Policy Implications

Being able to read proficiently is fundamental for success in life. Reading well enables people to learn new skills and acquire information and knowledge that improve the quality of their lives. In an increasingly digitised world, being a proficient reader also means being able to navigate among diverse and conflicting pieces of information and across pages of non-linear texts, using hyperlinks and other tools that the digital technologies found in laptops and smart phones provide. Individuals who develop the skills needed to use these texts efficiently and effectively will be at an increasing advantage in accessing higher education, finding and succeeding in a well-paid job, and participating fully in society. Thus, in order to strengthen students' performance in digital reading – and prevent a *digital divide* from arising between those who can and who cannot use these new technologies – it is important for policy makers and educators to:

- understand the nature of digital reading;
- examine students' performance in digital reading and address significant disparities that exist among selected populations, both within and across countries; and
- identify the influences on digital reading performance and design effective policy responses that leverage these, for example, through better access to ICT and training for both students and teachers.

HELPING STUDENTS DEVELOP EFFECTIVE SKILLS IN READING DIGITAL TEXTS

Policy makers and educators alike need to understand how the differences between printed and digital texts can affect instructional policies and practices. Low-level actions, such as identifying words and processing syntax, tend to be similar across the two media, as are the processes involved in constructing meaning. Yet there are important differences. For example, in the digital medium, the reader is often unaware of the amount of material available and necessary to complete a task successfully. Identifying effective strategies to teach digital reading skills is an important objective for instructional policies. These skills include the ability to critically evaluate the quality and credibility of available texts, integrate information from multiple texts, and – crucially – navigate effectively.

Navigation is unique to digital reading and an important variable in explaining differences in digital reading performance. To better understand the nature of navigation, PISA analysed the relationship between digital reading performance and three indices: the *number of page visits,* the *number of visits to relevant pages*, which includes revisits to a relevant page, and the *number of relevant pages visited*.

What is important in these data is that the variable *number of visits to relevant pages* has, on average, a weaker correlation with digital reading performance than does the *number of relevant pages visited*. One explanation is that the *number of relevant pages visited* reflects the behaviour of readers who are more efficient in identifying both the content and the order in which information must be processed. That means the tasks are generally less cognitively demanding for them. Because the former navigation variable includes revisits to relevant pages, it is likely to reflect the behaviour of readers who are less efficient in accessing and locating necessary information or have more trouble integrating the information they read because they are less effective in placing the information in a coherent order. Thus, improving students' ability to judge the relevance of pages to the task at hand might help to improve their digital reading performance.

Methods for improving students' navigation strategies can be derived from analysing ICT use at home. PISA results show that ICT use at home for leisure is, up to a point, positively related to both navigation skills and self-confidence in completing high-level ICT tasks. That may be because students' use of ICT at home is usually self-directed and, as a result, students learn, by experimenting, how to navigate across and among various pages to achieve their objectives. There is also a role for instruction too: given the positive association between awareness of reading and learning strategies and proficiency in reading, teachers can help by providing students with opportunities to reflect on different methods of navigating. This will allow students to develop a repertoire of approaches and learn how digital texts are structured.

Even though computer use at home for leisure is positively related to navigation skills, parents and educators should be aware that intensive users do not perform better in digital reading – and often perform worse – than moderate users. This negative association between intensive use of computers and performance is even more pronounced in mathematics, science and especially in print reading. Therefore, it is important for parents and teachers both to encourage students to use computers freely, so that they can improve their navigation skills, and also to provide guidance on balancing time spent using computers with time for other activities.

ADDRESSING UNDERPERFORMANCE OF BOYS

Policy makers should be particularly concerned about the gender gap in reading performance. According to the PISA 2009 print reading results, in the countries that also participated in the digital reading option, boys' scores are the equivalent of one year of formal schooling lower than girls'. Most of this gap can be attributed to the fact that boys are less engaged in reading than girls. However, the gender gap narrows to two-thirds of a year of schooling when digital reading is assessed. This narrowing of the gender gap often relates to differences in navigation skills between boys and girls. In Poland, Chile, Spain, the partner country Colombia and the partner economy Hong Kong-China, when comparing boys and girls who have similar levels of reading proficiency, boys tend to have better navigation skills than girls. These findings suggest that one way to promote better reading proficiency among boys lies in encouraging them to read digital texts, since reading more and reading with enjoyment promotes better reading, and better reading fosters stronger engagement.

IMPROVING ACCESS TO ICT

While the term "digital divide" originally referred to differences in access to digital technologies, it is now used more broadly to also denote disparities in the kinds of knowledge and skills that individuals bring to online practices. Nevertheless, a student cannot learn and apply those skills if he or she doesn't have access to computers and the Internet, both at home and at school.

This volume shows that access to both computers and the Internet has grown significantly in recent years and, as a result, fewer than 1% of 15-year-old students across OECD countries reported that they had not used a computer. However, although having a computer and Internet access at home is now nearly universal in many OECD countries, some countries do lag behind. In examining the relationship between performance in digital reading and access to computers at home or at school, access to computers at home relates positively to performance in digital reading, while access to computers at school does not. Even after accounting for students' socio-economic background, the performance advantage among students who have access to computers at home remains, albeit to a lesser degree, in 16 of the 19 countries that participated in the PISA ICT survey. As proficiency in using ICT is a key to success in the knowledge-based society, policy makers in countries where access to computers is still limited may consider expanding access.

Of particular concern is the limited access to computers at home among socio-economically disadvantaged students. On average, advantaged students report significantly higher levels of access to home computers than do their disadvantaged peers. However, some countries try to compensate for the lack of access to home computers among disadvantaged students by providing those students with more opportunities to use computers at school. Strategies that promote wider access to ICT at school can help to minimise the extent to which socio-economic differences between students are translated into digital competency gaps, with possible consequences for future employment opportunities.

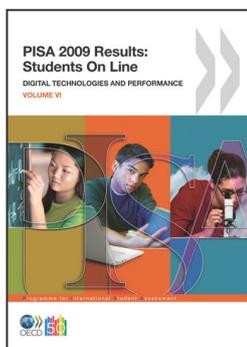## ENABLING EFFECTIVE USE OF ICT IN SCHOOLS

Perhaps the most puzzling finding from PISA 2009 is the lack of a clear relationship between the frequency of students' ICT use at school and performance in digital reading: ICT use at school is not positively associated with

navigation skills or with performance in digital reading in the same way as home use is, even after accounting for students' academic ability. This does not necessarily mean that computer use at school has no positive impact on school performance in general or on performance in digital reading in particular, since many other school policies and practices interact with the observed relationship. However, it does suggest that deeper analysis is required that looks beyond the frequency towards the quality of ICT use at school. Such analysis will need to consider a wider range of factors that can influence the effectiveness of ICT use at school. For example, schools could offer more project-based activities using ICT – particularly those that do not impose constraints on how to accomplish tasks but, rather, allow students to explore various approaches to problem-solving using ICT, much as they do when they use ICT at home. This could help students to improve their navigation skills. At the same time, teachers could develop reading methodologies that improve students' ability to distinguish between relevant and irrelevant material, and to structure, prioritise, distil and summarise text.

Nevertheless, if the use of ICT is not an integral part of a school's vision for teaching and learning and instructional systems, teachers are unlikely to be motivated to invest in the use of ICT. The OECD's 2009 Teaching and Learning International Survey (TALIS) shows that ICT skills are ranked second in teachers' evaluations of their own development needs. That suggests that if teachers have adequate opportunities to develop their skills in using ICT in general, and their understanding of the nature of digital reading and digital texts in particular, they will be more likely to develop the skills and confidence to integrate them effectively into instructional practices on a regular, daily basis.

Last but not least, it is important to look beyond the relationship between ICT use and reading performance. ICT can enable students to obtain more regular feedback on their learning progress. It can also make students more active participants in learning processes in the classroom and tailor those processes to individual students' needs, and it can provide students with up-to-date access to the world's current research and thinking.