

**Senate Committee: Education and Employment**

**QUESTION ON NOTICE  
Budget Estimates 2015 - 2016**

**Outcome: Agency: ACARA**

**Department of Education and Training Question No. SQ15-000420**

Senator Wright, Penny provided in writing

***ACARA: reading comprehension***

**Question**

In the Estimates hearing, I also referred to studies that show reading comprehension can be vastly different on screen to on paper. One such study, conducted with Year 10 students in Norway, showed significantly different levels of comprehension. That study can be found here:

[http://www.kau.se/sites/default/files/Dokument/event/2012/12/mangen\\_a\\_2013\\_reading\\_linear\\_texts\\_on\\_paper\\_ve\\_14552.pdf](http://www.kau.se/sites/default/files/Dokument/event/2012/12/mangen_a_2013_reading_linear_texts_on_paper_ve_14552.pdf)

- a) Is ACARA aware of other studies into the different between screen and paper reading comprehension, particularly with younger students? If so, please provide references for the studies.
- b) Is this something ACARA proposed to conduct its own research on? If so, how?

**Answer**

The Australian Curriculum Assessment and Reporting Authority (ACARA) has provided the following response.

a) Ackerman, R., & Goldsmith, M. (2011). Metacognitive regulation of text learning: On screen versus on paper. *Journal of Experimental Psychology: Applied*, 17(1), 18– 32.

Eklundh, K. S. (1992). Problems in achieving a global perspective of the text in computer-based writing. *Instructional Science*, 21(1), 73–84.

Garland, K. J., & Noyes, J. M. (2004). CRT monitors: Do they interfere with learning? *Behaviour and Information Technology*, 23(1), 43–52.

Kerr, M. A., & Symons, S. E. (2006). Computerized presentation of text: Effects on children's reading of informational material. *Reading and Writing*, 19(1), 1–19.

Lin, L., Robertson, T., & Lee, J. (2009). Reading performances between novices and experts in different media multitasking environments. *Computers in the Schools*, 26(3), 169–186.

Mangen, A. (2010). Point and click: Theoretical and phenomenological reflections on the digitization of early childhood education. *Contemporary Issues in Early Childhood* 11 (4).

Noyes, J. M., & Garland, K. J. (2008). Computer- vs. paper-based tasks: Are they equivalent? *Ergonomics*, 51(9), 1352–1375.

Piolat, A., Roussey, J.-Y., & Thunin, O. (1997). Effects of screen presentation on text reading and revising. *International Journal of Human-Computer Studies*, 47(4), 565–589

Reinking, D. (1988). Computer-mediated text and comprehension differences: The role of reading time, reader preference, and estimation of learning. *Reading Research Quarterly*, 23(4), 484–498.

Rice, G. E. (1994). Examining constructs in reading comprehension using two presentation modes: Paper vs. computer. *Journal of Educational Computing Research*, 11(2), 153–178.

Waˆstlund, E., Reinikka, H., Norlander, T., & Archer, T. (2005). Effects of VDT and paper presentation on consumption and production of information: Psychological and physiological factors. *Computers in Human Behavior*, 21, 377–394.

b) As part of the research program focussing on the move to NAPLAN online, ACARA will be undertaking two studies in 2015 which are relevant to this topic:

- Device effect study
- Readability and layout study

#### Device effect study

ACARA will trial numeracy, reading, spelling, and writing tests delivered across a range of devices (ie, laptops or tablets—with and without detachable keyboards) in schools across Australia.

The results from the tests taken online will be compared against paper-based item statistics obtained from previous and concurrent item trials. In addition, ACARA will collect qualitative data on the interaction and engagement of students with tests administered on different devices.

#### Readability and layout study

ACARA has commissioned a literature review regarding current knowledge about readability and layout in onscreen assessments, especially reading assessments. The literature review will also identify a set of interface, design and layout options that might provide optimal readability for NAPLAN online tests in 2017.

In addition, ACARA will use cognitive interviews to collect qualitative data on the interaction and engagement of students with tests administered in different layouts on different devices. The purpose of the cognitive interviews is to collect data to assist the selection of the optimal readability and layout solution for the NAPLAN online tests.

We are confident that these studies will provide greater understanding and suggest alternative text presentation options to address the issues raised in the Norwegian study referred to in the question above.