by keeping the original format. Other students were sensitive to character spacing and font. Some other students who has difficulty in reading standard text were helped by the insertion of patterns into words.

Scientific research should be conducted into how reading comprehension can be optimized by the development of the following new document formats:

1. Fonts that will help people with specific character recognition issues

2. New formats for people who have poor foveal (central) vision and/or eye tracking problems and therefore have difficulty controlling where they look. Some of these students find it exhausting trying to read which makes concentration on understanding the content difficult

3. Formats that use software to graphically highlight the grammatical structure of sentences and paragraphs. We hypothesize that at least some grammar rules can be learned from a graphical structuring of the grammar of sentences and paragraphs with relatively little teaching.

4. Formats that manage cognitive load. A lot of quantitative research has been conducted by Cognitive Load Theory (CLT) researchers on the impact of document layout on the learning outcomes of students. CLT shows us that documents laid out according to the principles of CLT shows significantly improved student performance. However, this science has not been widely incorporated into teaching materials. We want to develop automated tools that will lay out teaching materials in the optimal format as predicted by CLT so that teachers and students can gain the benefits of CLT layout without having to learn it and apply it themselves. (See for example "Efficiency on Learning, Evidence-Based Guidelines to Manage Cognitive Load" by Ruth Clark, Frank Nguyen and John Sweller" Pfeiffer 2006.) Prof John Sweller from UNSW, one of the inventors of CLT and one of the authors of the manuscript, will assist us in this project.

Recommendations:

Improve student learning outcomes by optimizing reading formats for individual students by a one- time funding grant of approx. $2.5m that would allow the development of:

1. technology that allows any student to receive their data in any format ($230,000),

2. an online accessible format subscription library for students ($720,000),

3. a Do-It-Yourself document conversion facility that will allow teachers, parents and students to accurately convert documents into accessible formats with minimal human intervention so that students can read what they want to read ($360,000)

4. new accessible formats ($540,000)

5. tools to optimally layout teaching materials according to the principles of CLT ($650,000)

It is anticipated that ongoing costs of the DIY conversion system and the online accessible format library will be paid for by subscriptions paid by schools and school and public libraries. The above costs do not include any programs to education teachers and the public about these facilities or the library data acquisition and conversion costs.