Results of the International Computer and Information Literacy Study (ICILS) 2018
ICILS 2018 assessment sample

More than 26,000 teachers

More than 2,200 schools

More than 46,000 students

In 14 countries & educational systems
Computer and Information Literacy (CIL) refers to an individual’s ability to use Computers to investigate, create and communicate in order to participate Effectively at home, at school, in the workplace, and in society.
1. UNDERSTANDING COMPUTER USE
The fundamental technical knowledge and skills that underpin the operational use of computers as tools for working with information

2. GATHERING INFORMATION
The investigative processes that enable a person to find, retrieve, and make judgments about the relevance, integrity, and usefulness of computer-based information and the processes of organizing and storing working with information that has been gathered

3. PRODUCING INFORMATION
Using computers to adapt information display and to design, and generate information products for specified purposes and audiences

4. DIGITAL COMMUNICATION
Competencies associated with information sharing in social networking (and broader web-based information sharing space) together with the social, legal and ethical responsibilities associated with information sharing

Computer & Information Literacy
Students' average computer and information literacy (CIL) scores

- Portugal: 516 (2.6)
- Uruguay: 476 (3.7)
- Chile: 519 (1.9)
- United States*: 499 (2.3)
- France: 516 (2.6)
- Denmark: 553 (2.0)
- Finland: 531 (3.0)
- North-Rhine Westphalia: 515 (2.6)
- Germany: 518 (2.9)
- Republic of Korea: 542 (3.1)
- Kazakhstan: 542 (3.1)
- Moscow (Russian Federation): 549 (2.2)

* Did not meet sample participation requirements
** Tested at the beginning of the school year
• Benchmarking participant

(1) Standard errors
Computational thinking is a way of approaching problems, relevant for many areas of education (not just computer programming)
1. **DECOMPOSITION**
   Breaking big problems into smaller, easier to manage problems

2. **PATTERN RECOGNITION**
   Analyse & look for a repeating sequence

3. **ABSTRACTION**
   Remove parts of a problem that are unnecessary & make one solution work for multiple problems

4. **ALGORITHMS**
   Step-by-step sequenced instructions on how to complete a task

**Computational thinking**
Key Messages
1. Digital natives are not digital experts:
Young people do not develop sophisticated digital skills
just by growing up using digital devices
Students' scores on the computer and information literacy (CIL) scale were divided across four levels.
Students' scores on the computer and information literacy (CIL) scale. In most countries, the majority of students scored in level 2. On average, across all countries, the proportion of students above level 2 is lower than the proportion below level 2.
2. Providing students or teachers with Information and Communications Technology (ICT) equipment alone is not enough to improve their digital skills. Students need to be taught how to use computers effectively and teachers need support in their use of ICT in teaching.
Most students have access to software-related resources for teaching and learning
Percentages of students at schools where ICT-Coordinators indicate that
the following software-related resources are available for both teaching and learning

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Resource Description</th>
<th>Example(s)</th>
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</thead>
<tbody>
<tr>
<td>60%</td>
<td>Practice programs or apps where teachers decide which questions are asked of students</td>
<td>Quizlet, Kahoot, mathfessor</td>
</tr>
<tr>
<td>54%</td>
<td>Single user digital learning games</td>
<td>e.g. languages online</td>
</tr>
<tr>
<td>29%</td>
<td>Multi-user digital learning games with graphics and inquiry tasks</td>
<td>Quest Atlantis</td>
</tr>
<tr>
<td>98%</td>
<td>Word-processor software</td>
<td>Microsoft Word®</td>
</tr>
<tr>
<td>98%</td>
<td>Presentation software</td>
<td>Microsoft PowerPoint®</td>
</tr>
<tr>
<td>85%</td>
<td>Video and photo software for capture and editing</td>
<td>Windows Movie Maker, iMovie, Adobe Photoshop</td>
</tr>
<tr>
<td>50%</td>
<td>Concept mapping software</td>
<td>Inspiration®, Webspiration®</td>
</tr>
<tr>
<td>22%</td>
<td>Data logging and monitoring tools</td>
<td>Logger Pro</td>
</tr>
<tr>
<td>42%</td>
<td>Simulations and modelling software</td>
<td>NetLogo</td>
</tr>
<tr>
<td>66%</td>
<td>A learning management system</td>
<td>Edmodo, Blackboard</td>
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<tr>
<td>76%</td>
<td>Graphing or drawing software</td>
<td>Practice</td>
</tr>
<tr>
<td>39%</td>
<td>e-portfolios</td>
<td>VoiceThread</td>
</tr>
<tr>
<td>70%</td>
<td>Digital content linked with textbooks</td>
<td></td>
</tr>
<tr>
<td>59%</td>
<td>Social media</td>
<td>Facebook, Twitter</td>
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</tbody>
</table>

Most students attended schools with access to word processing, presentation, video/photo and graphic/drawing software
But less than half of teachers reported using general ICT in most lessons
Less than half of teachers reported using general Information and Communications Technology (ICT) in most lessons.

In most lessons, 43% of teachers use word processing or presentation softwares,

32% of teachers use digital content linked with text books
How ICT is used at school
Students report being taught at school to...

- Provide references to internet sources: 68%
- Search for information using ICT: 74%
- Present information for a given audience or purpose using ICT: 66%
- Work out whether to trust information from the Internet: 65%
- Decide what information obtained from the internet is relevant to include in school work: 68%
- Organize information obtained from internet sources: 68%
- Decide where to look for information on the internet about an unfamiliar topic: 67%
- Use ICT to collaborate with others: 60%

Most students report learning about Computer and Informational Literacy (CIL) related issues at school.
Percentages of students reporting use of Information and Communications Technology (ICT) at least once a week during lessons to access:

Most frequent use of ICT:

- 29% Computer-based information resources
- 28% Word-processing software (e.g. using Microsoft Word ®)
- 26% Presentation software (e.g. using Microsoft PowerPoint ®)

Least frequent use of ICT:

- 10% Tools that capture real-world data (e.g. speed, temperature) digitally for analysis
- 9% Concept mapping software (e.g. Inspiration ®, Webspiration ®)
- 8% Simulations and modelling software
**Percentages of teachers reporting use of Information and Communications Technology (ICT) in most lessons for:**

<table>
<thead>
<tr>
<th>Most frequent use of ICT:</th>
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</thead>
<tbody>
<tr>
<td>64% <strong>The presentation of information through direct class instruction</strong></td>
<td>64%</td>
</tr>
<tr>
<td>45% <strong>The communication with parents or guardians about students’ learning</strong></td>
<td>45%</td>
</tr>
<tr>
<td>43% <strong>The support of student-led whole-class discussions and presentations</strong></td>
<td>43%</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Least frequent use of ICT:</th>
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<tbody>
<tr>
<td>32% <strong>The provision of feedback to students on their work</strong></td>
<td>32%</td>
</tr>
<tr>
<td>31% <strong>The support of collaboration among students</strong></td>
<td>31%</td>
</tr>
<tr>
<td>26% <strong>The mediation of communication between students and experts or external mentors</strong></td>
<td>26%</td>
</tr>
</tbody>
</table>
3. Teachers are more likely to promote Computer and Informational Literacy (CIL) and Computational Thinking (CT) in their teaching if they are confident users of ICT; they have positive views towards ICT; they feel their school has a collaborative approach to the use of ICT in teaching.
Teachers are confident undertaking a large number of ICT-related tasks but they lack confidence in some areas.
The tasks teachers are least confident to complete using ICT are......

...using learning management systems (59%)
...contributing to online discussions (58%)
...collaborating with others online (57%)

The tasks teachers are most confident to complete using ICT are...

...finding teaching resources on the internet (95%)
...producing presentations (84%)

* ICT = Information and Communications Technology
Teachers who are confident in their own CIL abilities who have a positive perception of ICT use in teaching and learning and teachers who feel they work in a collaborative professional environment are more likely to emphasise CIL and CT in their teaching.
There is a digital divide relating to the socioeconomic status, home access to devices and years of experience of using devices.
SES: Socioeconomic status
Parental education:

Students with a parent who had completed a Bachelor’s degree or higher:
average CIL score = 518

Students without parents who hold a degree:
average CIL score = 487

Books in the home:

Students who reported having 26 or more books in the home:
average CIL score = 517

Students who reported having fewer than 26 books in the home:
average CIL score = 467

Parental occupation:

Students of a parent with medium - high occupational status:
average CIL score = 522

Students of parents with low - medium occupational status:
average CIL score = 485

Students from higher socioeconomic backgrounds (measured by parental occupation, parental education and number of books in the home) had significantly higher Computer and Information Literacy (CIL) scores.
Students from higher socioeconomic backgrounds (measured by parental occupation, parental education and number of books in the home) had significantly higher Computational Thinking (CT) scores.
Home access & years of experience
Students with more computers in the home and more years of experience using computers have higher Computer and Information Literacy (CIL) scores.

**Computer availability at home**
- Fewer than 2 computers: 479
- 2 computers or more: 511

**Students’ years of experience using computers**
- Fewer than 5 years: 484
- 5 years or more: 515

Students who reported having 2 or more computers in the home scored an average of 32 CIL scale points more than students with fewer than 2 computers at home.

Students who reported having 5 or more years of experience using computers scored an average of 31 CIL scale points more than students with fewer than 5 years’ experience.
5.

Differences in students’ Computer and Information Literacy (CIL) scores within countries are larger than the differences between countries.
The range between the lowest 5% & the highest 95% of students’ CIL scores within countries varied between 216 scale points (in Denmark) and 347 scale points (in Kazakhstan).

The difference between the highest & lowest average CIL scores across countries was 157 scale points.
Variation in Computer and Information Literacy (CIL) scores

Differences within countries are larger than between countries

- Denmark
- Republic of Korea
- Finland
- Germany
- Portugal
- France
- Luxembourg
- Chile
- Uruguay
- Kazakhstan
- Italy
- United States*
- Moscow**
- North Rhine-Westphalia***

Average CIL score (±2SE)

25th
75th

* tested at the beginning of the school year
** not meeting the sample participation requirements
*** Benchmarking participants meeting sample participation requirements

BL1 Below Level 1 CIL scale
L Level
Variation in Computational Thinking (CT) scores
Variation in Computational Thinking (CT) scores

- Republic of Korea: 536
- Denmark: 527
- Finland: 508
- France: 501
- Germany: 486
- Portugal: 482
- Luxembourg: 460
- United States*: 498
- North Rhine-Westphalia**: 485

* not meeting the sample participation requirements
** Benchmarking participants meeting sample participation requirements
6.

Gender differences:
Girls tend to perform better than boys in CIL. On average, boys perform better than girls in CT but the differences are not consistent.
On average, girls perform better than boys in computer and information literacy (CIL)
On average, boys perform better than girls in computational thinking (CT)
7.

Students use computers more outside than inside school and more for leisure than for other purposes
Students use Information and Communications Technology (ICT) more outside than inside school and more for leisure than for other purposes.
Most students use ICT at least once a week for leisure activities such as...

- 7/10 Grade 8 students used ICT on a daily basis outside school for non-school related purposes
- 1/5 students reported ICT use on a daily basis for school-related purposes
- 4/5 listening to music or...
- 7/10 downloading videos
- 2/3 of students use ICT at least once a week to access information about things of personal interest from the internet

Students use Information and Communications Technology (ICT) more outside than inside school and more for leisure than for other purposes.
Percentages of students’ using Information and Communications Technology (ICT) on a weekly basis to create or edit information products

33% Write or edit documents

21% Use a spreadsheet to do calculations, store data or plot graphs (e.g. using Microsoft Excel ®)

19% Create a simple “slideshow” presentation (e.g. using Microsoft PowerPoint ®)

28% Record or edit videos

12% Write computer programs, scripts or apps (e.g. using Logo, LUA, or Scratch)

20% Use drawing, painting or graphics software or apps

20% Produce or edit music

8% Build or edit a webpage

Most often, students use computers to write or edit documents (33%) or to record or edit videos (28%)
Students use computers in most lessons for

...Languages (64%)
...Sciences (63%)
...Humanities (58%)
8.

On average, students & teachers have positive attitudes towards Information and Communications Technology (ICT) in education & society but they also acknowledge potential areas of concern.
Students
Four out of five students were confident about their ability to use Information and Communications Technology (ICT) to...

...search for information

...insert an image into a document

...write or edit text for a school assignment
Most students acknowledged positive outcomes of Information and Communications Technology (ICT) for society.

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Remarks</th>
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<tbody>
<tr>
<td>86%</td>
<td>Said ICT helps us to understand the world better</td>
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<tr>
<td>85%</td>
<td>Said advances in ICT usually improve people's living conditions</td>
</tr>
<tr>
<td>84%</td>
<td>Said ICT is valuable to society</td>
</tr>
<tr>
<td>83%</td>
<td>Said advances in ICT bring many societal benefits</td>
</tr>
</tbody>
</table>
Many students acknowledge that Information and Communications Technology (ICT) can have a negative impact on society.
Teachers
A majority of teachers agree that there are positive benefits to using Information and Communications Technology (ICT) in teaching and learning.

- 91% said that using ICT helps students to develop greater interest in learning.
- 92% said that it enables students to access better sources of information.
- 87% agree that it helps students to work at a level appropriate to their learning needs.
Most teachers agree that Information and Communications Technology (ICT) can have potential negative impacts.

71% Agree that ICT use results in students copying material from internet sources.

52% Said that using ICT results in poorer written expression among students.