

Are students ready for a technology-rich world?

OECD Briefing Notes for GERMANY

Overview

The new OECD report “*Are students ready for a technology-rich world?*” provides first internationally comparative data on:

- the opportunities 15-year-old students have for using computers at home and at school;
- how they use computers and their attitudes to them;
- the relationship between computer use and performance in key school subjects.

The overall picture that emerges from this report is that German 15-year-olds are generally experienced and confident in using computers, but that access to computers and their use is more limited at school than at home. School principals in Germany tend not to consider this a problem for instruction, though, which may imply that computers in German schools are effectively utilised, not considered central to instruction, or that school principals are not as aware of their potential for instruction as is the case in other countries.

German 15-year-olds who are established computer users tend to perform better in key school subjects than those with limited experience or a lack of confidence in their ability to perform basic computer functions, an advantage that tends to be larger than at the OECD average level and holds even after accounting for socio-economic background factors. Students report using computers at home for a wide range of functions, not just to play games. Half of all students surveyed reported frequent use of word processing software and of the Internet as a research tool.

Girls are less confident than boys in performing computer functions, especially high-level tasks such as programming or multi-media presentations and these gender differences are larger in Germany than at the OECD average level. Girls also tend overall to use computers less frequently than boys, who are more likely than girls to have computers at home in most OECD countries and more likely to play computer games and do programming.

The opportunities students have for using computers at home and at school

Fifteen-year-old students’ access to computers has increased significantly in Germany between 2000 and 2003 both at home and in schools (see Figure 2.5 in the report). The trend was similar, though often less pronounced, in most OECD countries. The exception is Finland, where 96% of students already had access to a computer at school in 2000.

However, even when schools are equipped with computers, students don't necessarily have the same degree of access from one country to another. The number of 15-year-old students needing to share a computer in a school in Germany, for example, is twice as high than at the OECD average level and three times higher than in Australia, Korea and the United States (Table 2.4). This being said, a below-average 34% of school principals report that a shortage of computers hinders instruction to some extent or a lot (OECD average 44%) and the percentage of school principals reporting that a shortage of software hinders instruction is, at 43%, around the OECD average level (Table 2.5).

In Germany, 71% of the computers at school are connected to the Internet (OECD average 78%) and 45% are part of a local area network (OECD average 68%).

Almost all 15-year-old students in OECD countries have some experience with the use of computers, but the length of time for which students have been using computers differs greatly across countries. Figure 2.3 shows that 33% of German 15-year-olds have more than five years of access to computers, around the OECD average level. However, in some countries a majority of 15-year-olds have more than five years of experience, such as Australia (69%), Canada (66%), United States (62%), Sweden (57%), New Zealand (55%), Denmark (52%), Finland (51%), Iceland (50%) and Korea (45%).

How students use computers and their attitudes to them

Even though access to computers is more universal at school than at home, in all but two OECD countries 15-year-old students use their computers at home most frequently. 82% of German 15-year-olds use computers at home several times each week, and only Canada, Iceland, Sweden, Australia, Korea, Denmark, Belgium and the United States show a higher proportion of frequent home users (OECD average 74%). In contrast, Germany has, at 23%, the lowest percentage of 15-year-olds using computers several times each week at school, just slightly more than half the OECD average level of 44% (Figure 3.2).

Students use computers at home for a wide range of functions, not just to play games. Half of all students surveyed reported frequent use of word processing software and of the Internet as a research tool. When students' frequency of computer use for Internet and entertainment is summarised on an index, German 15-year-olds score around the OECD average level. The picture is similar with regard to the use of computers for programs and software. However, girls tend overall to use computers less frequently than boys, who are more likely than girls to have computers at home in most OECD countries and more likely to play computer games and do programming. Germany shows some of the largest gender differences on such measures (Figure 3.3).

Together with students in Austria, Canada, Iceland, Korea, Poland and Portugal, German 15-year-olds were among the most positive in their attitudes towards computers. However also here, Germany shows some of the largest gender differences (Table 3.6).

Girls are also far less confident than boys in performing computer functions, especially high-level tasks such as programming or multi-media presentations.

Generally, students in all participating countries report to be reasonably confident in using ICT, with the majority saying they are able to perform 17 of the 23 tasks specified very well by themselves. Students are relatively more confident in performing routine tasks than Internet-based tasks or high-level tasks on a computer, although even in the case of the latter, most students reported that they could do each task at least if they had some help. German students report an above-average level of confidence in the use of routine, Internet, and high level ICT

tasks. However, also on this dimension Germany shows some of the largest gender differences favouring boys.

The relationship between computer use and performance in key school subjects.

German students without access to a computer at home scored significantly lower than students with a computer on the PISA 2003 mathematics test. Even after accounting for socio-economic background factors, the performance difference amounts to almost the equivalent of one school year. With 79 PISA score points before the adjustment and 32 points after, the gap is significantly larger than at the OECD average level (61 and 22 PISA points respectively). With regard to access to computers at school, the differences were not significant (Table 4.2).

More importantly, the results show clearly that experienced computer users perform better in key school subjects. In Germany, the mathematics performance of students with less than one year of computer use is 436 PISA score points, between the average performance of students in Greece and Turkey, while the performance of students with between three and five years of computer use is 528 PISA score points, at the level of Switzerland, and the performance of students with more than 5 years of computer use is 533 PISA Score points, at the average performance level of Canada and Japan. More than half of this performance advantage remains even after accounting for socio-economic background factors (Table 4.3). The picture is similar in most OECD countries and generally also holds for the other subject areas assessed by PISA (Table 4.8).

Students attitudes and confidence in computer use is another variable closely related to their subject matter performance on the PISA test, again even after accounting for socio-economic factors.

“Are students ready for a technology-rich world?” is available from the OECD’s Online Bookshop (www.oecd.org or e-mail sales@oecd.org) and to journalists from the OECD’s Media Division (newscontact@oecd.org). For further information, journalists are invited to contact Andreas Schleicher, Head of the OECD’s Education Statistics and Indicators Division, on +33 1 45 24 93 66 or +33 6 07 38 54 64, or e-mail: Andreas.Schleicher@OECD.org