

IEA COMPASS: BRIEFS IN EDUCATION

DIGITAL NATIVES—REALITY OR MYTH?

Evidence from IEA's International Computer and Information Literacy Study



SUMMARY

Are young people truly *digital natives*, or simply frequent users of technology? International data collected across three cycles of ICILS (2013, 2018, and 2023) show that against a backdrop of explicit representation of digital literacy competencies in curriculums across countries and increasing ICT (information and communications technologies) use by students in schools, students' CIL (computer and information literacy) has declined. Most students can execute basic functional commands on a computer, yet relatively few can complete fundamental tasks related to evaluating digital information. In contrast to this reality, large majorities of students believe they can judge the trustworthiness of internet-based information at least moderately well. These findings demonstrate that everyday exposure to technology does not automatically build the critical digital literacy skills measured by ICILS. As the use of GenAI (generative artificial intelligence) expands and the scale of online misinformation grows, education systems must do more to develop students' capacity to critically evaluate the digital information they encounter.

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IMPLICATIONS

- ▶ Given that students' use of ICT in schools increased while their CIL achievement declined between 2013 and 2023, the effectiveness of digital literacy education endeavors should be assessed on more than access to ICT resources or frequency of use. Instead, careful attention must be given to evaluating students' actual CIL learning outcomes.
- ▶ Although students' capacities to evaluate digital information are extensively embedded in national curricula, these expectations are not reflected in their demonstrated capabilities. A core set of digital evaluation skills must be developed through explicit instruction; mere exposure to digital information sources is insufficient to foster critical evaluation.
- ▶ Many students overestimate their ability to evaluate digital information. Targeted teaching, and regular assessment and reporting of students' digital skills could help to both strengthen students' evaluative skills, and support students to develop better understanding of their own capabilities and how to improve them.

INTRODUCTION

In a world where digital information has become the currency of communication, the importance of individuals' capacity to independently, purposefully, and critically engage with digital information continues to increase (Vuorikari et al., 2022). The importance of ICT and digital literacy-related competencies is formalized for example, as the "proportion of youth and adults with information and communications technology (ICT) skills" in the UN Sustainable Development Goals (UN, 2017 – SDG 4.4.1), and in the European Commission's target that the "share of low-achieving eight-graders in computer and information literacy should be less than 15 percent, by 2030" (European Commission, 2021). Further, the emergence of GenAI, is rapidly changing the ways in which people access and create digital information, creating greater urgency in the need for people to develop critical digital literacy skills. In ICILS 2023, countries consistently reported placing strong emphasis on the core aspects of CIL, with 10 of 11 listed aspects of CIL each reported to be explicitly stated in curriculum in at least 25 of 34 countries. Students' capacity to evaluate the reliability of information sources was of particular importance, having been reported to be explicitly emphasized in the curriculums of 30 of 34 countries. The remaining four countries reported that this capacity was implicitly stated in the curriculum (Fraillon, 2025).

Given the essential value of the capacity to engage with digital information, and the corresponding rise in internet use during the 2000s, one might assume that there would be a corresponding growth in young people's capacity to engage with digital information. This assumption reflects the notion of the *digital native* introduced by Prensky in the early 2000s (Prensky, 2001) suggesting that young people, who grow up with digital technologies, become "native speakers of the digital language of computers, video games, the [i]nternet and other technology" (Tóth et al., 2022, p. 154).¹

DATA & ANALYSIS

Student data from ICILS 2013, 2018, and 2023 were analyzed. Students' CIL was measured using the ICILS test, with achievement reported on the common CIL scale established in ICILS 2013 (Duckworth & Fraillon, 2025). To address the third question, countries were grouped into three categories based on their students' average confidence in evaluating digital information—Low, Medium, and High. Each group included 10 countries drawn

The notion of the digital native is widely contested (Selwyn, 2009; Evans & Robertson, 2020). Critics have cited concerns regarding a lack of scientific empirical evidence to support the concept of the digital native (Eynon, 2020; Helsper & Eynon, 2010; Gallardo-Echenique et al., 2015; Judd, 2018; Kirschner & De Bruyckere, 2017; Selwyn, 2009) and about perceptions that the concept has been mythologized in public discourse (Kirschner & De Bruyckere, 2017; Reid et al., 2023). Despite this, the concept of the digital native remains deeply embedded in both academic and public discourse concerning how contemporary generations learn (Eynon, 2020; Evans & Robertson, 2020; Reid et al., 2023). Data from three cycles of ICILS provide a valuable opportunity to examine grade 8 students' CIL achievement, including their capacity to engage critically with digital information.

This brief situates student CIL competencies within the conceptual framework of the digital native, examining how assumptions associated with this notion align, or fail to align, with empirical evidence. Focusing on changes in students' CIL across ICILS cycles, the analysis considers these patterns in relation to students' capacity to evaluate digital information critically. This latter, more specific dimension of CIL, is of growing importance given the rapid expansion of both human-generated and AI-generated digital content. The brief addresses the following three questions:

- 1: How has students' CIL achievement changed over time and how does this compare with changes in students' use of ICT at school?
- 2: How well can students critically evaluate digital information?
- 3: How do students' self-perceptions of their capacity to critically evaluate digital information relate to their objectively measured achievement skills?

RESULTS

1: How has students' CIL achievement changed over time and how does this compare with changes in students' use of ICT at school?

In recognition of the importance of young people being able to manage digital information with a critical eye, the European

Commission adopted the proportion of students below ICILS CIL Level 2 as a standard for monitoring progress in the development of digital literacy among young people. This standard represents the proportion of "low achieving eight-graders in digital skills" (European Commission, 2021, p. 15) with the established target

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¹ This recent quotation from Tóth et al., 2022 is an interpretation of a quotation from Prensky, 2005, p. 8.

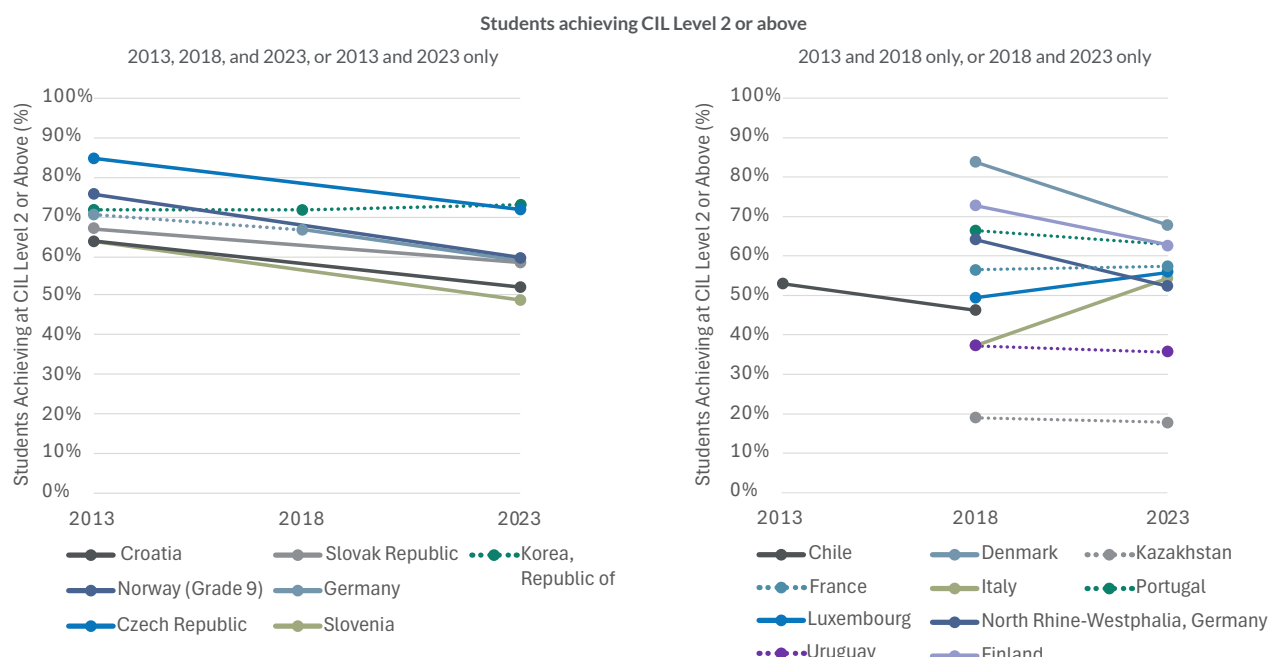
that the proportion of low achieving students should be less than 15 percent by 2030.

Students working below CIL Level 2 execute basic operational skills and complete simple tasks under explicit instruction. These students do not demonstrate independent critical evaluation and decision-making skills when working with digital information. With this standard in mind, grade 8 student achievement of CIL Level 2 or above can consequently be thought of as minimally sufficient.

These students can as a minimum “use computers to complete basic and explicit information gathering and management tasks and to create simple information products that reflect standard design and layout conventions” (Duckworth & Fraillon, 2025, p 71).

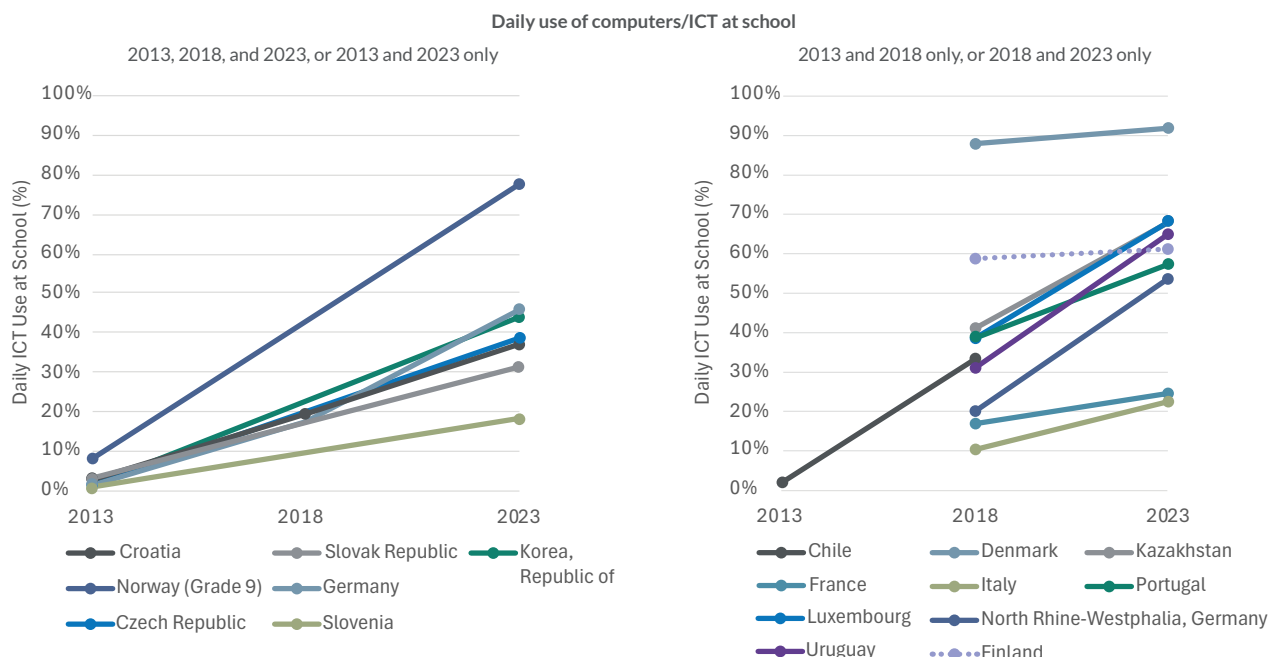
Figures 1 and 2 show the percentages of students at CIL Level 2 or above, and the percentages of students reporting daily use of ICT at school across the three cycles of ICILS.

Figure 1: Percentages of students achieving at CIL Level 2 or above since 2013



Note: Solid lines denote statistically significant differences between cycles. Dotted lines denote non-statistically significant differences.

Figure 2: Percentages of students reporting daily computer/ICT use at school since 2013



Notes: Solid lines denote statistically significant differences between cycles. Dotted lines denote non-statistically significant differences. In 2013, students were asked about daily use of computers at school. In 2018 and 2023 they were asked about daily use of ICT.

The data presented in Figures 1 and 2 show that, while CIL achievement tended to decrease between 2013 and 2023, student ICT use at school tended to increase. In six of the seven reported countries, the percentage of students achieving CIL Level 2 or above was significantly lower in 2023 than in 2013 (Figure 1). On average across these seven countries, the percentage of students at CIL Level 2 or above decreased by 11 percentage points. The percentages of students at CIL Level 2 or above also tended to be lower across the nine countries and the benchmarking participant with comparable data between 2018 and 2023. On average, across the eight countries and the benchmarking participant with comparable data,² the percentage of students at CIL Level 2 decreased by 5 percentage points between 2018 and 2023 (Figure 1).

The decreases in CIL achievement are in stark contrast to students' ICT use in schools (Figure 2). Across the three ICILS cycles there were consistently clear increases in students' reported ICT use at school.³ In all seven countries with comparable data between cycles, the percentages of students reporting daily computer/ICT use was higher in 2023 than in

2013. The magnitudes of differences are consistently large. In these countries, on average, the percentage of students reporting daily use of computers/ICT at school increased by 39 percentage points.

Consistent increases were also evident in the countries and the benchmarking participant with comparable data between 2018 and 2023. On average this increase was 19 percentage points.

2: How well can students critically evaluate digital information?

Students' capacity to critically evaluate digital information is an essential feature of digital literacy as measured in ICILS, is strongly emphasized in the curriculums of ICILS countries, and is represented in influential digital literacy frameworks such as the European Commission Digital Competence Framework for Citizens (DigComp) (Vuorikari et al., 2022). In ICILS 2023 the tasks associated explicitly with the critical evaluation of the veracity of digital information were among those that students found the most difficult to complete.

Table 1: ICILS 2023 information evaluation task descriptions and percentage correct

| # | Summary task description | ICILS 2023 Average correct (%) | ICILS 2023 Range correct (%) | CIL Level |
|-----|--|--------------------------------|------------------------------|-----------|
| 1.1 | Describes two ways to find evidence that a website is a reliable source of information. | 4 (0.13) | 0 to 10 | 4 |
| 1.2 | Describe at least one way to find evidence that a website is a reliable source of information. | 24 (0.28) | 7 to 52 | 3 |
| 2 | Identifies one indicator that information on a given website advertising a product may not be credible.* | 16 (0.23) | 1 to 50 | 4 |
| 3 | Identifies at least one piece of evidence that distinguishes the degree of bias in two contrasting articles on a given topic. | 19 (0.25) | 6 to 39 | 4 |
| 4 | Identifies one indicator that information on a given crowd-sourced website may be either credible, or not credible.* | 32 (0.29) | 6 to 72 | 3 |

* Breathing Task 5 and 6, available to view online: <https://www.iea.nl/icils2023-assessment>

The four tasks shown in Table 1 illustrate common practices that consumers of digital information may need to undertake when evaluating the credibility and potential bias in given information sources. The tasks are located within the upper two levels (3 and 4) of the ICILS CIL achievement scale, and were successfully completed by between four percent and 32 percent of students on average across countries.

In contrast, the tasks that students found easiest to complete in ICILS 2023 were typically those associated with the execution of basic computer skills. For example, 94 percent of students on average across countries were able to open at least one of two specified links from a document in a web browser (73 percent of students could open both links) and 87 percent of students could download a file from a chat message. The gap between students'

² In Italy in 2018 students were tested near the beginning of the school year whereas in 2023 they were tested near the end of the school year. This difference in the time of testing across cycles should be taken into account when interpreting differences in achievement between the cycles.

³ Given the slight differences in the equivalent questions across the three cycles, we have not reported the statistical significance of differences.

successful execution of basic computer skills, and their capacity to execute fundamental tasks associated with information evaluation is clear.

3: How do students' self-perceptions of their capacity to critically evaluate digital information reflect their achievement?

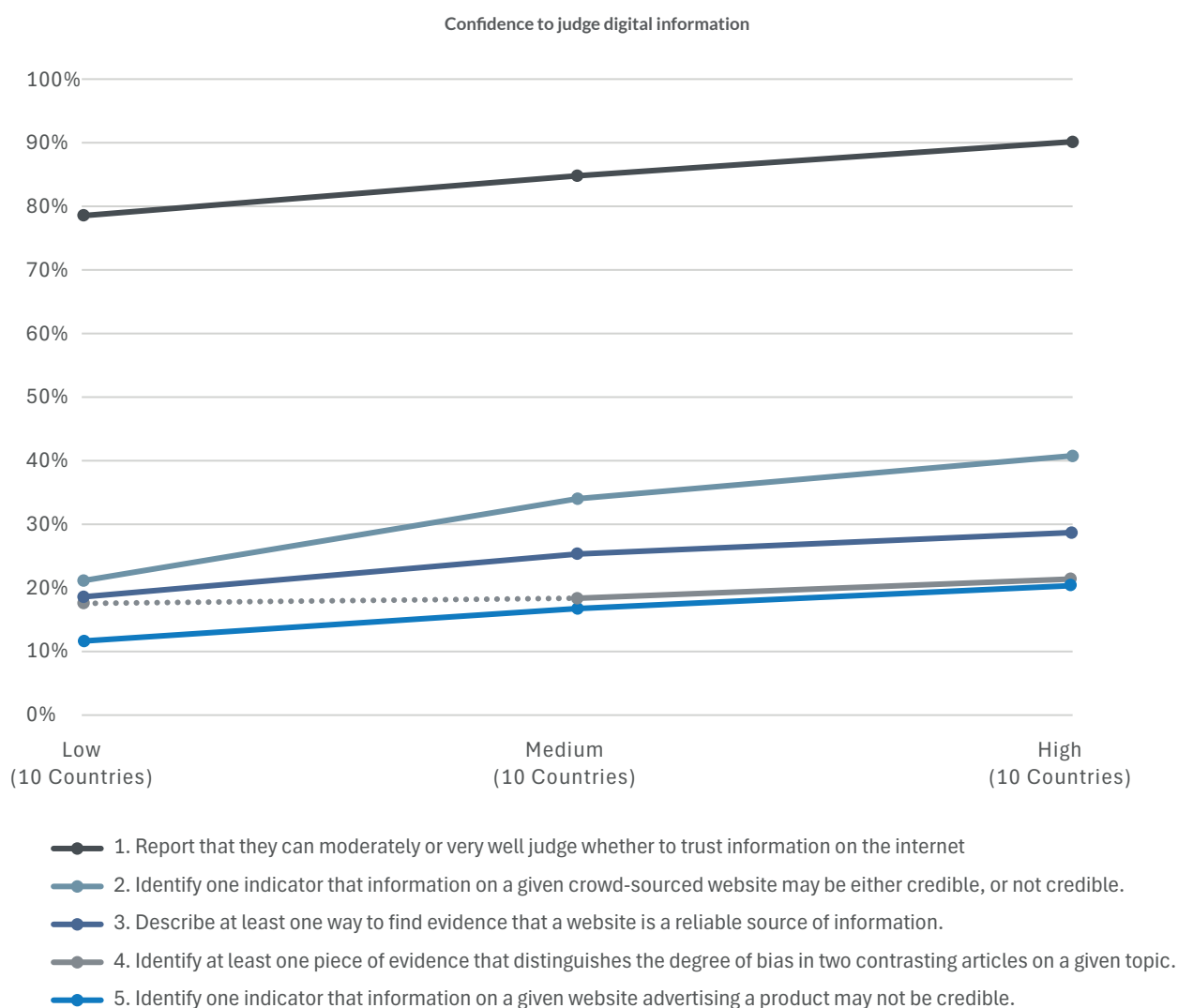
In ICILS 2023 students were asked to rate their confidence to judge whether they could trust information they found on the internet. This question addresses the central purpose of the set of tasks shown in Table 1, each of which assesses specific evaluative skills that can be used to judge the trustworthiness of information.

Across all ICILS countries, grade 8 students expressed much greater confidence in their ability to judge the trustworthiness of internet-based information than is reflected by their demonstrated achievement to do so. On average across

countries, 84 percent of students reported that they could judge the trustworthiness of internet-based information at least moderately well. This is in stark contrast to the average percentages of students who were able to correctly answer the associated ICILS 2023 assessment tasks (Table 1).

In ICILS 2023, there was a broad range of student achievement within and across countries. To describe the association across countries between students' confidence to evaluate digital information and their achievement on the four related tasks, we created three equally sized groups of countries based on students' average self-reported confidence (Low, Medium, and High) to judge the trustworthiness of internet-based information. Figure 3 shows the average percentages of students correctly responding to the four information evaluation tasks reported in Table 1, and their average confidence to evaluate internet-based information in each of these three groups of countries.

Figure 3: Variations in average percentages of students' expressing at least moderate confidence to judge internet-based information and in students' achievement on five information evaluation capabilities, by student confidence tertile groups



► **Note:** Solid lines denote statistically significant differences. Dotted lines denote non-statistically significant differences.

The large differences between students' positive beliefs about their capacity to evaluate digital information and their capacity to execute the fundamental associated skills is clearly illustrated in Figure 3. Across all three tertile groups, the gap between students' self-reported confidence and their successful completion of each of the four associated achievement tasks is consistently large.

Figure 3 also illustrates small positive associations across countries between students' confidence to judge the trustworthiness of

information and their associated achievement on each of the four tasks. The average percentages for each of the five variables shown in Figure 3 are statistically significantly higher in each adjacent higher tertile group than the lower adjacent group with the exception of the difference between the Medium and Low tertile groups for the fourth listed assessment task (relating to identification of bias).

DISCUSSION

Implicit in the notion of the digital native is the assumption that increasing use of digital technology is likely to be associated with increases in the quality of this use; however, ICILS results do not support this assumption. Students' use of ICT at school has increased across the 10 years of ICILS and student CIL achievement has decreased. While the use of ICT in schools clearly offers a great opportunity to support students to improve their digital literacy capabilities, it is clear that increased exposure to ICT alone does not correspond increased student CIL achievement including students' capacity to evaluate digital information.

ICILS results show that not all digital literacy competencies are equal, and that it is a mistake to assume people who demonstrate fluency in executing operational commands will consequently be able to critically evaluate the credibility of digital information. While high proportions of students could execute simple software commands under instruction, three quarters of students on average across countries were unable to list one way of checking the credibility of a given website as a source of information

(see Table 1). If students continue to lack such fundamental information evaluation skills, they will be increasingly susceptible to misinformation and disinformation from human sources, as well as to inappropriate and inaccurate use of AI-generated information sources.

Critics have warned of the risks associated with mythologizing the concept of the digital native in public discourse (Kirschner & De Bruyckere, 2017; Reid et al., 2023). A combination of students' proficiency in basic technical tasks and the unsubstantiated belief that they belong to a generation of inherently skilled technology users may have fostered unrealistic perceptions of their own digital capabilities.

As we move toward a new generation of AI-generated digital information, the capacity for students to evaluate the accuracy of this information continues to be increasingly important. The data shown in this brief demonstrate the imperative on education systems to better support students to develop these critical capabilities.

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