Teachers’ ICT and problem-solving skills: Competencies and needs

- The education sector performs well for information and communication technology (ICT) and problem-solving skills, although it still lags behind the professional, scientific and technical activities sector.

- Primary and secondary teachers have better ICT and problem-solving skills than the general population, and similar skills to other tertiary-educated adults. In Japan and Korea, however, primary and secondary teachers are over 40 percentage points more likely than other tertiary graduates to have good skills when age is taken into account.

- On average, across the countries participating to the TALIS survey, 59% of lower secondary teachers expressed a need for professional development in ICT skills for teaching.

How are ICT and problem-solving skills measured?

Individuals with “good ICT and problem-solving skills” are individuals scoring at the two highest proficiency levels (Levels 2 and 3) in the assessment of problem solving in technology-rich environment of the Survey of Adults Skills. To score at these levels, individuals must participate in the computer-based assessment and solve problems that require both ICT and problem-solving skills. These individuals are able to solve problems that require at least some navigation across webpages and applications, involve multiple steps and operators, and possibly the use of tools (such as a sort function). The tasks may also require evaluating the relevance of a set of items to discard distractors, and applying integration and inferential reasoning. These individuals thus demonstrate a high level of problem-solving competence and at least a basic level of ICT skills (OECD, 2013b).

More than 40% of workers employed in the education sector have good ICT and problem-solving skills.

As Figure 1 shows, workers employed in the education sector (either as teachers or in other roles) are more likely to have good ICT and problem-solving skills than workers employed in human health and social work activities. The difference is on average 15 percentage points across the countries and sub-national entities participating in the Survey of Adult Skills (PIAAC)¹ in 2012, and it is over 20 percentage points in the Czech Republic and in Finland.

However, on average, workers in the education sector are 15 percentage points less likely to have good ICT and problem-solving skills than those working in the professional, scientific and technical activities sector, which includes scientific research and development and legal and accounting activities. Hence, education can be considered as a high-performing sector in ICT and problem solving, although it still lags behind some very skill-intensive activities.

Teacher’s skills are similar to those of other tertiary-educated adults.

The fact that education has a relatively high proportion of workers with good ICT and problem-solving skills can be explained by the fact that it employs many tertiary-educated workers, particularly teachers. For example, among countries that participated in the 2013 Teaching and Learning International Survey (TALIS),² more than 95% of primary and lower secondary education teachers had a tertiary degree.

More than 40% of workers employed in the education sector have good ICT and problem-solving skills.

In all countries participating in the Survey of Adult Skills, the proportion of other tertiary-educated adults (i.e. excluding teachers) with good ICT and problem-solving skills is significantly higher than that of the general adult population.

¹ The Survey of Adult Skills is a product of the OECD Programme for the International Assessment of Adult Competencies (PIAAC), assessing adults’ competencies and skills.

² TALIS is the OECD Teaching and Learning International Survey. It asks teachers and school leaders about the conditions that contribute to the learning environments in their schools.
Primary and secondary teachers tend to be proficient in other domains as well. For example, after accounting for age, they are on average eight percentage points more likely to have good literacy skills than other tertiary graduates across participating countries. This difference is significant at the 5% confidence level.

Lower secondary teachers are expressing a need for professional development in ICT skills for teaching.

ICT has permeated many aspects of everyday life and work. As a result, students who have not learned to navigate through a complex digital landscape will find it difficult to develop their professional and social life fully in the future. To address this
Building teachers’ skills is of vital importance to deliver the promises technology holds. In a context of rapid change, teachers must become active agents not just in implementing technological innovations in the field of education, but in designing them too. Despite teachers’ strong ICT and problem-solving skills, the TALIS data show that applying these skills in a teaching situation often remains a challenge. Meanwhile, Programme for International Student Assessment (PISA) results suggest that although limited use of computers at school may be better for students than not using them at all, using them more intensively than the current OECD average tends to be associated with significantly poorer student performance (OECD, 2015c).

One interpretation of these findings is that educators need the training to learn how to use technology to improve teaching methodologies, while staying firmly focused on student learning. Meanwhile, online tools can help teachers and school leaders to exchange ideas and good practices, creating collaborative networks and inspiring each other, transforming what used to be an individual task into a collaborative process. In the end, technology can amplify great teaching, but great technology cannot replace poor teaching.
Figure 3. Lower secondary teachers’ needs for professional development (2013)

Percentage of lower secondary education teachers indicating they have a moderate or high level of need for professional development in selected areas

<table>
<thead>
<tr>
<th>Area of Need</th>
<th>Percentage Need</th>
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<tbody>
<tr>
<td>ICT skills for teaching</td>
<td>50%</td>
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<tr>
<td>Teaching students with special needs</td>
<td>45%</td>
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<tr>
<td>New technologies in the workplace</td>
<td>40%</td>
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<tr>
<td>Approaches to individualised learning</td>
<td>35%</td>
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<tr>
<td>Teaching cross-curricular skills (e.g. problem solving, learning-to-learn)</td>
<td>30%</td>
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<tr>
<td>Student evaluation and assessment practice</td>
<td>25%</td>
</tr>
<tr>
<td>Student behaviour and classroom management</td>
<td>20%</td>
</tr>
<tr>
<td>Pedagogical competencies in teaching subject field(s)</td>
<td>15%</td>
</tr>
<tr>
<td>Student career guidance and counselling</td>
<td>10%</td>
</tr>
<tr>
<td>Approaches to developing cross-occupational competencies for future work or future studies</td>
<td>5%</td>
</tr>
<tr>
<td>Knowledge and understanding of the subject field(s)</td>
<td>3%</td>
</tr>
<tr>
<td>Teaching in a multicultural or multilingual setting</td>
<td>3%</td>
</tr>
<tr>
<td>Knowledge of the curriculum</td>
<td>2%</td>
</tr>
<tr>
<td>School management and administration</td>
<td>1%</td>
</tr>
</tbody>
</table>

Source: OECD, TALIS 2013 Database, [http://dx.doi.org/10.1787/888933045183](http://dx.doi.org/10.1787/888933045183), Table 4.12.Web.

The bottom line: The education sector performs well for ICT and problem-solving skills as teachers – who make up a large proportion of its workforce – tend to have better ICT and problem-solving skills than the overall population. In a world where students must learn to navigate complex digital landscapes to succeed in the future, teachers play an important role which poses high demands on their skills and competencies. This may be why, despite their relatively high skills, more than half of lower secondary teachers expressed the need for professional development in ICT skills for teaching.

For more information

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