The “second digital divide” in Europe: what do we know about gender, migrant and socio-economic gaps?

Few would argue against the need for schools to enable all students to develop effective and efficient digital literacy and numeracy as a lifelong and life-wide competence. Yet the OECD/PISA report ‘Students, Computers and Learning: Making the connection’, published in early 2016, provides strong evidence that, in addition to the well-known divide between students with and without home access to technology, there is a ‘second digital divide’: the ability to take full advantage of ICT in digital reading and navigation competences is affected by gender, socio-economic background and migrant status.

European Schoolnet’s Steering Committee, comprising 30 ministries of education, commissioned further analysis of the optional computer-based assessment component of PISA to assess digital reading skills, in which 15 European countries participated. Accordingly, European Schoolnet’s Knowledge team undertook to analyse further the OECD PISA dataset for 15 year-olds, in partnership with the Research Institute for the Evaluation of Public Policies (FBK/IRVAPP, based in Trento/Italy), and to report on the differences between digital and traditional (paper) literacy achievement and students’ gender, migrant status and socio-economic background.

The full report drafted by IRVAPP is available here.

BACKGROUND INFORMATION

The first digital divide is the gap between those students with access to online technology both at school and home and those who do not have home access. This socio-economic gap in students’ physical access to ICT, has been shrinking almost everywhere. Major concerns are now posed by the so called ‘second digital divide’, i.e. the socio-economic gap in use and ability to take full advantage of ICT, in particular digital reading competences. Digital reading competences involve both traditional print reading skills and a set of ‘navigation skills’, e.g. knowing how to search and find the relevant information, being able to critically examining and assessing internet information sources.

15 European Union countries took part in the PISA Computer Based Assessment (Austria, Belgium, Germany, Denmark, Spain, Estonia, France, Hungary, Ireland, Italy, Poland, Portugal, Slovakia, Slovenia, and Sweden), plus Norway and Israel.

The OECD report, Students, Computers and Learning: Making the Connection, is available at here.
Online reading proficiency

Evidence from the analysis

The main factor accounting for inequality in digital reading is differences in traditional print reading skills, not digital ones. Nonetheless, there are significant differences in digital reading between groups, not ascribable to differences in print reading skills, indicating that there are ‘digital-specific’ gaps.

The differences are, however, not the same for all the variables considered. Most interestingly:

- At first sight boys underperform girls on the digital reading test but, when the difference in print reading skills is taken into account, their disadvantage turns into an advantage, suggesting that boys are more proficient with computers and ICT.
- Children of immigrants underperform those of natives on the digital reading test, but if print reading skills are taken into account, this gap disappears. This result holds true in most countries. In some countries though, a ‘migrant penalty’ persists (Belgium, Denmark, Estonia and Norway), pointing to a double disadvantage of immigrants’ children, both in traditional print reading and digital skills (NB: some caution required as small numbers are available for the analysis).
- In all 15 countries, children of highly-educated parents in socio-economically higher ranked occupations have higher scores in the digital reading test than those whose parents did not progress beyond lower levels of education and who have lower-ranked occupations. This pronounced social-background gap in digital reading is almost entirely explained by the difference in students’ print reading skills. However, even if those differences are taken into account, small residual significant gaps persist in 12 of the 15 countries (Austria, Denmark, France, Hungary, Israel, Norway, Poland, Portugal, Spain, Sweden, Slovenia, Slovakia), indicating that the advantage of children with more privileged social backgrounds is not always limited to traditional competences but also extends to digital ones.

Background information

Similar skills are needed in print and online reading: understanding language, identify the style and structure, judge about the relevance of both, etc. However, online reading requires additional skills to navigate a non-linear page structure that contains combination of text, images, animations, hyperlinks, etc.

Ideas for policy action

- Raise awareness of these findings among mother tongue and language teachers, bring print and digital literacy teachers and leaders together to look at 21st century literacy, making use of short duration professional development activities and topic-focused communities of practice;
- Exploit the fact that ICT can support equity (gender and migrant background), because differences are less pronounced for digital reading than for print reading;
- Individual countries where there is a migrant or socio-economic background ‘penalty’ after controlling for differences in print reading should consider the implication of the findings for specific policy actions and responsive practice.

Navigation skills

Evidence from the analysis

Overall, the results indicate that gender, migration background and parental education and occupation are only a small factor in the variability of students’ navigation skills, although in some countries differences due to social backgrounds are noticeable:

- Migrant versus native differences in navigation behaviour are close to zero in nearly all countries.
- The results suggest there are gendered approaches to the use of ICT: boys on average are more technically able to use ICT but at the same time are less focused, while girls are more reflective. Boys
Ideas for policy action

Consider how teaching and assessment of navigation skills may be gender biased, for example, the balance between activities or test items favouring risk taking as opposed to reflection and caution.

Raise awareness of teachers about such gender differences and actions to ensure a balance between technical and strategic digital competences is nurtured for girls and boys;

Girls’ confidence can be boosted if they are told that they perform better than boys at tasks such as targeted navigation;

Teachers could be encouraged to guide and support students in exploiting technology for their own aspirations, personal development and career orientation. Such a focus will particularly benefit students from socio-economically disadvantaged backgrounds.

Individual student characteristics versus school factors

Evidence from the analysis

Digital skills are more dependent on students’ individual characteristics than school factor and these characteristics have a significantly smaller effect than in reading, mathematics and science.

This finding suggests that school and classroom activities are more dedicated to developing traditional competences such as literacy and numeracy than digital skills.

Digital gaps are however associated with some features of national education systems; for example the quality of the school attended (measured by the school’s mean print reading score) correlates positively with students’ navigation skills.

Ideas for policy action

Consider print and digital literacy and numeracy in a merged, holistic, approach and as a quality factor of school education;

Provide additional support to help teachers embed ICT into their teaching to ensure a greater understanding that navigation and print reading skills are best developed in tandem;

Devote more attention during classroom activities to students’ digital skills development;

Design and adapt learning spaces in and out of school to better support learning and meaningfully integrate technology.
The study findings on a second digital divide reported in this briefing carry a number of implications for how educational technology is used in schools.

- Learning to read should systematically include reading digital media in order to reduce the second digital divide. Likewise digital competence development should not take place in isolation from other competences. There are benefits for both digital and print literacy if the two are combined in a whole-school approach that views literacy as a cross subject matter – particularly across native and foreign language teaching and ICT skills and media literacy.

- The study revealed some significant gender and migrant background differences, suggesting that a 'one size fits all' approach could contain unintended bias. Positive efforts should be made to exploit the fact that ICT is more neutral in this respect and can even ensure more equity because differences are less pronounced for digital reading than for print reading.

- Design tasks and tests with a mix of technical know-how and reflection, given that the study showed how boys tend to perform better in screen-based navigation tasks requiring technical digital competence and girls in those calling for reflection and caution.

**IMPLICATIONS FOR TECHNOLOGY USE IN TEACHING AND LEARNING**

**What the research shows**

More generally, research since the early days of technology in schools shows that ICT can:

- Support innovation and new ways of organising learning in time and space
- Support effective pedagogies, notably active learning, collaboration, project-based learning, independent learning and personalisation
- Motivate and engage students and help them understand complex concepts, providing them with richer and more compelling learning environments, and improving productivity
- Support access and inclusion, in particular of students with disabilities, those with learning difficulties, and those from a different language background.
- Help students develop digital age competences, including higher order thinking skills, creativity and digital competence
- Enable new forms of feedback and assessment, including learning analytics and adaptive learning, games and simulations
- Make possible activities that would otherwise not be possible for example showing dangerous experiments, enabling collaboration over distance, and involving outside experts
- Prepare students for life and work after school and to play their part in a society which has transformed the way young people communicate, seek help, access information and learn.

**3 key factors for the successful use of ICT in education**

1. The school needs to have a positive culture of innovation, reflection and improvement
2. Technology has to be fit for purpose, accessible and perform reliably
3. Teachers need appropriate competences and support.