



Foreword

Information and communication technology (ICT) has revolutionised virtually every aspect of our life and work. Students unable to navigate through a complex digital landscape will no longer be able to participate fully in the economic, social and cultural life around them. Those responsible for educating today's "connected" learners are confronted with challenging issues, from information overload to plagiarism, from protecting children from online risks such as fraud, violations of privacy or online bullying to setting an adequate and appropriate media diet. We expect schools to educate our children to become critical consumers of Internet services and electronic media, helping them to make informed choices and avoid harmful behaviours. And we expect schools to raise awareness about the risks that children face on line and how to avoid them.

This report provides a first-of-its-kind internationally comparative analysis of the digital skills that students have acquired, and of the learning environments designed to develop these skills. This analysis shows that the reality in our schools lags considerably behind the promise of technology. In 2012, 96% of 15-year-old students in OECD countries reported that they have a computer at home, but only 72% reported that they use a desktop, laptop or tablet computer at school, and in some countries fewer than one in two students reported doing so. And even where computers are used in the classroom, their impact on student performance is mixed at best. Students who use computers moderately at school tend to have somewhat better learning outcomes than students who use computers rarely. But students who use computers very frequently at school do a lot worse in most learning outcomes, even after accounting for social background and student demographics.

The results also show no appreciable improvements in student achievement in reading, mathematics or science in the countries that had invested heavily in ICT for education. And perhaps the most disappointing finding of the report is that technology is of little help in bridging the skills divide between advantaged and disadvantaged students. Put simply, ensuring that every child attains a baseline level of proficiency in reading and mathematics seems to do more to create equal opportunities in a digital world than can be achieved by expanding or subsidising access to high-tech devices and services. Last but not least, most parents and teachers will not be surprised by the finding that students who spend more than six hours on line per weekday outside of school are particularly at risk of reporting that they feel lonely at school, and that they arrived late for school or skipped days of school in the two weeks prior to the PISA test.

One interpretation of all this is that building deep, conceptual understanding and higher-order thinking requires intensive teacher-student interactions, and technology sometimes distracts from this valuable human engagement. Another interpretation is that we have not yet become good enough at the kind of pedagogies that make the most of technology; that adding 21st-century technologies to 20th-century teaching practices will just dilute the effectiveness of teaching.



If students use smartphones to copy and paste prefabricated answers to questions, it is unlikely to help them to become smarter. If we want students to become smarter than a smartphone, we need to think harder about the pedagogies we are using to teach them. Technology can amplify great teaching but great technology cannot replace poor teaching.

The report leaves many questions unanswered. The impact of technology on education delivery remains sub-optimal, because we may overestimate the digital skills of both teachers and students, because of naïve policy design and implementation strategies, because of a poor understanding of pedagogy, or because of the generally poor quality of educational software and courseware. In fact, how many children would choose to play a computer game of the same quality as the software that finds its way into many classrooms around the world? Results suggest that the connections among students, computers and learning are neither simple nor hard-wired; and the real contributions ICT can make to teaching and learning have yet to be fully realised and exploited.

Still, the findings must not lead to despair. We need to get this right in order to provide educators with learning environments that support 21st-century pedagogies and provide children with the 21st-century skills they need to succeed in tomorrow's world. Technology is the only way to dramatically expand access to knowledge. Why should students be limited to a textbook that was printed two years ago, and maybe designed ten years ago, when they could have access to the world's best and most up-to-date textbook? Equally important, technology allows teachers and students to access specialised materials well beyond textbooks, in multiple formats, with little time and space constraints. Technology provides great platforms for collaboration in knowledge creation where teachers can share and enrich teaching materials. Perhaps most importantly, technology can support new pedagogies that focus on learners as active participants with tools for inquiry-based pedagogies and collaborative workspaces. For example, technology can enhance experiential learning, foster project-based and inquiry-based pedagogies, facilitate hands-on activities and cooperative learning, deliver formative real-time assessment and support learning and teaching communities, with new tools such as remote and virtual labs, highly interactive non-linear courseware based on state-of-the-art instructional design, sophisticated software for experimentation and simulation, social media and serious games.

To deliver on the promises technology holds, countries will need a convincing strategy to build teachers' capacity. And policy-makers need to become better at building support for this agenda. Given the uncertainties that accompany all change, educators will always opt to maintain the status quo. If we want to mobilise support for more technology-rich schools, we need to become better at communicating the need and building support for change. We need to invest in capacity development and change-management skills, develop sound evidence and feed this evidence back to institutions, and back all that up with sustainable financing. Last but not least, it is vital that teachers become active agents for change, not just in implementing technological innovations, but in designing them too.

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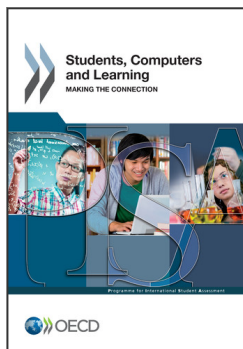
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