



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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Teacher education research in Europe: trends, challenges, practices and perspectives

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



Edited by Nicole Bianquin and Francesco Magni





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BOOK OF PROCEEDINGS

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Touch in small hands. Responding to the challenges of technology in childhood 0-6¹

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Abstract

Recent studies indicate an increase in the spread and use of digital devices among children aged 0 to 6 years. This phenomenon presents both significant risks and new opportunities for early childhood education. Internationally, reports such as Common Sense Media (2019) have raised concerns. In Italy, the Italian Society of Pediatrics (2018) published research revealing a very concerning statistic: 30% of parents rely on devices to “calm” their children as early as the first year of life. Based on this research evidence, this contribution aims to identify innovative educational approaches in contemporary pedagogical literature that foster conscious and responsible use of technology from early childhood.

Keywords: childhood 0-6; technologies; educational risks and opportunities; pedagogical rethinking.

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¹ This article is a joint and synergistic effort of the authors. For the sole purpose of recognizing personal contributions where required, it is clarified that paragraphs 2 and 3 are attributed to Francesca De Vitis and paragraphs 1 and 4 to Marcello Tempesta.

1. Use of Technology in the 0-6 age range: a brief look at the Italian, European, and international context

The use of technology in the 0-6 age group is attracting increasing attention, not only among education professionals. Recent research, including in the pedagogical field, highlights significant socio-geographical differences in attitudes towards technology in early childhood: some countries promote the integration of technology into educational frameworks, while others emphasize the risks associated with early exposure.

In Italy as well, the use of technology among children aged 0-6 is a rapidly growing phenomenon. According to research by the Italian Society of Pediatrics (2018), a shocking statistic emerges: 30% of parents report using digital devices to calm their children as early as the first year of life. Moreover, nearly half of children aged 2 to 6 access devices such as tablets and smartphones daily.

Research evidence shows, on the one hand, a growing tendency to integrate technology into everyday life, and on the other, reflects uncertainties and criticalities regarding adults' use of technology with respect to childhood.

The absence of clear educational models regarding the relationship between technology and early childhood often creates confusion within families, resulting in an educational loneliness that makes it difficult to navigate the opportunities and risks associated with digital use.

While several European countries are investing in targeted digital educational strategies, in Italy, technology in early childhood is frequently limited to a simple entertainment function.

This situation reflects a "pedagogical fracture" between the educational potential of technology and its use in daily practice. The lack of structured pathways risks turning a potentially formative tool into an element of passivity, which does not contribute to the full development of the child's cognitive, social, and emotional skills.

Aware of these criticalities, some initiatives in Italy are seeking to promote a more balanced and conscious approach to the use of technology in early childhood:

- in the school context, the National Guidelines and New Scenarios for the Nursery School Curriculum (2018), while prioritizing play, direct experiences, and manipulative activities, integrate technology in mediated, innovative, and well-designed contexts (an example is the promotion of the educational methodology Coding Unplugged);
- in the social context, awareness campaigns such as "Guadagnare Salute" (2023) by the Ministry of Health emphasize the importance of reducing early exposure to screens, instead encouraging activities that directly involve children in social, creative, and physical experiences.

In Europe, the landscape of technology use in the 0-6 age group varies greatly between countries. In Nordic countries, such as Sweden and Finland, technology is integrated into educational pathways from nursery school onwards, representing advanced models of digital integration. Here, the approach is not limited to the use of tools, but is based on a pedagogical vision that places the child at the center of an innovative educational process aimed at developing 21st-century skills. Sweden, with a long tradition of investment in education, already introduced a national strategy for digital literacy in the 1990s, recognizing technology as a key element for exploration and creative learning, even in early childhood. However, the country is currently reviewing its digital approach, favoring a return to traditional methods based on paper and pen to counteract the decline in basic skills.

Finland, known for the excellence of its education system, has integrated technology into educational contexts since the 2000s and, with the 2014 reform, made the teaching of computational thinking and digital skills compulsory from preschool, promoting a balanced and creative use of digital tools as support for learning and play.²

² Finland was the first country in Europe to introduce the Coding Unplugged methodology, which involves applying robotics principles from early childhood, with games that stimulate computational thinking (e.g., Bee-Bot and Scratch Jr.). Of socio-educational interest is also the "Phenomenon-Based Learning" Project, which integrates technology and interdisciplinary themes, such as sustainability and the environment, promoting exploration and collaboration (in www.routledge.com; www.phenomenonbasedlearning.com; www.oecd.org).

The approach of Northern European countries stands out not only for promoting creative and collaborative use of technologies, but also for adopting a participatory perspective that actively involves families.

By contrast, the approach adopted in Mediterranean countries (Italy, Spain, and Greece) is different, where the introduction of technology in educational contexts is less structured and the focus is often on the risks associated with improper or excessive use.

This diversity of approaches has led the European Union to develop guidelines (Redecker, 2017) aimed at promoting digital skills in both children and education professionals (educators, teachers, and parents), emphasizing that, in the 0-6 age group, technology should be used as a complement to analog experiences, never replacing spontaneous play and direct contact with peers.

Internationally, numerous studies analyze the impact of digital devices on the development of children aged 0-6. Among the most relevant are those by Common Sense Media, which since 2013 has recorded and attested that the use of digital media among young children is increasing, with significant implications for their development, and the report *The Future of Child Development in the AI Era. Cross-Disciplinary Perspectives Between AI and Child Development Experts* (2024), which explores the implications of integrating artificial intelligence into children's environments, highlighting both opportunities and challenges for their cognitive, socio-emotional, and relational development.

In light of what has been illustrated, it can be said that the three contexts-Italian, European, and international-recognize, albeit with different approaches, the complexity of introducing technology in the 0-6 age group.

Italy, together with other Mediterranean countries, adopts a more traditional and cautious approach, while Northern European countries and the international context agree on the importance of moderate and supervised use of technology in the early years of life, balancing the potential educational benefits with the risks associated with excessive exposure.

All share the goal of promoting conscious use of technology that supports the harmonious development of children, while also emphasizing the fundamental need for collaboration between school, family, and society to design, implement, and support effective educational actions aimed at the well-being of the youngest in the digital age.

2. New research challenges for early childhood pedagogy 0-6

The scientific literature on the relationship between technology, media education, and the 0-6 age group is rapidly evolving and addresses complex challenges that require a profound pedagogical rethinking centered on the well-being of the child. As already highlighted by Neil Postman in his essay *The Disappearance of Childhood* (1982), childhood is a phase of intrinsic vulnerability, exposed to the risk of early exposure to digital content and tools not suited to the specific developmental characteristics of this age. Digital overstimulation, often lacking adult mediation, can compromise the child's harmonious development, causing a forced acceleration of growth that Postman describes as a true dissolution of childhood itself.

In this fragile educational context, Bers (2018) warns against an excessively critical attitude towards technology, which risks limiting the ability to generate innovative and constructive ideas. Instead, she proposes orienting towards active care of digital environments, conceiving them as reliable and stimulating spaces where children can explore, learn, and collaborate through creative experiences, thus configuring a true "digital playground."

Bers calls for a different approach, aimed at identifying the real "added value" that technology and media education can offer in the 0-6 age group, without neglecting the crucial role of adult mediation. The conscious presence of educators and parents is indeed fundamental to transform technology into a tool for balanced growth, capable of supporting children's cognitive, emotional, and social development.

The most recent studies confirm that early and unmediated exposure to digital devices can entail significant risks, such as delays in the development of language and social skills, difficulties with

attention and concentration, alterations in executive functions, and an increase in impulsive behaviors or symptoms associated with disorders such as ADHD. Moreover, digital overstimulation can interfere with emotional regulation and sleep, compromising the balanced and multidimensional brain growth typical of childhood (De Marchi, 2023; Italian Society of Pediatrics, 2018).

For these reasons, it is essential to promote thoughtful and mediated use of technology, integrating it with free play activities, direct social interaction, and multisensory experiences—fundamental elements for healthy and harmonious development. Only through a shared educational pact between families, schools, and communities will it be possible to enhance the potential offered by digital technology, while safeguarding the fragility and specific developmental characteristics of childhood. The resulting educational commitment is therefore complex and requires a continuous search for balance between digital and analog experiences, between physical and virtual learning modes, and between direct relationships and those mediated by screens. Ensuring this balance means promoting a conscious and mediated use of technology, integrating it with moments of free play, face-to-face social interaction, and multisensory activities, which are essential for the harmonious and complete development of the child.

3. Starting from children: Education Technology and Screen Education

Starting from the interests and questions of children means reconsidering Piaget's idea of the "child as researcher," who, by exploring, experimenting, and interpreting the world through actions and feedback, becomes an active builder of their own learning. According to Jean Piaget, cognitive development takes place through processes of assimilation and accommodation, in which the child actively constructs knowledge by interacting with the environment (1967). From this perspective, innate curiosity, exploratory ability, careful observation, and a natural tendency toward problem solving make children "extraordinary suggesters" of educational innovation. In the current context, characterized by the pervasive presence of digital technologies, the adult's role remains to guide and facilitate varied learning experiences, starting from the technological "oddities" that spark the interest of the youngest. In fact, the adult should not merely transmit content, but co-construct with the child educational pathways that enhance their agency and their ability to actively explore the digital world. Refocusing on children in the 0–6 age group also implies the need to seek, in contemporary literature, educational models that respond to the challenges posed by the integration of technologies and media education in childhood. Among the most significant models are Educational Technology (EdTech) and Screen Education, which propose innovative pedagogical approaches aimed at integrating technology as a tool for learning and development, without neglecting the fundamental role of adult mediation and concrete experience.

Educational Technology (EdTech), according to Selwyn (2016), is not just a set of tools, but an educational paradigm that redefines the relationship between teachers, students, content, and educational experiences. In this sense, using interactive platforms (e.g., Google Classroom), EdTech not only offers opportunities for personalized learning but also facilitates engagement and collaborative learning (Roschelle et al., 2000), fostering the development of skills such as critical thinking and creativity—essential abilities in the complexity of contemporary society.

Screen Education is considered an educational response to the increasingly pervasive use of digital screens in childhood and adolescence. This approach, inspired by the theories of N. Postman, aims to develop creativity and critical skills through the promotion of:

- conscious use of devices;
- construction of participatory digital environments;
- restoring the "proper distance" in the relationship between childhood and adulthood.

The educational proposal is based on two scientifically supported pillars. On the one hand, it responds to the recommendations of the World Health Organization (WHO), which suggests avoiding screen exposure in children under 2 years old and limiting use to a maximum of 30–60 minutes per day for

the 2–6 age group, to prevent negative effects on neurocognitive, socio-emotional, and physical development. On the other hand, it values the crucial role of the active involvement of adult reference figures—families, teachers, educators—in transforming the digital experience into a meaningful educational opportunity.

A symbolic example is interactive digital reading, which integrates sounds and images to enrich emotional language, stimulate visual education, and foster the development of listening and storytelling abilities. These digital activities do not replace traditional playful-educational experiences but rather expand them, as Tisseron (2018) emphasizes in his 3-6-9-12 model, which frames Screen Education as a set of media educations differentiated by age and usage methods.

The 3-6-9-12 pedagogical model highlights the central role of family and school in accompanying childhood, promoting a constant balance between the need for protection and the goal of preparing children for a conscious, critical, and safe use of technology. Refocusing on children means valuing their very first experiences with touchscreen devices to build true “alliances of educational-digital co-responsibility.” These alliances involve school, family, and society in defining and implementing educational strategies aimed at creating a “secure digital base” which allows the youngest to “inhabit the digital world with care” and to achieve a state of “digital well-being”.

In this way, an integrated and multidisciplinary approach is promoted, recognizing the importance of a mediated and protected digital environment, capable of supporting the balanced development, emotional security, and cognitive growth of children in contemporary society.

4. Conclusions

To refocus on children, it is essential to recognize that technological experience and media education today take the form of *onlife* experiences (Floridi, 2015), that is immersed in a hyperconnected reality where the distinction between online and offline loses its meaning: from early childhood the digital dimension is deeply intertwined with every day, social, and relational life. In this scenario, the growth of the youngest occurs within an informational ecosystem characterized by an overabundance of content, the blurring of real and virtual, and continuous interaction among people, machines, and digital environments. In an increasingly complex society, protecting the fragility of childhood and enhancing its potential thus requires a systematic and multidisciplinary reflection on the relationship between childhood, adulthood, and technology. It is necessary to promote media education that, on one hand, protects children from the risks of early and unmediated digitalization, and on the other, accompanies them in discovering the opportunities offered by digital technology, preserving the fundamental value of play, relationships, and discovery typical of this life stage.

In this context, pedagogy, aware of the complexity characterizing the relationship between childhood and technology, is oriented toward seeking educational practices founded on solid theoretical and methodological premises. Education, by its transformative nature, supports the growth process through an action that does not merely prescribe predefined paths but commits to co-constructing them together with children, starting from the digital experiences they live in the present. Technology can be considered one of the “one hundred languages” (Malaguzzi, 1993) through which children express ideas, emotions, develop critical thinking, and interpret the surrounding reality, thus contributing to richer, multidimensional, and meaningful learning. From this perspective, the pedagogical challenge broadens it is not only about promoting digital competence (what technology can do *for* children) but also about fostering digital well-being (what technology can do *with* children), valuing the experiential and relational dimension of learning mediated by digital tools.

At the same time, it is fundamental to invest in the training of adults—educators, teachers, and parents—so that they can reinvent the relationship between technology and childhood, taking on an active and conscious role in educational mediation. Recent research confirms that the so-called “touch generation” no longer includes only preadolescents and adolescents (10–18 years) but also preschool children who enter the 0–6 educational system bringing both the enthusiasm of discovery and the uncertainty typical of growth processes. However, digital overstimulation, especially if not

mediated by competent adult figures, risks compromising these processes, causing phenomena of forced acceleration of development or, conversely, inhibition of natural evolutionary stages. Putting early childhood (0–6 years) back at the center is necessary both to naturally and openly face the complexity of the digital world and to reaffirm that, as in every other domain of human culture, education represents the most powerful “technology” developed by humans to acquire, transmit, and improve their knowledge (Marangi, 2023). In this light, the active and conscious presence of adults in children’s digital journey becomes essential to transform technology into an environment of growth, discovery, and relationship, thus promoting meaningful and inclusive learning from early childhood. Considering this evidence, the educational challenge consists in promoting a balance between protection and enhancement, between innovation and respect for childhood rhythms, so that technology truly becomes a tool for growth, well-being, and inclusion.

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