Teachers and digital skills

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Abstract:

In an ever-changing technological landscape that challenges teachers' digital skills, this study aims to provide a general theoretical framework and an assessment of teachers' digital skills; for this purpose, a specific survey has been prepared.

Digital skills are fundamental in education, as technology continues to play an increasingly significant role in our daily lives.

Understanding digital skills is essential for educators to effectively integrate technology into their teaching practices.

Key Word: *Teachers, Digital skills, Education, Teacher professional development.*

I. Introduction

In today's society, the new generations are required to have an advanced level of digital skills, as they are constantly changing, students' learning habits have changed, their needs and circumstances are no longer the same, which is why it is essential that the school knows how to provide an educational, didactic and safe response to the needs of students. To achieve this goal, a teacher with updated training and a level of digital skills is needed to be able to undertake the teaching-learning process of students successfully, promoting the acquisition of key skills in students.

This paper defines both the digital skills needed by Italian teachers and the level of digital skills of teachers in primary and secondary schools (first and second grade), based on a framework of skills suitable for the Italian educational environment. The age groups involved range from 6 to 19 years, the levels according to the International Standard Classification of Education (ISCED), are: ISCED 1 (6-11 years), ISCED 2 (11-14 years) and ISCED 3 (14-19 years).

Societal changes resulting from technological development push teachers to develop new digital skills, and to conduct their lessons using them.

Digital pedagogical skills mainly refer to the use of digital technologies in teaching processes, in the application of pedagogical and didactic judgment and in the awareness of its implications for learning, they are the abilities to use digital technologies, communication tools and networks to access, manage, integrate, evaluate and create information in order to live better in today's society. In a broader vision, digital pedagogical skills do not refer only to the mastery of technology, but rather to how teachers can use this technology to improve their professional practice, empower their students and improve learning outcomes. In the field of education, digital skills are essential to be successful in the current digital age, both for teachers and students.

Technological change pushes teaching professionals to develop on two levels:

1) Improve their digital skills;
2) improve teaching activities to provide all students with the skills needed to succeed in the digital world.

Teacher training is a key element to address the educational challenges posed by the information society (Loureiro et al., 2022; Silva et al., 2022). This interest is reflected in the description of viable actions for optimal integration between technology and education, as well as in the evaluation of different aspects of teachers' professional development (Cateriano-Chávez et al., 2021).

II. Aim research

The aim of the research is: in the first phase to define what are the digital skills needed by Italian teachers; in the second phase to carry out an evaluation of the level of digital skills possessed by teachers in Italy.

III. Methodology

The first part of the research, that is, the one for the definition of the digital skills needed by teachers, was carried out through bibliographic consultation. The second part of the research, that is, the one for the evaluation of the digital skills of Italian teachers, was carried out through a survey.

The data collection took place through a survey consisting of a total of 70 questions, both qualitative and quantitative. The quantitative questions had a closed answer, with an evaluation based on a Likert-type scale with values between 1 and 5, where 1 represents the value with which one completely disagrees with the question and 5 the value with which one completely agrees.

The questions in the survey were designed in such a way as to obtain as an answer what teachers are actually able to do, trying to limit the effect of an excessive self-assessment, as a teacher or anyone else could think they know how to carry out an activity, but when they have to do it, they encounter difficulties.

300 teachers from different Italian schools responded anonymously to the survey.

The survey was used to examine 5 sections:
1. General information;
2. Programming and evaluation;
3. Teaching;
4. Teacher professional development;
5. Digital pedagogical skills.

Digital pedagogical skills were examined through 7 areas:
- Computer literacy;
- Digital pedagogy;
- Digital use and production;
- Digital communication and collaboration;
- Digital citizenship;
- Computer security;
- Problem solving.

The area of "computer literacy" includes all knowledge and skills related to the search, selection, evaluation, storage and retrieval of information. "Digital pedagogy" refers to the use of digital elements to improve or change the educational experience; the area of "digital use and production" refers to the ability to create, modify and recombine digital content in a creative way; the "digital communication and collaboration" area includes the ability to interact responsibly with technology, to share content and to collaborate with others; "digital citizenship" refers to the rights and duties that aim to simplify relationships between citizens, businesses and public administrations, through the use of digital technologies; the "cybersecurity" area refers to the knowledge and skills to secure one's devices, protect personal data, safeguard physical and psychological well-being; the "problem solving" area identifies digital needs and resources, to solve conceptual problems through digital means.

IV. Results

As regards general information from the answers provided by Italian teachers, we obtained the following data: average age 49, of which 70% women and 30% men; the type of school concerns 29.3% primary school, 14.7% lower secondary school, 55% upper secondary school (of which 22% for high schools, 18% for technical institutes, and 15% for vocational institutes).

42% of the teachers who responded to the survey use Digital Technologies systematically for their lessons, 49% use them occasionally, while 9% do not use them. Older teachers have greater difficulty using digital technologies; as regards school grades, primary school teachers have greater difficulty using digital technologies, followed by lower secondary school teachers, while upper secondary school teachers demonstrate greater mastery; as regards the subjects, teachers of STEM (Science, Technology, Engineering and Mathematics) subjects, are those who have the greatest mastery, while among teachers of other subjects there are no significant differences.

Among the reasons that limit the use of Digital Technologies by teachers through the data collected, the following emerged:
- A limited number (in some cases completely absent) of equipment (computers, tablets, Interactive Multimedia Whiteboards, etc.);
- a limited or completely absent internet connection;
- obsolete computers or computers in need of repair;
- lack of technical support;
- absent or inadequate teaching materials.

From the data[1] processing we obtained the following results for the digital pedagogical skills section:

- Computer literacy: 7.0;
- digital pedagogy: 6.4;
- digital use and production: 6.0;
- digital communication and collaboration: 6.6;
- digital citizenship: 5.6;
- cyber security: 5.6;
- problem solving: 5.4.

Overall, in three areas, "computer literacy", "digital pedagogy" and "digital communication and collaboration", there are values above sufficiency, in the area "digital use and production" there is a value equal to sufficiency, while the areas "digital citizenship", "cyber security" and "problem solving" represent the most critical areas, with values below sufficiency.

The average value obtained for digital pedagogical skills is equal to 6.1, just above sufficiency.

V. Discussion

Society through technological progress has undergone significant changes, and consequently educational processes must be readjusted, as it must provide students with the necessary digital knowledge.

Today, new teaching methods are needed, teachers have an important role to play so that digital technologies can be learned and used correctly and effectively by students.

In order for in-service teachers to achieve the desired success in their professional life, they must first accept the role of technology in education and have the ability to use technology (Erdemir et Al., 2019).

From the early years, children interact with various types of electronic games, driven by curiosity, they playfully explore their different potential and intuitively formalize with the very articulated performances of these resources.

The role of digital skills in education is to prepare students for the digital world and equip them with the necessary skills.

The use of digital technologies can help teachers create innovative learning experiences, resulting in students becoming more actively involved. Digital technologies can be used by teachers to personalize learning and adapt it to students' individual levels, interests and needs. However, it is important to avoid amplifying inequalities, for example in terms of students' access to technology or lack of skills. Accessibility for all students is crucial, including those with Special Educational Needs.

Digital technologies enable active participation of students in learning processes, and this has developed a new teacher-student relationship.

Since educational institutions and teachers are faced with students who use technological tools such as computers, the Internet and mobile phones on a daily basis, it is inevitable that they will encounter significant difficulties if they do not develop their skills in using current technological products (Aksoy, 2003). Growing up and living in the digital age does not automatically make "digital natives" competent and aware in the use of digital technologies (Prensky, 2001). Therefore, teachers are expected to have the necessary skills and infrastructure to perform their profession adequately (Şad & Nalçacı, 2015).

In STEM (Science, Technology, Engineering and Mathematics) education, digital skills are particularly important. STEM subjects require a high level of digital literacy, as students need to use digital tools and technologies to conduct research, analyse data and solve complex problems. Therefore, teachers of these subjects are expected to have a high degree of mastery of digital skills.

Digital skills are also essential in adult education, where students need to develop digital skills to improve their employability and keep up with the demands of the "digital workplace".

VI. Conclusion

Teachers have the task of developing in students an added value (cultural and educational), oriented towards digital technologies, enhancing as much as possible the knowledge already possessed by the student.

Considering that the survey for digital pedagogical skills showed an average value of 6.1, which is slightly above sufficiency, revealing a poor mastery of the digital skills possessed by Italian teachers, this value cannot be considered reassuring, as it is obtained by those who should provide students with the knowledge and skills necessary to live in an increasingly digitalized society, for which it is believed that educational institutions must promote a system of permanent training of teachers based on collaborative and active approaches, for learning digital technologies.

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[1] To obtain the value in tenths the data were multiplied by 2.

The survey showed that many educational institutions are not equipped with the necessary IT tools or are poorly functioning, for which a strategic plan should be activated for their supply and/or maintenance, as well as normal IT assistance to teachers by technicians should be guaranteed.

Furthermore, it is essential to clearly establish training plans for teachers on topics related to digital skills, which must include programs or guides for their assessment. Finally, it is highlighted that teachers' digital skills must be understood as a set of knowledge, skills and attitudes that cover different areas of knowledge.

The digital skills possessed by teachers are the primary key to the development of students' digital skills.

The development of digital skills should be integrated into the school curriculum at all levels of education, from primary school to higher education. In this way, students can develop the skills they need to succeed in the digital age and become more competitive in the world of work.

Finally, the survey prepared for the research could be useful over time to schools as a permanent observatory, as well as a self-assessment tool for teachers.

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