

PAT Reading Comprehension:

Are online and paper-based scores comparable?

Online assessment offers many benefits. Besides savings in time and administration, the digital format brings the potential for new, innovative question types and rich diagnostic information. A first step towards realising this potential is to move traditional pencil and paper tests online. During this move, questions have emerged about possible differences between the two formats. As a leader in educational assessment, NZCER is committed to investigating these questions, especially in relation to its Progressive Achievement Tests (PATs). Our latest study compared student results for PAT: Reading Comprehension for those who had completed the test online and those who had completed it on paper.

We were interested in two questions:

- Are the test questions equivalent across online and paper formats for PAT: Reading Comprehension?
- Are student scores equivalent across online and paper formats for PAT: Reading Comprehension?

We looked at nearly 200,000 student results and used two different analysis methods to answer these questions. You can read more in the full report

<http://www.nzcer.org.nz/research/publications/mode-equivalency-pat-reading-comprehension>.

What we found

1. There was very little difference in how questions functioned online and how they functioned on paper. Students found the same questions easier or more difficult, regardless of whether they answered them online or on paper.
2. Students completing the test online tended to score slightly lower on average than those who completed it on paper. This was true regardless of ethnicity, gender or school decile.
 - The differences we found in average scores were small. Broadly speaking, they equate to getting two to four fewer questions correct out

of the total number of questions in the online test (between 32 and 42, depending on the test). This roughly translates to a difference of up to half a stanine.

- This difference in average scores was slightly greater for Māori students and students in decile 1 and decile 2 schools.

Possible explanations

More research is needed, but possible contributing factors to the difference in the average score in PAT: Reading Comprehension include:

- Familiarity with the online environment – in the online test, students have to both comprehend the written text and cope with the demands of the digital interface. If students do not practise reading comprehension online in the classroom, there may be a mismatch between their classroom experience and their test experience.

Students completing the PAT Reading Comprehension test online tended to score slightly lower on average than those who completed it on paper.

- Online reading behaviour – people tend to read differently online, skimming and scanning text rather than reading it word-by-word from beginning to end. Some studies have shown that it is easier to engage in deep, focused reading when the text is presented on paper, compared to online.
- The interactive nature of many online texts – students' experiences of reading online most likely involve interactive sites, where features like hyperlinks make it possible to jump from place to place, plotting a unique path through the information. In an online test situation, students' attention may be divided as they look for these interactive features.

Important points

- Our findings are in terms of averages and describe the differences in results when considering a large number of students in a wide range of schools. Because of this, the effects we found may not exist in your school or classroom.
- These findings apply only to PAT: Reading Comprehension. An earlier, smaller-scale study of PAT: Mathematics showed very little difference in achievement between those sitting it online and those who took the paper test.
- Our findings have implications for assessment design and for the use of technology for assessment purposes, particularly for reading comprehension. NZCER is committed to doing more research in this area, to enable all learners to have equitable access to our assessments.

What can your school do?

- Remember that PAT Reading Comprehension, whether online or paper-based, offers reliable, robust information about students' reading comprehension. Potential differences between scores in the online and paper-based formats are small and might not exist in your school.
- Recognise that students who have previously completed their assessments on paper might achieve at a somewhat lower level when they move to an online format. This is only a problem when comparing a paper-based result with an online result, for example when first transitioning from a paper-based to an online format.
- Because of the potential differences between scores in the online and paper-based formats, we recommend using the same format when

assessing students at the beginning and end of year—either paper or online—to ensure scores are comparable.

- Consider your learners' readiness to move to an online format. Think about their familiarity and confidence with the digital environment and the types of digital devices you will use for the test, and their experience of reading online. Students with limited experience in these areas might not be ready to take the test online.

An earlier, smaller-scale study of PAT: Mathematics showed very little difference in achievement between those sitting it online and those who took the paper test.

- Make sure students are familiar with the online assessment format before completing PAT: Reading Comprehension online. PAT: Reading Comprehension online is designed to be as similar as possible to the paper-based version, but there are some differences. These include the ability to change the screen format, font and background. Students might need to experience these and other online features ahead of the assessment, to minimise distraction during the assessment itself.

The full report offers a more detailed discussion of these issues.

We are happy to answer any questions you might have. Contact educationadviser@nzcer.org.nz