Teacher education is a deeply pedagogical process rooted in values, ethics, and the social purpose of schooling. Globally, it sits at the core of educational quality and fairness, as research in comparative and international education demonstrates: the training of teachers directly influences students' learning chances, social inclusion, and the democratic aims of schools. Teachers are not simply transmitters of curricula, but active professionals whose convictions, reflective skills, and ability to manage the complexities of classroom life give shape and substance to the educational experience itself.

The pedagogical dimension of teacher education frames teaching as a relational, context-aware, and ethically grounded profession rather than just a set of procedural skills. From a research perspective, this demands robust research methodologies that can critically examine the complex realities of schools and inform evidence-based policies. Equally important is the connection between theory and practice, which helps to bridge the persistent gap between universities and schools.

The contributions gathered in this volume reflect the richness and diversity of experiences showcased during the ATEE Spring Conference 2024, held at the University of Bergamo from May 29 to June 1, 2024. The volume presents 70 selected papers out of more than 300 presented by researchers representing over 40 countries.

This broad spectrum of studies highlights promising directions that can inspire renewed inquiry and concrete proposals aimed at improving contemporary educational systems.

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May 29th – June 1st, 2024
S. Agostino, Bergamo

Edited by Nicole Bianquin and Francesco Magni

UNIVERSITÀ DEGLI STUDI DI BERGAMO

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Association for Teacher Education in Europe

BOOK OF PROCEEDINGS

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POSTER SESSION

The contributions published in this book of proceedings have been evaluated through a double-blind peer review process. We would like to thank the members of the Scientific Committee, as well as the many other professors, researchers and experts who agreed to act as reviewers.

Rethinking digital competences for teaching in the Post-Covid Era: A participatory approach

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Abstract

The evolving definition of teachers' digital competence encompasses cognitive, critical and ethical dimensions. Among these, the socio-relational aspect gained prominence during Emergency Remote Teaching, underscoring the importance of fostering student engagement and effective communication in online learning environments, as revealed in the literature review. This mixed-methods study explores the socio-affective components of digital competence necessary for inclusive, high-quality education. Through a participatory evaluation process involving consultations with 179 educators across Europe, the D-Paideia Qualifications Framework, based on DigCompEdu, was validated. Findings emphasize the importance of the socio-relational aspects of digital competencies. The insights highlight the need to adapt existing digital competence frameworks to better support teachers in navigating the complexities of post-pandemic education, fostering inclusive and engaging learning environments.

Keywords: teacher professional development; digital competence of educators; post-Covid education; Erasmus+ project; mixed methods.

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1. Introduction

The current definition of digital competence of teachers surpasses a technocentric view and includes more complex dimensions related to cognitive, critical and ethical factors (Mishra & Koehler, 2006; Ranieri, 2022). Among these, the socio-relational dimension has emerged as essential during the experience of Emergency Remote Teaching (ERT). In this scenario, the ability to support teaching through strategies aimed at enhancing the motivation and commitment of all students and impactful communication has emerged as pivotal for benefiting from distance education (OECD, 2021).
The present contribution focuses on digital competence's socio-affective and relational components for teaching and learning. The initiative is situated within the context of the Erasmus+ project "Digital-Paideia", aiming to empower educators to leverage digital technology to support inclusive and high-quality education proficiently. The D-Paideia project is grounded in the DigCompEdu framework (Redecker, 2017, see Figure 1) and emphasizes the necessity of updating this model to better align with the evolving pedagogical demands and competencies required of educators in the post-pandemic era.

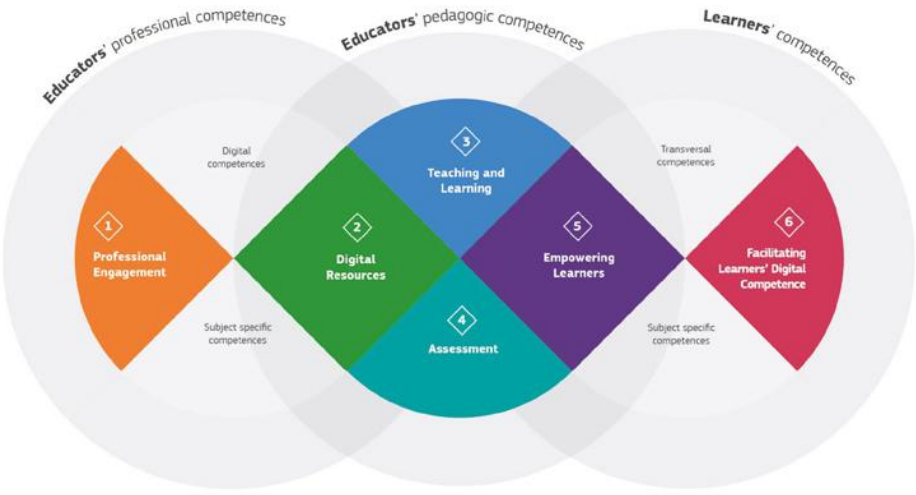

Figure 1:Digital Competence Framework for Educators (DigCompEdu)

During the first year, the following steps took place (Ranieri et al., 2023): identification of the need to develop an updated framework on social-emotional and relational skills, a literature review, a first draft of the QF and the participatory evaluation process with teachers and experts (Figure 2).

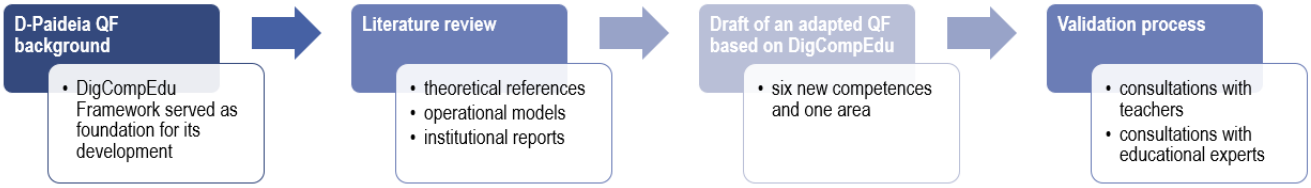

Figure 2: Development stages of D-Paideia QF

The review of the current literature and models addressing teachers' digital competences revealed some gaps in existing frameworks for assessing teachers' digital competence, particularly in addressing the social and emotional challenges of online teaching during ERT (Gabbi, Ancillotti & Ranieri, 2023). The rationale for extending the DigCompEdu framework is supported by this broader analysis, where the framework's limitations are critically discussed in comparison with other international models such as TPACK (Mishra & Koehler, 2006), Digital Teaching Professional Framework (ETF, 2019) and the UNESCO ICT Competency Framework for Teachers (Butcher, 2018). Accordingly, the aspects related to social-relational skills, digital well-being and mental health deserve appropriate and urgent attention (Carretero

et al., 2021). To address these limitations, a draft Qualification Framework (QF) was developed, expanding on the DigCompEdu by integrating new elements into its professional and pedagogical dimensions.
Three new elements have been introduced within the Professional Engagement area (Awareness of local and global policy, Motivation for adopting digital technologies, and Balance and safety 'onlife'). In the central area of Pedagogical Competences, a new section titled "Social Skills and Communication" has been added, encompassing three key components: Managing educational relationships with ICT, Diverse and flexible teaching strategies, and Digital reputation and identity management. Finally, the framework aligns the Learners' Competence dimension with the most recent version of the European Digital Competence Framework for Citizens (DigComp 2.2). This revision aims to address the educational shifts and challenges that have emerged due to the pandemic, ensuring that the framework remains relevant and responsive to contemporary teaching and learning contexts.

2. Method

As previously explained, the literature review revealed potential additions to the DigCompEdu model. The validation process involved both domain experts and practicing teachers, with the latter representing the central focus of this study. The adapted draft of the Qualifications Framework was presented for discussion with teachers through consultations, aiming to assess the significance attributed to the highlighted aspects by practitioners and validate it. A key strength of this research lies in its participatory evaluation approach (Patton, 1997), which offers valuable insights into the social and relational aspects of digital teaching. By involving educators directly in the validation process of the D-Paideia Framework, the study explored the perceived importance of these components, highlighting their role in cultivating inclusive and engaging learning environments. The study adopted a mixed-methods approach to assess the relevance of the D-Paideia QF among European teachers (Creswell & Plano Clark, 2011), in line with what was done through expert consultation (Gabbi & Ancillotti, 2024). The research was guided by the following question: *What aspects of digital competence for teaching are recognised by teachers?*
The validation process of the QF involved educators through online workshops and in-person events. Data were collected by a questionnaire including 12 items on a Likert scale and an open-ended question, aimed at analyzing perspectives on the diverse components of digital competence in teaching. Each competence to be added to the DigCompEdu was covered with two questionnaire items highlighting different aspects (Table 1). Quantitative and qualitative analysis of the data were carried out, using statistical and content analysis, respectively.

QF Area	***Competence***	***#***	***Label***
Professional engagement	Awareness on local and global policy	Q1	Awareness of ICT local policies
		Q2	Awareness of ICT global policies
	Motivation for adopting digital technologies	Q3	Motivation for adopting digital technologies
		Q4	Training on self-efficacy for adopting digital technologies
	Balance and safety 'onlife'	Q5	Digital wellbeing for teachers and students
		Q6	Health promotion
Social skills and communication	Managing educational relationships with ICT	Q7	Managing relationships with students and families
		Q8	Managing relational dynamics, especially for SEND students
	Diverse and flexible teaching strategies	Q9	Design and convert teaching strategies and resources
		Q10	Digital teaching pedagogy beyond the use of digital technologies

Digital identity and reputation management	Q11	Digital identity and online reputation management
	Q12	Teachers' digital lifestyles and professional development

Table 1: Overview of the questionnaire's structure

3. Results

3.1 The opinions of teachers on the proposed digital competence dimensions

The age of the participants (*n* = 179) ranged from 20 to 67 years, with an average age of 46.88 years (*SD* = 9.44). 81% of the participants identified as female (145), 2.8% preferred not to specify their gender (5), and 16.2% identified as male (29). The majority of participants were from Greece (48; 26.8%), followed by Spain (45; 25.1%), Italy (38; 21.2%), and Bulgaria (29; 16.2%), among others.

Regarding role in school and experience, the majority of participants in the consultations identified themselves as teachers (68.2%), primarily focusing on ISCED 1 (Primary Education) with 42.5% and ISCED 2 (Lower Secondary Education) with 20.7%. Their main school subjects include Foreign Languages (22.3%) and Primary School Subjects (25.1%), with varying years of teaching experience (*M* = 19.47; *SD* = 9.70).

Generally, it can be observed that all dimensions were evaluated positively (rating from 5 to 7) and that neutrality (rating 4) or disagreement (rating from 1 to 3) were rare. In the professional engagement area, Figure 3 shows the degree of agreement of the questionnaire participants concerning the proposed competencies. Adding up positive responses, digital well-being for teachers and students received the highest average consensus score among the participants (97.8%). Participants also agree that the need for teachers' digital competence includes the ability to responsibly and sustainably manage digital resources in the school environment (96.6%), while the statement Q3 ("*motivation to adopt ICT is a fundamental dimension of digital competence: without it, even if able to use existing technologies in their practice, new possibilities are not explored in the classroom*") received the least support (88.8%).

The new area of communication and relations skills also received a good degree of agreement from participants, although to a slightly lesser extent (Figure 4). The aspects that emerge most are related to the digital identity of teachers (94.4%), considering how it affects social interactions and educational relationships, and the use of technology for inclusion, especially for students with disabilities and from socio-economically disadvantaged backgrounds (94.4%). The lowest approval was achieved for the statement Q7 ("*maintaining a remote relationship to communicate and collaborate with families and students is not easy and requires specific training*") which garnered 81% of the consensus.

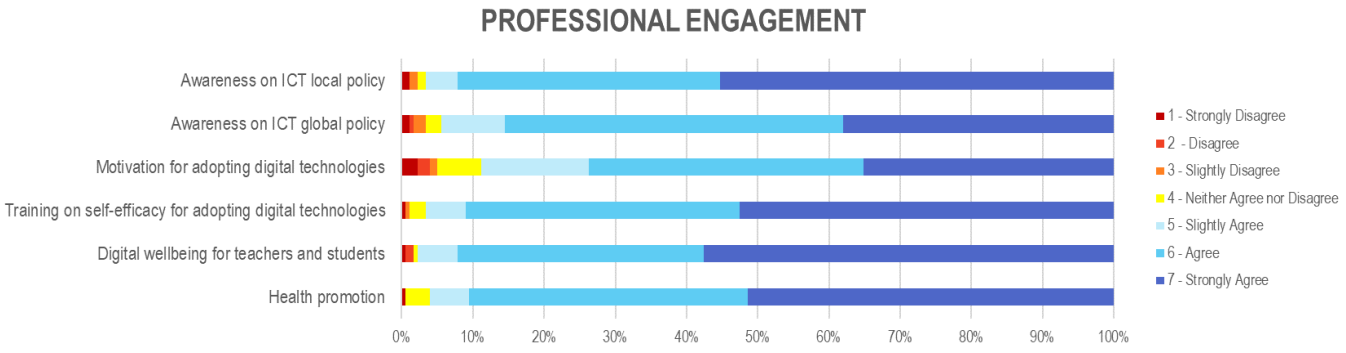

Figure 3: Agreement on the updated competencies of the professional development area

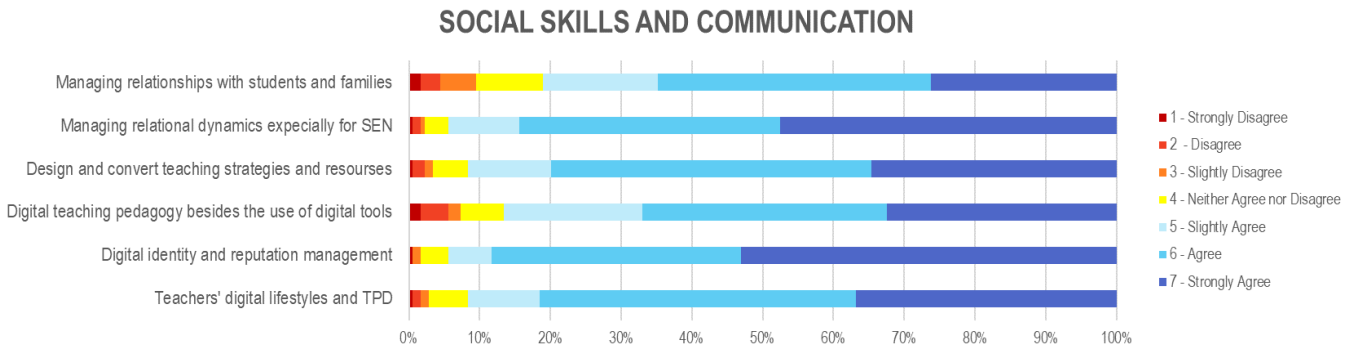

Figure 4: Agreement on the updated competencies of the new area on the socio-emotional dimension

3.2 Concepts, perspectives and practices associated with digital competence

The qualitative section of the study explored teachers' perspectives on the most crucial aspects of digital competence for teaching. Participants responded to the open-ended question: "*In your professional practice, what's the most important aspect of digital competence for teaching?*". After data cleaning to remove duplicates and ensure inclusion criteria, 173 responses were analyzed. The thematic analysis (Braun & Clarke, 2017) aimed to identify key aspects of digital competence, focusing on participants' conceptions of its role in teaching. Using an inductive approach, the analysis examined personal attitudes, motivation and strategies such as tool availability, relationship networks and teacher training. The thematic analysis revealed recurring themes and sub-themes, offering valuable insights into the strategies and priorities educators see as essential for digital teaching (Table 2).

Themes	**Sub-themes**	**Description**
Digital pedagogy *(f=145)*	Learning Design	Focuses on creating an inclusive digital learning environment by considering timing, context, methods and educational content.
	Tools and Resources	Covers the technical knowledge and practical use of devices, applications or software essential for teachers' digital competence.
	Students' Engagement	Focuses on engaging, motivating and involving students through the use of digital resources during lessons.
School policy and organization *(f=60)*	School Resources	Involves providing necessary equipment and digital support teams: it includes the availability of physical and human resources.
	Digital School Community	Promotes a culture of sharing, participation, and investment in digital innovation initiatives and projects within the school.
	Continuing Professional Development (CPD)	Focuses on the importance of ongoing training for teaching staff in the use of digital technologies, both individually and as a team.
Social and ethical implications of digital actions *(f=51)*	Digital Literacy	Involves thinking critically and interacting ethically with digital content and services, ensuring informed and responsible usage.
	Ethics and Digital Behaviour	Emphasizes the responsible use of devices and appropriate digital communication, including respecting privacy and complying with laws.
	Digital Well-being	Includes practices that promote the digital well-being of individuals, ensuring a healthy interaction with digital environments.
Digital educational relations	Communication Skills	Covers the relational skills teachers need in digital contexts, including effective communication and interaction.

(f=45)	Interaction in Digital Environments	Involves the methods of interacting with students and other school actors using digital tools
	Professional Collaborative Practices	Promotes the sharing of experiences and collaboration among teachers within and between schools.
	Families' Involvement	Emphasizes the active involvement of families in school activities through the strategic use of digital tools, fostering stronger school-community connections.
Attitude toward digital technologies *(f=30)*	Digital Teaching Mindset	Focuses on the professional attitude, including curiosity, flexibility and motivation, in using technologies for teaching.
	Reflective Digital Teaching	Highlights the importance of teachers actively participating and growing through practical actions when integrating technologies into their teaching practices.

Table 2: Overview of participants' conceptions of digital competence for teaching with frequencies

The most frequently mentioned theme was *Digital Pedagogy*, emphasizing the instructional use of technology. Sub-themes - Learning Design, Tools and Resources and Students' Engagement - highlight the emphasis on designing effective digital learning experiences, selecting suitable tools, and fostering active, inclusive classroom engagement. Under Learning Design, participants stressed tailoring digital content to students' needs: *"modifying content and designing innovative teaching paths*" and *"ensuring content motivates and includes all students*". They also emphasized creating inclusive digital environments: *"adapting tasks to promote motivation and inclusion*". In Tools and Resources, the importance of mastering digital platforms was evident: *"teachers must have an excellent knowledge of digital tools and use them appropriately*". Educators noted the need to stay updated and experiment with tools: "*choosing the most appropriate ones for each situation*". Also, the *"practical use of tools like Zoom and Teams was particularly vital during emergency remote teaching*". The Students' Engagement sub-theme underscored how digital tools enhance learning. Educators shared how platforms like Padlet, Kahoot and Scratch fostered active engagement and creativity. However, challenges in maintaining engagement, especially for students with low attention spans, were also noted, underscoring the constant effort required to keep students motivated in digital environments.

The second theme that emerged, *School policy and organization*, reflects systemic factors impacting digital teaching. Sub-themes include School Resources, Digital School Community and Continuing Professional Development (CPD). In School Resources, participants stressed the need for sufficient technical support, in terms of "*hardware and software*", to ensure teachers work freely and effectively. There was also a call for schools to adopt a centralized approach to digital implementation, led by management, to streamline processes. The Digital School Community sub-theme emphasized the value of collaboration. Educators spoke about the need for a unified vision, with one participant noting that "*the entire educational community must move in the same direction*". Stronger collaboration among teachers and parents was also seen as essential, fostering a more cohesive digital learning ecosystem. CPD emerged as a critical enabler of digital teaching, with participants underscoring the importance of ongoing training to keep pace with technological advancements. Teachers highlighted the need for *"periodic face-to-face training*" and lifelong learning opportunities. Many expressed concerns about the lack of preparation for distance learning and stressed the importance of workshops and seminars to enhance digital competence.

Another significant theme was the *Social and Ethical Implications of Digital Actions*, which encompassed Digital Literacy, Ethics and Digital Behaviour and Digital Well-being. Educators stressed that digital competence goes beyond technical skills: it requires critical thinking and information literacy, "*to understand the digital world and guide students effectively*". In terms of Ethics and Digital Behaviour, protecting digital identity and privacy emerged as a top priority. Participants emphasized teaching students how to safeguard their online presence and behave responsibly in digital spaces. Educators also noted the need to prepare students to handle negative

online experiences. Digital Well-being is focused on helping students manage their time online and prioritize their health. Teachers highlighted the importance of setting boundaries and educating students about the risks associated with digital platforms, especially for younger learners.
The theme of *Digital Educational Relations* brought attention to the relational dimension of digital teaching. Clear and effective communication was considered essential: "*teachers must establish communication channels and guide students in their responsible use*". The challenges of maintaining interaction in virtual settings were also discussed, with teachers sharing how they've had to adapt their teaching styles to foster richer connections with students. Collaboration among educators was another key focus, with participants valuing the sharing of experiences and resources: "*participating in collaborative networks helps create a supportive environment*". The involvement of families was also highlighted, emphasizing the importance of maintaining strong communication between school and home to support students' digital learning journeys.
Finally, the theme teachers' *Attitude toward digital technologies* emerged, with sub-themes of Digital Teaching Mindset and Reflective Digital Teaching. Educators emphasized the importance of cultivating a Digital Teaching Mindset, characterized by curiosity, flexibility and a willingness to innovate. One participant reflected on the shift from simply acquiring tools to thinking critically about how technology can transform teaching: *"It's about moving from 'I need an iPad' to 'What can I do differently with tech?'"*. In contrast, Reflective Digital Teaching focuses more on practical, action-oriented strategies aimed at professional improvement. As one educator put it: "*we must rethink our educational practices and embrace self-criticism to grow professionally*". Resilience and a commitment to lifelong learning were seen as vital in navigating the ever-evolving digital landscape.

4. Conclusions

The socio-emotional and relational dimension of digital competence emerged as particularly crucial during the experience of Emergency Remote Teaching (ERT) (Carretero et al., 2021; OECD, 2021). This dimension played a central role in shaping the QF developed within the Erasmus+ project D-Paideia, which aims to empower educators to effectively leverage digital technology in fostering inclusive and high-quality education (Gabbi, Ancillotti & Ranieri, 2023).
The participatory approach (Patton, 1997) was crucial in refining and emphasizing the most relevant aspects of digital competence, ensuring their applicability to current everyday school practices. The findings underscore participants' recognition of essential elements of digital competence, including digital well-being, awareness of local ICT policies and training focused on digital teaching self-efficacy. The data reveals strong agreement among participants on the competences proposed in the D-Paideia QF to update the DigCompEdu framework (Redecker, 2017).
Furthermore, responses to the open-ended questions underscore the multifaceted nature of digital competence in effective teaching. The thematic analysis identified five main themes that reflect interconnected perceptions of pedagogical-digital competence, emphasizing the role of shared practices, school organization and teachers' attitudes toward technology, in addition to ethical and relational aspects (Butcher, 2018; ETF, 2019; Mishra & Koehler, 2006; Ranieri, 2022). These findings provide a nuanced understanding of digital competence, offering a roadmap for integrating technology into educational practices while addressing the socio-relational and well-being needs of both teachers and students. Our work aligns with the European Union's green and digital transition agenda, which emphasizes the importance of ethical use of technology to develop digital skills that include ethical awareness, critical thinking and understanding of the environmental and social impacts of digital.
Finally, the D-Paideia QF has been translated into a curriculum designed to prepare educators for the evolving challenges and opportunities of digital teaching and learning. This curriculum, which will be used to train many European teachers in the next year, not only addresses the technical and pedagogical dimensions of digital competence but also emphasizes the critical socio-relational and ethical aspects essential for fostering inclusive, engaging and high-quality learning environments.

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