

Student Digital Vulnerability: A Cross-Country Analysis

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Extended Abstract

The use of digital technologies in European education systems has expanded substantially in recent years, particularly following the widespread adoption of hybrid and online learning models. Nonetheless, a non-negligible share of students continues to face digital vulnerability, understood as the *risk* of having limited access to adequate digital devices, insufficient internet connectivity, or low levels of digital competence. According to EU-SILC data, around 5.4% of school-aged children (6-16) live in households unable to afford a computer or internet connection (Ayllón et al., 2023). Moreover, results from ICILS 2023 indicate that approximately 43% of 14-year-olds in the EU fail to reach a basic level of digital literacy.

Recognizing the importance of digital competencies for future labor-market participation, the European Commission has set clear goals and actions through its Digital Education Plan (2021-2027) and the Digital Decade 2030 agenda. These initiatives aim to ensure universal access to digital learning, strengthen student digital skills, upskill teachers, and integrate ethical and safe use of technology in education, thereby preparing students for a competitive, digitally driven economy.

Alongside these institutional efforts, a flourishing economic literature has been developed in recent years. Several studies, surveyed in the next section, have focused on the digital divide analysing how family background, school resources, and territorial disparities contribute to unequal digital access and skills acquisition among students. However, despite the growing interest in student digitalization, student digital vulnerability in European countries has not yet been systematically investigated.

This paper seeks to fill this gap by constructing a harmonized measure of student digital vulnerability and applying it to recent cross-country European data. Using microdata from the latest edition of PISA (2022), we first develop a comparable index capturing the two key dimensions of digital vulnerability, i.e. material and skills vulnerability for 9 EU countries (Austria, Belgium, Germany, Denmark, Spain, Finland, Greece, Italy and Sweden). We then investigate the main factors associated with these vulnerabilities, documenting how individual characteristics, family background, and school-level resources contribute to shaping digital disadvantage among students.