The INVALSI DigComp digital competence assessment: a data analysis to understand student proficiency profiles and support didactics.

Paola Giangiacomo – Valeria F. Tortora – Monica Papini

INVALSI

X SEMINAR
"DATA FROM AND FOR THE EDUCATIONAL SYSTEM: TOOLS FOR RESEARCH AND TEACHING"
ROME, 19 – 20 – 21 NOVEMBER 2025

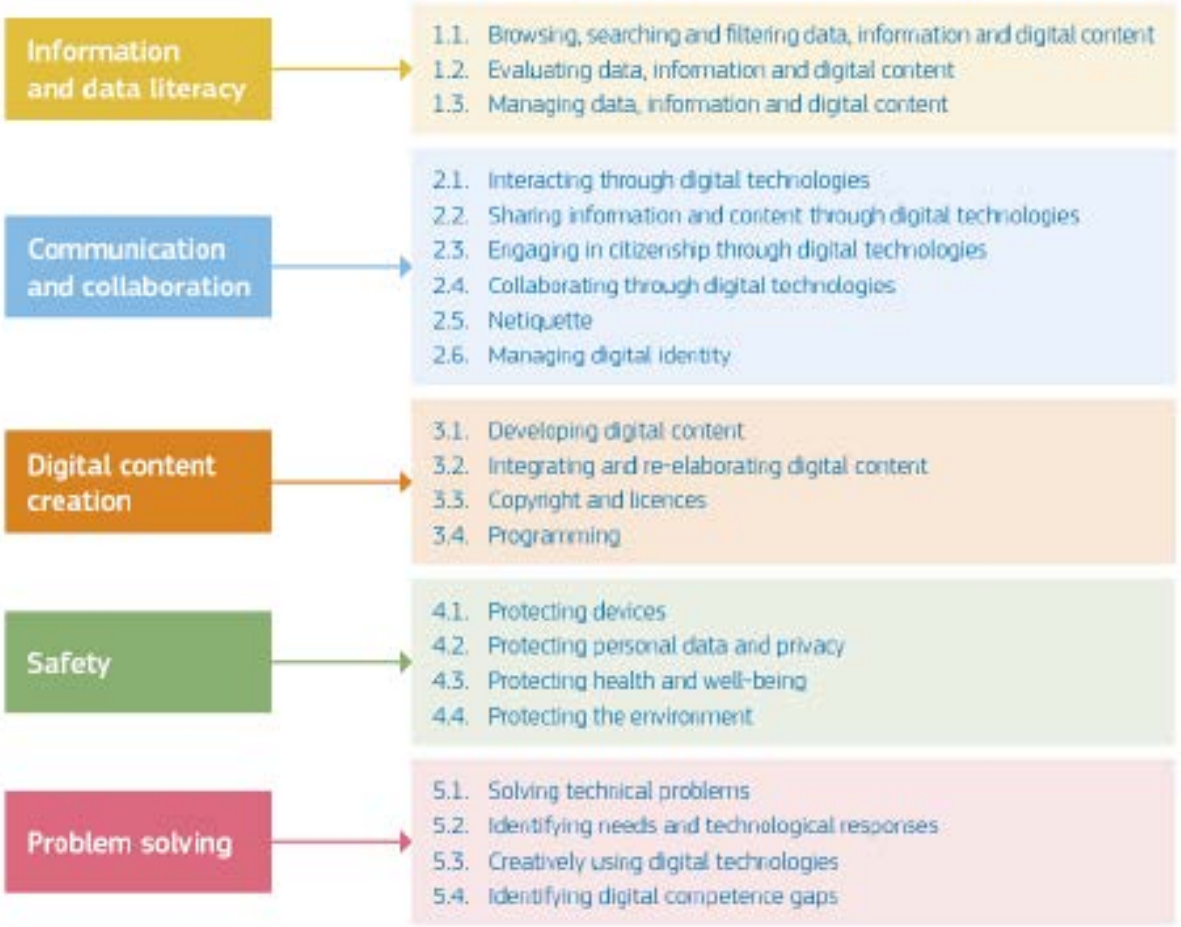
Context and Relevance

In recent years, digital technology has become a structural component of education, profoundly transforming teaching, learning, and assessment practices.

Digital competence is no longer limited to technical proficiency but represents an essential dimension of modern citizenship—anchored in critical, conscious, and responsible use of technology.

In this framework, INVALSI plays a crucial role by providing comparable and evidence-based data that allow us to understand how digital competence develops and varies across the Italian school system, highlighting strengths and critical areas.

Theoretical Framework



Research Objectives

The study aims to analyze in depth the results in digital competence among Italian students, identifying the main factors that influence their development.

Specifically, we seek to understand how these competences are distributed according to variables such as gender, geographical area, and socio-economic and cultural background.

The National Model

Objective Assessment: Measuring Real Competence

Directly measures students' actual know-how, revealing both strengths and areas needing improvement.

Delivers reliable data, essential for planning targeted interventions and support strategies.

Perception Questionnaire

Captures how students perceive their own digital competence.

Heavily influenced by self-confidence, past experiences, and contextual factors.

Helpful for understanding the student's perspective, but less reliable for precise measurement.

Why Objective Assessment Matters

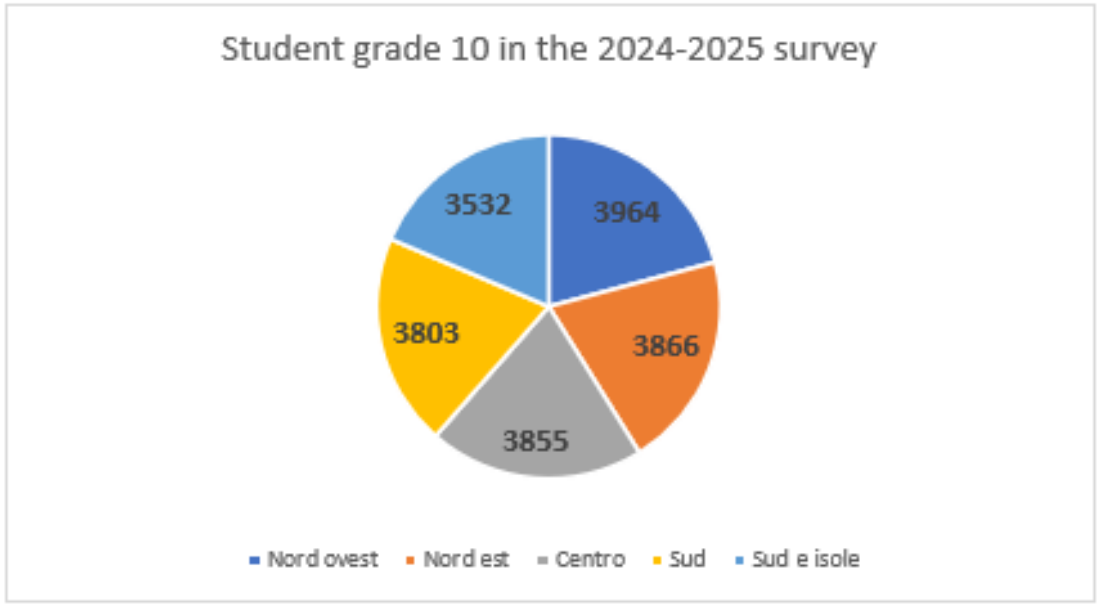
Enables the design of personalized and effective training programs.

Reduces the risk of both overestimating and underestimating students' skills.

Provides a foundation for fair and evidence-based evaluation and decision-making.

INVALSI Data and Sources

Sito Web servizio statistico INVALSI



Methodology and Analysis

- The system applies a robust, multidimensional methodology to guarantee that results are both reliable and comparable across students and contexts.
- Using the calibrated Rasch model, each question is designed to provide unbiased, objective measurements at both the individual and group level.
- A consistent vertical scaling system allows for meaningful comparisons of student achievement across multiple grades and over time.
- Competence thresholds, established through the Bookmark procedure, clearly differentiate between basic, intermediate, and advanced levels of digital proficiency within the DigComp framework.

Construction of the Digital Competence Scale

- The digital competence scale was designed as a vertical and coherent construct, describing the progressive acquisition of digital skills.
- Through the Rasch model and the bookmark method, three levels of mastery were identified: basic, intermediate, and advanced.
- This structure allows for a clear and transparent interpretation of results, linking numerical scores to meaningful educational descriptors.
- The empirical validation of the scale, based on students' responses, ensured internal consistency and applicability across different school contexts.

Results and analysis

Distribution of Digital Competence Levels

LEVEL	DATA LITERACY	COMUNICATION	CONTENT CREATION	SECURITY
Basic	10.9%	9.3%	16.0%	15.0%
Intermediate	38.1%	33.8%	40.8%	42.8%
Advanced	51.1%	56.9%	43.2%	42.2%

Territorial Disparities



The territorial analysis reveals significant differences in the distribution of digital competence across the country.

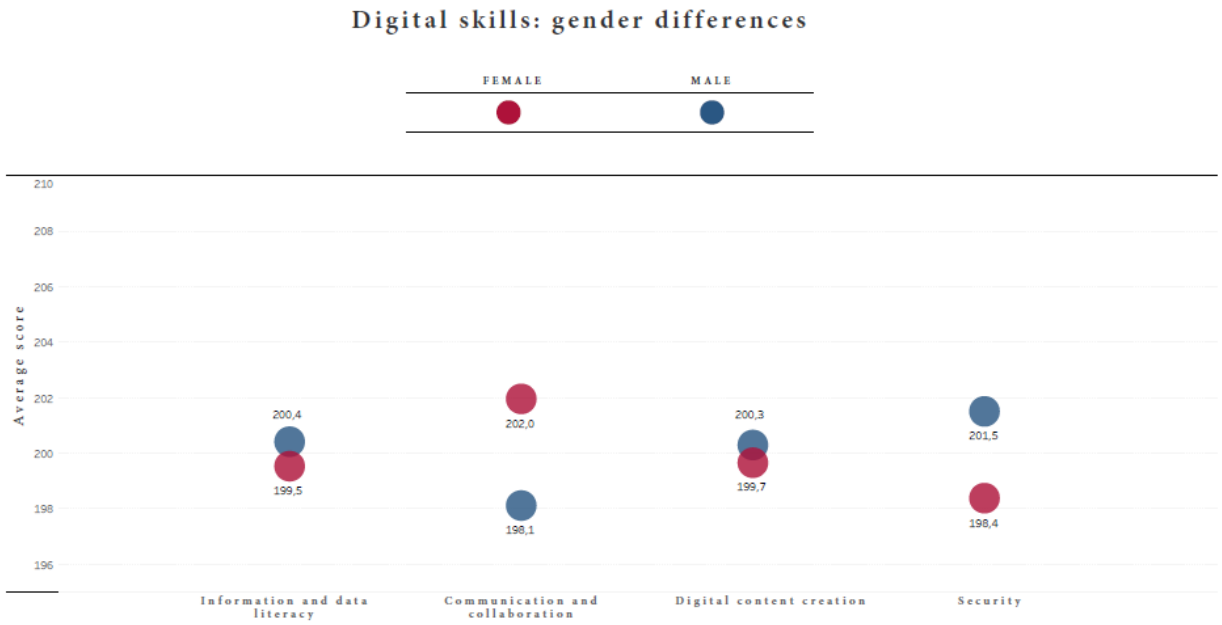
Students in Northern Italy tend to achieve higher average scores and are more frequently placed in the advanced levels, while those in the South and Islands show a greater concentration in the basic levels.

These disparities reflect both infrastructural inequalities—such as connectivity and resource availability—and socio-economic differences.

Students from families with richer cultural resources achieve higher results than those from less favourable backgrounds.

Socio-Economic Differences

	Basso	Medio-basso	Medio-alto	Alto
Area "Alfabetizzazione su informazioni e dati"				
Base	12,9%	8,8%	8,2%	6,3%
Intermedio	42,8%	40,8%	40,3%	37,0%
Avanzato	44,2%	50,4%	51,5%	56,7%
Area "Comunicazione e collaborazione"				
Base	10,7%	7,7%	7,1%	5,4%
Intermedio	38,2%	35,3%	35,1%	30,4%
Avanzato	51,1%	57,0%	57,8%	64,2%
Area "Creazione di contenuti digitali"				
Base	19,1%	15,4%	14,8%	11,8%
Intermedio	42,7%	41,5%	40,5%	37,2%
Avanzato	38,2%	43,1%	44,7%	51,0%
Area "Sicurezza"				
Base	17,2%	14,3%	12,7%	9,9%
Intermedio	44,3%	42,7%	41,8%	39,3%
Avanzato	38,4%	42,9%	45,6%	50,8%


Digital skills: gender differences
FEMALE
MALE
Average score
210
208
206
204
202
200
198
196
200,4
199,5
202,0
198,1
200,3
199,7
201,5
198,4
Information and data literacy
Communication and collaboration
Digital content creation
Security

Relations with Other Core Competences



Towards Informed Digital Citizenship

Schools are entering a new phase where digital technology plays a central role in both daily life and educational missions.

Developing digital human capital means equipping students with critical thinking skills and robust digital safety awareness for responsible online citizenship.

Digital education not only nurtures individual strengths but also ensures inclusive, personalized support for students facing challenges.

Summary of Main Findings

The overall findings outline a complex yet coherent picture of digital competences within the Italian school system.
The analyses indicate a general improvement in students' digital abilities, while also revealing persistent disparities linked to social, economic, and territorial factors.

Differences between students and schools show that digital competence results from an interaction of individual and environmental factors, with schools playing a decisive role in fostering its development.

These findings highlight the need for a systemic vision that embeds digital competence within educational policy, teacher training, and methodological innovation.

Thank you for your attention

paola.giangiacomo@invalsi.it
valeria.tortora@invalsi.it
monica.papini@invalsi.it