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**SELFIE for TEACHERS: a self-assessment tool
for the professional development of teachers¹**

**SELFIE for TEACHERS: uno strumento autovalutativo
per lo sviluppo professionale degli insegnanti**

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ABSTRACT

The advent of digital technologies in education has made the development of digital competencies among teachers essential, supported by the guidelines of international educational policies. This contribution aims to examine the results of a survey conducted as part of teacher training programs using the Selfie for Teachers tool, an online questionnaire developed under the European DigCompEdu initiative (European Commission, 2017). The questionnaire, consisting of 32 items reflecting the 22 competencies of the European framework for digital competencies in education, was

¹ This contribution is the result of joint work by both authors. Specifically, V. Pitrella authored paragraphs 2 (including paragraphs 2.1 and 2.2) and 3 (including paragraphs 3.1, 3.2, and 3.3), while E. Gulbay wrote paragraphs 1 and 4.

administered to a sample of 63 teachers enrolled in teacher training programs for lower and upper secondary schools at the University of Palermo during the 2023/2024 academic year. The article critically analyzes the results, exploring areas of strength and weakness and offering reflections on the personalization of professional development pathways and the use of technologies to improve inclusive and accessible teaching.

Keywords: digital competencies, teachers training, education, digital technologies.

RIASSUNTO

L'avvento delle tecnologie digitali nell'educazione ha reso fondamentale lo sviluppo di competenze digitali tra i docenti, supportato dalle linee guida delle politiche educative internazionali. Il presente contributo si propone di esaminare i risultati di un'indagine svolta nell'ambito dei percorsi di formazione degli insegnanti condotta attraverso l'uso dello strumento Selfie for Teachers, un questionario online sviluppato nell'ambito dell'iniziativa europea DigCompEdu (European Commission, 2017). Il questionario, composto da 32 item che riflettono le 22 competenze del quadro europeo sulle competenze digitali per l'educazione, è stato somministrato a un campione di 63 insegnanti frequentanti i percorsi di abilitazione all'insegnamento per le scuole secondarie di primo e secondo grado presso l'Università di Palermo nell'a.a 2023/2024. L'articolo analizza criticamente i risultati, indagando le aree di forza e debolezza e proponendo riflessioni sulla personalizzazione dei percorsi di sviluppo professionale e sull'uso delle tecnologie per migliorare la didattica inclusiva e accessibile.

Parole chiave: competenze digitali, formazione degli insegnanti, istruzione, tecnologie digitali.

1. INTRODUCTION

The integration of digital skills is now a central priority for the education system, representing an essential component for preparing teachers to meet the needs of an increasingly digitalized world. Information and Communication Technologies (ICT) have become essential for enhancing the quality of education, providing immediate access to global resources and facilitating a more inclusive learning environment. Integrating ICT enables teachers to better address modern educational needs, fostering essential digital competencies for both students and educators (Ilhomovna, 2023). With the growing proliferation of technology, the need has emerged to define clear standards for educators' digital competencies, to ensure teaching is well-equipped to overcome today's difficulties. In response to this need, the European Commission (2017) has developed targeted tools to support self-assessment and professional growth for teachers, among which SELFIE for Teachers (Self-reflection on Effective Learning by Fostering the use of Innovative Educational technologies) stands out (Joint Research Centre & Economou, 2023). This self-reflection tool, based on the DigCompEdu framework (Digital Competence Framework for Educators), provides a pathway for evaluating and developing teachers' digital competencies, offering structured support toward more innovative teaching. DigCompEdu is based on six areas of digital competence that teachers should develop to

integrate effectively within the modern educational environment. Among these, the creation and sharing of digital resources, the use of technology for assessment, and the promotion of online collaboration are essential pillars. Self-reflection enables teachers to critically examine their teaching practices, fostering continuous improvement and enhancing their ability to innovate within a digital framework (Petlák, 2021). SELFIE for Teachers was designed to support teachers on this path, helping them to reflect on their digital skills, identify strengths and areas for improvement, and set a growth path oriented toward adopting increasingly digitally proficient teaching practices. This reflective process enables teachers to recognize their own pedagogical practices involving technology, encouraging continuous improvement of their digital competencies. Through self-reflection, they can pinpoint areas of strength and identify opportunities for growth, facilitating a more effective integration of digital technologies in teaching and enhancing students' digital skills (Castaño Muñoz *et al.* 2023).

Numerous studies highlight the effectiveness of SELFIE and DigCompEdu as support tools for teacher training and the promotion of digital pedagogy. In particular, the study by Bocconi *et al.* (2020) implemented SELFIE in 201 Italian schools, involving over 31,000 participants and revealing significant differences in perceptions among students, teachers, and school leaders. The results underscore the importance of a systemic approach to digital technology integration, showing how this approach fosters constructive collective reflection adaptable to various educational contexts. Similarly, Gulbay & De Franches (2022) applied the same tool to a sample of over 2,200 Sicilian teachers, identifying significant variations in digital competencies across different school levels. This finding highlights the importance of differentiated training programs tailored to the specific needs of various educational contexts. Likewise, Kampylis & Sala (2023), through a thematic analysis of 5,247 responses collected from the aforementioned questionnaire, confirm the need to improve school digital infrastructure and intensify teacher training for more effective use of technology, consistent with international evidence. Further insights come from the study by Castaño Muñoz *et al.* (2023), which, on a sample of approximately 60,000 European teachers, explored the relationship between students' acquisition of digital competencies and collaborative practices among teachers. The results show that using technology in interdisciplinary projects is closely related to the development of students' digital skills, reinforcing the relevance of collaborative practices.

These findings suggest that SELFIE is a valuable and adaptable tool for assessing the digital competence of schools, capable of differentiating between institutions at different stages of digital maturity. Its modular structure enables transversal and flexible use across different types of schools, allowing more advanced institutions to customize the survey to better capture innovative teaching practices (Costa *et al.*, 2021).

In this context, the present study aims to explore the effectiveness of SELFIE for Teachers among pre-service teachers enrolled in specific qualifying programs, such as the 60-credit courses in Italy. The goal is to obtain an empirical foundation to identify the strengths and critical areas in the digital competencies of pre-service teachers, providing recommendations for targeted training programs and implementing more effective educational policies.

2. METHODOLOGY

This study adopted a quantitative approach, using a structured questionnaire to collect data on self-assessed digital competencies of trainee teachers. The data collection tool used was the SELFIE for

Teachers questionnaire, developed as part of the European DigCompEdu initiative, aimed at supporting the evaluation of digital competencies in the educational context.

2.1 Tool

The SELFIE for Teachers questionnaire consists of 32 items, structured to align with the 22 digital competencies identified in the European DigCompEdu framework. The items are organized into six main areas, each representing a specific set of digital skills:

- Professional engagement: this includes competencies in internal communication, digital supervision, peer collaboration, the use of school digital infrastructure, and reflection on professional growth and continuous learning through technology.
- Digital resources: this area involves skills for researching, selecting, creating, and modifying digital materials for educational purposes, as well as managing, protecting, and sharing digital content securely and in compliance with copyright regulations.
- Teaching and learning: this focuses on the design of educational activities, student guidance and feedback, and the promotion of collaborative and self-regulated learning.
- Assessment: this includes practices for conducting formative and summative assessments, analyzing learning evidence, and planning future interventions.
- Empowering student potential: this area centers on accessibility, inclusiveness, personalization, and active student participation in the learning environment. It includes the use of digital technologies for blended learning, integrating both in-person and remote experiences.
- Developing students' digital competencies and responsible use: this area focuses on safe, ethical, and informed technology use, including data literacy, online communication and collaboration, content creation, digital safety, identity management, and problem-solving in digital contexts.

Each competency is outlined across six progression levels, offering a self-assessment scale to estimate and monitor development in each area. This progression guides teachers from a basic familiarity level to an advanced mastery, delineating a professional growth path in digital competencies.

2.2 Participants

The study involved a total of 63 teachers, 32 male and 29 female, enrolled in the initial 60-credit qualification program at the University of Palermo for the 2024/25 academic year. The participants are distributed across the following teaching categories: 34 teachers in A048 (Physical and Sports Sciences for Upper Secondary School), 16 teachers in A049 (Physical and Sports Sciences for Lower Secondary School), and 11 teachers in A046 (Legal-Economic Sciences). Although the sample size is limited, it is representative of specific professional categories, enabling the collection of meaningful data on the use of digital competencies in the secondary school context, with particular attention to physical education and legal-economic disciplines. These findings provide valuable insights for improving initial teacher training.

3. RESULTS

In this survey, responses to the questionnaire were coded on a numeric scale from 0 to 6, where each value represents a specific level of perceived competence by the teachers. A score of 0 corresponds to "I have not yet developed this skill," indicating a lack of familiarity or practical experience with the specific competence, while a score of 6, at the opposite end, represents the highest level of mastery, indicative of advanced and consolidated competency. The conversion of responses into numerical values enabled an accurate and comparable quantitative analysis, facilitating the calculation of averages across different competency areas and percentages for individual competencies within each area. Specifically, averages were calculated for each area, allowing for an overarching view of strengths and areas needing development. In contrast, individual competencies within each area were expressed as percentages, reflecting the degree of mastery relative to the maximum score on the scale, with higher percentages indicating a stronger proficiency in each skill. This dual approach of using averages and percentages provided a detailed understanding of teachers' digital competencies, identifying both general trends across competency areas and specific skills requiring attention. The chosen quantitative method thus enables a systematic analysis of strengths and gaps, making it possible to detect and compare teachers' competencies across different categories of expertise. This, in turn, lays the foundation for targeted recommendations to support ongoing professional development and enhance digital proficiency among educators.

3.1 Percentage of competencies per area

Within each competency area, percentages were calculated for each specific skill to provide a representative measure of mastery. This approach synthesizes individual responses into a percentage that reflects the level of proficiency for each distinct competency, offering a clear and detailed overview of teachers' digital capabilities across various domains (Fig. 1).

Area	Competency	Percentage
Professional engagement	Organizational communication	46%
	Online learning environments	31%
	Professional collaboration	40%
	School technologies and infrastructure	34%
	Reflective practice	34%
	Digital life (ethics and safety)	40%
	Professional learning (through tech)	41%
	Professional learning (about tech)	31%
	Computational thinking	26%
Digital resources	Research and selection	43%
	Creation	34%
	Editing	29%
	Management and protection	32%
	Sharing	30%
Teaching and learning	Lesson planning	34%
	Guidance and feedback	33%

	Collaborative learning	31%
	Self-regulated learning	30%
	Emerging technologies	27%
Assessment	Assessment strategies	33%
	Test analysis	30%
	Feedback and planning	29%
Empowering student potential	Accessibility and inclusion	27%
	Differentiation and personalization	29%
	Active participation	29%
	Blended learning	31%
Student digital competencies	Digital literacy	27%
	Communication and collaboration	29%
	Content creation	30%
	Safety and well-being	31%
	Responsible use	28%
	Problem solving	29%

Figure 1. Percentage of competencies per area

The most relevant results are presented below, with particular attention to competencies that stand out with especially high or low percentages, revealing participants' strengths and areas for improvement. The area of professional engagement received relatively high percentages, particularly in organizational communication (46%), reflecting a decent ability among teachers to use digital tools to facilitate communication flow and collaboration within the educational community. Professional collaboration also scored positively (40%), indicating that teachers feel capable of using digital technologies to exchange information and work with colleagues. However, professional learning on digital technologies scored lower (31%), signaling limited engagement in technological development activities and the need for more institutional support to promote continuous learning. Finally, computational thinking received a low percentage (26%), revealing a gap in logical and digital problem-solving skills, underscoring the importance of targeted interventions to develop advanced skills essential for innovative teaching.

In the area of digital resources, resource research and selection emerged as one of the most developed competencies, with a percentage of 43%, indicating a fair ability among teachers to locate and evaluate useful digital content for teaching. In contrast, the competencies related to creating and editing digital resources scored lower (34% and 29%, respectively), suggesting a limited capacity among teachers to customize or independently develop digital materials to suit teaching needs. Additionally, resource management and protection scored low (32%), indicating that digital content organization and security represent an important area for improvement.

In the teaching and learning area, results show moderate competence in designing educational activities supported by digital technologies (34%). However, competencies related to collaborative and self-regulated learning were less developed, highlighting difficulties among teachers in using technologies that promote autonomy and collaboration among students. Moreover, the use of emerging technologies to enhance the educational experience scored one of the lowest values in this

area (27%), indicating a need for targeted training to introduce teachers to innovative tools. Regarding digital assessment competencies, assessment strategy received a moderate percentage (33%), suggesting a certain familiarity with using digital tools to monitor learning. However, competence in feedback-based planning scored lower (29%), highlighting a lack of capacity to use data collected through assessment to guide subsequent teaching activities.

In the area of empowering student potential, competencies related to inclusion and accessibility scored low (28%), followed by the personalization of teaching activities (29%). These results indicate that teachers find it challenging to adapt digital technologies to meet students' specific needs and to make content accessible to all. This observation calls for a reflection on the level of practical training and awareness teachers receive regarding inclusive strategies supported by technology.

Finally, in the area of developing students' digital competencies, digital literacy received one of the lowest percentages (27%), indicating limited capacity among teachers to support students in developing their basic digital skills. Responsible technology use and digital problem-solving (28% and 29%, respectively) also emerged as weak areas, suggesting that teachers need support in promoting ethical digital behaviors and preparing students to face the challenges of the digital world.

3.2 Overall average by area

Subsequently, average values for each competency area were calculated by combining the averages of individual competencies. This step made it possible to obtain a synthetic indicator for each area, useful for immediately representing the average level of digital competence perceived by teachers across different evaluation domains.

Area	Average
Professional engagement	2.2
Digital resources	2.02
Teaching and learning	1.94
Assessment	1.85
Empowering student potential	1.75
Student digital competencies	1.73

Figure 2. Overall average by area

The area of professional engagement, with an average score of 2.2, emerged as the strongest, showing good results in organizational communication and professional collaboration, although it also revealed a significant gap in computational thinking, highlighting the need to strengthen advanced technical skills. The area of digital resources also presented a relatively high average (2.02), reflecting good ability in content research and selection, but indicating challenges in creating and personalizing digital materials. This underlines the importance of improving resource adaptation to meet specific teaching needs. The teaching and learning area, with an average score of 1.94, demonstrated moderate skills in digital lesson planning but showed notable weaknesses in collaborative and self-regulated learning practices, as well as in the use of emerging technologies. This points to the necessity of adopting innovative teaching methodologies. Similarly, in the area of assessment, an average score of 1.85 indicates a fair familiarity with monitoring strategies, while the low scores in feedback-based

planning suggest a lack of data-driven approaches. This underscores the need to train teachers in more targeted and effective assessment practices. The area of empowering student potential, with an average score of 1.75, reveals a limited ability in inclusive and personalized teaching, highlighting the need for training on inclusive and adaptive technologies to make learning accessible to all. Lastly, the area of developing students' digital competencies, which had the lowest average (1.73), reflects insufficient teacher preparation in digital literacy and responsible technology use, underscoring the urgent need to strengthen these essential competencies.

3.3 Digital competency levels by teaching category in key areas

The analysis of results was further refined by examining the levels of digital competence among teachers, divided by teaching category, across the main areas of competence. This comparison helped identify significant differences among the teaching categories in terms of digital proficiency, highlighting specific needs and training requirements related to their respective disciplines. As previously described, the sample includes teachers from the following categories: A048 (Physical and Sports Sciences for Upper Secondary School), A049 (Physical and Sports Sciences for Lower Secondary School), and A046 (Legal-Economic Sciences).

		Competency average			Area average		
Area	Competency	A048	A049	A046	A048	A049	A046
Professional engagement	Organizational communication	49 %	40%	48%	2.2	1.90	2.37
	Online learning environments	34 %	21%	38%			
	Professional collaboration	41%	39%	38%			
	School technologies and infrastructure	34%	32%	38%			
	Reflective practice	34%	29%	42%			
	Digital life (ethics and safety)	40%	38%	40%			
	Professional learning (through tech)	41%	40%	43%			
	Professional learning (about tech)	30%	28%	38%			
	Computational thinking	27%	20%	30%			
Digital resources	Research and selection	44%	45%	38%	2.1	2.06	2
	Creation	36%	45%	37%			
	Editing	32%	22%	30%			
	Management and protection	33%	32%	30%			
	Sharing	30%	28%	32%			
Teaching and learning	Lesson planning	35%	35%	32%	1.93	1.75	1.88
	Guidance and feedback	34%	30%	32%			

	Collaborative learning	31%	32%	32%			
	Self-regulated learning	32%	25%	35%			
	Emerging technologies	29%	23%	27%			
Assessment	Assessment strategies	37%	26%	30%	2.02	1.56	1.7
	Test analysis	35%	22%	28%			
	Feedback and planning	29%	30%	27%			
Empowering student potential	Accessibility and inclusion	30%	21%	28%	1.88	1.47	1.75
	Differentiation and personalization	30%	29%	27%			
	Active participation	32%	21%	32%			
	Blended learning	34%	27%	30%			
Student digital competencies	Digital literacy	29%	17%	33%	1.82	1.37	1.95
	Communication and collaboration	30%	25%	28%			
	Content creation	32%	23%	33%			
	Safety and well-being	32%	27%	33%			
	Responsible use	29%	20%	38%			
	Problem solving	30%	26%	28%			

Figure 3. Digital competence levels per competition class in the main areas

In the area of professional engagement, the results show that teachers in category A046 demonstrate the highest level of digital competence, with an average of 2.37, followed by those in A048 (2.2) and A049 (1.90). This trend suggests that Legal-Economic Sciences teachers have greater familiarity with digital skills in this area. Organizational communication stands out as a particularly well-developed competency, with teachers in A046 and A048 achieving high scores (48% and 49%, respectively), while computational thinking shows lower scores across all categories (30% in A046 and only 20% in A049), indicating a potential area for improvement.

In the area of digital resources, the average scores reflect a moderate level of proficiency across the categories, with teachers in A048 and A049 demonstrating a stronger ability in digital resource research and selection (44% and 45%, respectively), followed by those in A046 (38%). However, competencies related to editing digital resources appear less established, suggesting a need for further development to effectively adapt digital materials to specific teaching requirements. The area averages for digital resources were 2.1 for A048, 2.06 for A049, and 2.0 for A046.

In teaching and learning, the average scores indicate moderate digital competence in designing digitally supported educational activities, with teachers in A048 achieving the highest scores in lesson planning (35%), while collaborative learning and self-regulated learning are less developed. Particularly, A049 teachers face challenges in fostering student autonomy, as reflected by a low score in self-regulated learning (25%). Area averages in teaching and learning were 1.93 for A048, 1.75 for A049, and 1.88 for A046. Such outcomes highlight a potential gap in equipping students to take ownership of their learning through digital tools. This underscores the need for targeted training that not only improves teachers' technical skills but also enhances their ability to foster independent learning among students.

The assessment area reveals variations across categories, with A048 teachers achieving higher scores in assessment strategies (37%) compared to other groups. However, feedback-based planning remains a critical aspect for all categories, with lower percentages in each group (for instance, 29% in A048). Area averages in assessment were 2.02 for A048, 1.56 for A049, and 1.7 for A046.

The area of empowering student potential shows lower levels of proficiency overall, with A048 teachers slightly more competent in terms of inclusion and accessibility than the other categories (30% in A048 and 21% in A049), though all categories demonstrate a need for improvement in supporting the diverse needs of students. The average scores in this area were 1.88 for A048, 1.47 for A049, and 1.75 for A046. These results indicate that teachers find it challenging to adapt digital technologies to meet students' specific needs and to make content accessible to all. This may also reflect a broader difficulty among teachers in calibrating activities for diverse student needs or identifying effective didactic mediation strategies. It raises questions about whether teachers critically evaluate how digital technologies could support the accessibility of content and whether their training adequately prepares them to do so. Finally, in the area of students' digital competencies, a similar trend is observed, with A046 teachers demonstrating a stronger ability to promote digital literacy (33%) and responsible use of technology (38%) compared to the other groups. A049 teachers achieve the lowest scores in this area, with 17% in digital literacy, underscoring the importance of targeted training interventions to ensure adequate preparation in developing students' essential digital skills for the future. Area averages for student digital competencies were 1.95 for A046, 1.82 for A048, and 1.37 for A049. These trends suggest that teachers' use of digital technologies tends to concentrate on structured and standardized activities, such as communication and document sharing, rather than more creative or transversal integration into teaching practices. This focus might reflect a professional development approach that prioritizes operational over pedagogical skills. Addressing this gap by fostering a broader perception of digital tools as instruments for teaching innovation could help enhance both student engagement and the overall learning experience. Tailored training programs emphasizing these aspects could play a key role in bridging this divide.

4. CONCLUSIONS

This survey on the use of SELFIE for Teachers among teachers in training provided a clear mapping of digital competence, highlighting both areas of strength and weaknesses. The results show that digital competence in the educational context is not uniform but includes a range of skills that also vary by teaching category. On the one hand, skills such as professional engagement and resource seeking appear well-established, while advanced skills such as computational thinking and personalized technology management for students remain weak points that require priority attention. The observed differences among teaching categories highlight the need for a targeted training system, capable of meeting the specific needs of teachers across different disciplines. For instance, categories A046 and A048 show greater competence in key areas like professional engagement and digital resource management, whereas A049 shows deficiencies, particularly in student empowerment and basic digital skills. Implementing tailored training pathways could help improve overall teaching effectiveness and promote more equitable access to digital resources for all teachers.

In light of these observations, it is clear that SELFIE for Teachers can represent not only a self-assessment tool but also a starting point for training policies aimed at differentiation and personalization. The systematic adoption of this tool could facilitate greater awareness and

consistency in professional development pathways, enabling institutions to develop more targeted training strategies. It would also be desirable to promote greater awareness of the use of technologies in a critical and creative way, developing training pathways that foster a shift in the perception of technologies from administrative obligation to tools for enriching teaching. Only through structured and continuous support is it possible to bridge the digital divide and foster teaching that meets the needs of an evolving school system.

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