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From device to relationship: digital mediators, engagement and social and emotional learning in the integrated 0–6 system

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Abstract: This theoretical and reflective paper discusses the conditions under which digital mediators can foster children's engagement in social and emotional learning (SEL) processes within the integrated 0–6 system. In the light of the bioecological model and the concept of affordance – extended to include possibilities for social interaction – engagement is interpreted in relational terms. On this basis, the educational design potential of three open-ended apps (*BlaBlaBla*, *Andar per boschi* and *Loopimal*), selected as illustrative case studies, is examined. The analysis suggests that the educational value of these mediators lies in the interaction between design properties (such as openness and multimodality) and the educational configuration (including shared use and adult mediation), from which some minimum criteria for educational and teaching design within the 0–6 settings can be hypothesised.

Keywords: relational engagement; social and emotional learning; integrated 0–6 system; digital mediators; adult mediation

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1. Digital childhood as a pedagogical issue

Digital environments and touchscreen media are increasingly permeating the lived experience of pre-school children, who – as Undheim (2022) states – are growing up in contexts where access to technology is widespread and interwoven with everyday life. Even before the age of three, particularly within the family setting, children use apps to play games, watch videos, take photographs and listen to music (Nardone, 2025). At the same time, research highlights a gap between these experiences and those available in early years settings, to the extent that Undheim (2022) has spoken of 'disconnected contexts', highlighting the limited awareness among educators and teachers regarding the role of technology in children's experiences. This situation also raises the issue of equity, since the European declaration promoted in 2022 by the European Literacy Policy Network (ELINET) recognised digital literacy as a right of every child, to be guaranteed by supporting parents as well as educational and school staff (Valtin, 2023). Consequently, there is a need to examine the role that digital technology can play within the Italian integrated 0–6 system (Legislative Decree No. 65 of 13 April 2017).

International guidance on the subject reflects the complexity of the phenomenon. In particular, the position statement by the National Association for the Education of Young Children (NAEYC) and the Fred Rogers Centre (2012)

argues that technology and media can support children's learning and relationships, provided that the experiences are shared and engaging; it also rules out passive exposure to non-interactive media for children under the age of two, with particular reference to formal educational settings. The document also emphasises the need to promote opportunities for engagement with digital media that support responsive interactions between adults and children.

The literature on this topic is predominantly descriptive and rarely includes children under the age of three (Undheim, 2022); moreover, it offers few pedagogical criteria for selecting digital mediators to promote social and emotional learning. In light of these premises, this paper aims to discuss the conditions under which digital mediators can foster children's engagement in social and emotional learning (SEL) processes within educational settings for children aged 0–6. In this regard, given the developmental specificities of the age group under consideration, the paper seeks to explore the possibility of interpreting engagement primarily as participation in a relationship. From this perspective, the educational value of digital mediators should be sought not only in the characteristics of the devices themselves, but also, and above all, in the configuration of relationships, spaces and adult mediation within which they are embedded.

2. Social and emotional learning, engagement and digital technologies: a theoretical framework

2.1. Social and emotional learning in early childhood: skills that are developed through relationships

According to the definition developed by the Collaborative for Academic, Social, and Emotional Learning (CASEL, 2020), social and emotional learning encompasses the processes through which children and adults acquire and effectively use the knowledge, attitudes and skills necessary to regulate their emotions, set and achieve positive goals, show empathy towards others, establish and nurture healthy relationships, and make responsible choices. Furthermore, CASEL breaks these processes down into five areas: self-awareness, self-management, social awareness, relationship skills and responsible decision-making (CASEL, 2020).

Denham et al. (2009) further emphasise that social-emotional competence refers to the set of skills that enable a person to meet their own needs without compromising the quality of their relationships with others (social competence) and to recognise their own and others' emotions, thereby guiding their behaviour, managing interactions and effectively regulating their emotional states (emotional competence). Childhood, as Zarra-Nezhad et al. (2023) point out, is a crucial stage for the development of social-emotional competences and represents a unique opportunity to lay the foundations for healthy development. From this perspective, educational staff play a strategic role in creating safe and stimulating environments, attuned to children's needs, so that social and emotional learning can be promoted in an integrated manner (Zarra-Nezhad et al., 2023).

In this vein, a relational and intersubjective framework for social and emotional learning in early childhood emerges, consistent both with the social-constructivist perspective (Rogoff, 1990)—which interprets development as a socially mediated process—and with the values expressed in the *Linee pedagogiche per il sistema integrato*

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zerosei (Ministero dell'Istruzione, 2021), which recognise the child as an active co-constructor of meaning and knowledge alongside peers and adults.

2.2. Engagement from a relational perspective: insights from a bioecological framework

The bioecological model proposed by Bronfenbrenner and Morris (2006) outlines a perspective from which it is possible to interpret engagement in 0–6 settings as participation in a relationship. According to these scholars, human development occurs through processes of progressively more complex reciprocal interaction between an individual and the people, objects and symbols in their immediate environment. Such interactions, when they occur regularly over extended periods of time (as in play or reading), are termed 'proximal processes'. Within this framework, engagement in early years settings can be understood as part of a proximal process that encompasses interactions with materials, with educational and school staff, and with peers (Cadima et al., 2015): in this sense, digital technology can be regarded as one of the elements of the environment with which children interact and through which they can initiate interactions with peers and adults.

In this paper, therefore, the term 'relational engagement' refers to the child's participation in a configuration of relationships with adults, peers and materials, mediated in part by digital technology. The construct thus involves two main elements: on the one hand, the opportunities for participation that settings make available; on the other hand, the potential for such participation to foster in children a sense of belonging (i.e. recognising themselves as part of the group) and agency (i.e. the ability to make choices that tangibly influence the activity).

2.3. Digital technologies in early years settings: some empirical evidence

The qualitative study conducted by Arnott (2016) in two pre-school settings over a nine-month period, focusing on 24 technological resources, shows that children aged 3–5 play with technology in clusters, exhibiting varying degrees of social participation and assuming different social status roles and positions in relation to technology. With particular reference to cooperative play, the study showed that it is strongly influenced by contextual factors: the agency of children and educators, technological affordances, cultural systems, and the routines and practices of the setting.

Undheim (2022), furthermore, examined 35 studies, conducted between 2010 and 2020, on the use of digital technologies (devices, tools, resources and media) with children aged 0 to 6 in early years settings. The review highlighted the potential for children to take on the role of active creators of digital content, such as photographs, audio recordings, multimedia stories and animations. In this regard, open-ended applications proved particularly significant, as they offer children multimodal opportunities to communicate, collaborate with peers and document their own thought processes. Digital technology therefore requires a carefully designed pedagogical practice guided by adults.

In light of these considerations, this paper offers a reflection on technological devices, taking as its starting point the concept of affordance (Gibson, 1979) – understood as the set of possibilities for action that an environment offers an agent – and extending this to include possibilities for social interaction. In this sense, affordances make it possible to describe the interaction between children and their environment, highlighting the opportunities and obstacles that arise from this

encounter. The aim is therefore to develop the analysis not so much with reference to affordances of use as with reference to the opportunities for social interaction that they can help to make possible.

3. Analysis of selected digital mediators: affordances, relational configurations and adult mediation

3.1. Approach and analytical procedure

In this theoretical and reflective paper, the analysis focuses on the educational design potential of selected applications and does not report observed outcomes.

The applications around which the analysis is structured – *BlaBlaBla* (Bravi, 2010), *Andar per boschi* (Centro Zaffiria, 2018) and *Loopimal* (Yatatoy, 2015) – were selected according to three criteria: a) the diversity of potential socio-relational affordances that can be activated (which can be defined in terms of expressive, narrative and compositional value); b) their suitability for the 0–6 age group and for group work; c) the absence of closed pathways with a single correct answer. This is, therefore, not a representative sample but rather a selection of cases deemed illustrative. Subsequently, the apps were analysed according to five dimensions: 1) the potentially predominant affordance in socio-relational terms; 2) the configuration of possible relationships (child–adult, child–peer, child–materials); 3) multimodal components (visual, auditory, gestural and bodily); 4) the forms of adult mediation required and links with non-digital mediators and with the physical environment; 5) the areas of social-emotional competence ideally stimulated (CASEL, 2020). It should be noted, in this regard, that the affordances indicated as predominant are hypothesised at the level of educational design and refer to the type of action elicited (i.e. expressing, narrating, composing), not to the apps' design features. These are, therefore, profiles in which the predominant orientation is accompanied by secondary possibilities that can be realised through adult mediation.

3.2. Analysis of the selected apps

BlaBlaBla, conceived by Lorenzo Bravi (2010), features a series of stylised faces that react in real time to the intensity of the voice picked up by the microphone, without recording the sound. The predominant affordance may have an expressive value: the faces invite the player to give them a voice (Nardone, 2025), providing the child and the group with a visible trace of the vocal act and thus creating a form of audiovisual mirroring around which to experiment with voice, facial expressions and emotion. The app – which offers an open-ended play experience (Nardone, 2025) – draws on established educational practices in early years settings, such as the use of mirrors and picture books featuring faces depicting different emotions, to support emotional literacy, and could also be introduced to children under the age of three, in brief moments of shared use mediated by an adult. From a 'learning by doing' educational perspective, it can be used to set up a workshop with the class group, centred on emotional and expressive aspects, designed to promote social-emotional and empathic skills. The educational value of *BlaBlaBla* depends to a large extent on adult mediation. The app itself does not name the emotions: it is the adult who can name and verbalise the emotional experiences expressed by or attributed to the faces, offering an interpretation and thereby supporting the expansion of children's

emotional vocabulary and mutual recognition. Furthermore, when the app is used in a group setting, taking turns can serve as a situated exercise in waiting and listening.

'Andar per boschi' (Centro Zaffiria, 2018) is an app developed by the 'Zaffiria' Centre for Media Education (Centro Zaffiria) and dedicated to nature and the landscape; it allows users to create animated woodlands from their own drawings. The screen fills with animals, backgrounds, weather conditions and trees drawn by the players, which come to life and transform. Furthermore, the camera function allows users to capture colours and patterns observed in the real world and use them to decorate the tree canopies. Textures collected outdoors by the group of children – for example, through frottage of bark and leaves – can thus be photographed and incorporated into the canopies of an animated woodland, which can be exported as an image or video (Centro Zaffiria, 2020). In this way, the app weaves together analogue exploration and digital composition, enabling outdoor experiences to be linked with indoor activities, thereby fostering a connection between the 'inside' and 'outside' of the early childhood setting. The predominant affordance, in this case, can be considered to have narrative value: the woodland, populated by animals drawn by the children, becomes a setting around which to imagine and tell stories. Co-constructed and observed together, it constitutes the outcome of a shared process (collection, selection, composition, shared vision) and takes the form of a collective product in which each person's contribution is recognisable. In design terms, however, the app primarily encourages a creative process: the narrative value is realised above all through adult mediation and the link to shared reading. As Nardone (2025) suggests, the app lends itself to links with picture books such as *Io sono foglia* (Mozzillo, 2020), illustrated by Marianna Balducci. This opens up avenues for self-observation and reflection on emotions, dreams and desires, within a sequence that includes bodily exploration, shared reading and conversation. Within a framework of relational engagement, the fact that individual contributions remain recognisable within a collective outcome can support social and emotional learning and a sense of belonging to the group, while also acknowledging children's empowering role as content creators.

Loopimal (Yatatoy, 2015) is an app that combines colours, music and movement. The main characters are six animals, each associated with its own musical backing track. By dragging blocks of different shapes and colours, children can 'programme' the animal's movements and enrich the musical backing track, creating choreographies and melodies. The app is based on a visual and gestural 'grammar', with no objectives or 'correct' answers. The predominant affordance is therefore of a compositional nature. The sequence becomes a shared product and, as it does not necessarily require the use of spoken language, lends itself to being negotiated through gestures and imitation: this makes the app suitable for small-group work and accessible even to children with emerging spoken language skills, provided they possess the motor skills that may be required. In a class-group workshop setting, the screen can be projected and the composition can be performed as a collective dance (Nardone, 2025); the use of the screen could thus alternate with phases of bodily movement that would require an increasing capacity for listening and attuning to others. In this way, adult mediation could restore a kinaesthetic quality to the digital experience, enhancing its potential for the development of social-emotional skills.

Table 1. Analytical summary of the selected apps.

App	Predominant affordance from a hypothetical-design perspective	Relationships and groupings	Multimodal components	Adult mediation and connections	SEL areas that can ideally be stimulated (CASEL, 2020)
BlaBlaBla (Bravi, 2010)	Expression: real-time mirroring of vocal intensity	With an adult and peers: pairs, small or large group; taking turns	Auditory and visual; variations in facial expressions	Naming emotional experiences; regulating turn-taking; mirrors, picture books, voice and facial expression games	Self-awareness and social awareness
Andar per boschi (Centro Zaffiria, 2018)	Storytelling: creating a shared landscape	With materials and peers: small group (collection, composition); large group (viewing)	Tactile and physical (frottage); visual (photography, animation)	Organising outdoor exploration; highlighting contributions; picture books	Relationship skills; self-awareness
Loopimal (Yatatoy, 2015)	Composition: sequences of blocks that generate movement and sound	With peers and an adult: small group; screening for the whole group	Visual and gestural; auditory; bodily (dance)	Initial free exploration; negotiation of sequences; alternating between screen and dance	Relationship skills

4. Possible implications for educational design within the integrated 0–6 system

This reflection seeks to highlight that open, narrative and collaborative digital environments are consistent with a relational understanding of engagement, particularly where they enable children to narrate, negotiate, create and reflect together. Engagement, therefore, can be considered in its qualitative dimension, in relation to the relational density of the proposed experiences; furthermore, it is plausible to assume that each digital environment embodies a certain conception of the child and of relationships, which those who select it are called upon to make explicit. On the basis of these considerations, therefore, it is possible to hypothesise some criteria for reflection regarding the digital medium and its context of use: a) the relational configuration (whether the mediator encourages shared use); b) openness (the opportunity to access a variety of outcomes); c) multimodality (that is, the variety of visual, auditory, gestural and bodily components that can support expression and communication among children); d) continuity (with reference to any non-digital mediators, outdoor experiences and shared reading); e) the documentability of individual and collective contributions (which is particularly evident in *Andar per boschi*); f) adult mediation (that is, the interventions required on

the part of the adult to ensure the experience acquires social and emotional significance).

With regard to the final reflective dimension mentioned above, a conception of the educator as a mediator of the digital experience emerges, called upon to observe emotions and reactions, verbalise experiences, reflect back the children's questions and foster peer dialogue, in line with the importance attached to co-participation by NAEYC and the Fred Rogers Centre (2012). From the perspective of training for educational staff, this implies a necessary focus on fostering skills in observing, verbalising and building on children's contributions, to be incorporated with increasing awareness into the practice of pedagogical documentation, to which the *Linee pedagogiche* attribute a central role in 0–6 settings (Ministero dell'Istruzione, 2021) and which should be extended and critically examined in relation to the use of digital technology in the experiences offered within 0–6 educational settings.

From the specific standpoint of teaching practice, and in line with the views expressed by Nardone (2025), the perspective outlined implies a dialogic process between digital tools and traditional mediators within collaborative workshop settings, in which the arrangement of spaces takes on significance as a pedagogical variable: a tablet held by a single child, a device on a low table around which several children gather, and an image projected for the whole group offer different configurations in terms of who can see, act, speak and respond. Furthermore, in terms of inclusion, the choice of mediators based on non-verbal 'grammars' (*Loopimal*) or those responsive to any vocal output (*BlaBlaBla*) can help to reduce certain barriers to participation for children with developing language skills or special educational needs.

4.1. Limitations of this paper and possible implications for research

The limitations of this paper lie in its theoretical and reflective approach: the three applications analysed are, in fact, illustrative cases that do not allow for generalisations or – given the selection criteria – a comparison with single-answer applications. It should be emphasised that the analysis concerns the apps' educational design potential rather than their direct use in early childhood settings; consequently, the reflections presented are hypothetical. The proposed criteria, however, could be tested through research-training (*ricerca-formazione*), video-recorded observation of interactions, and a comparison between open-ended and single-answer apps.

5. Concluding reflections

The aim of this paper was to discuss the conditions under which digital mediators can support children's engagement in social and emotional learning processes. Based on the analysis carried out, it is possible to hypothesise that these conditions lie in the interaction between certain design properties of the mediator (such as openness to multiple outcomes and multimodality) and the educational configuration in which it is embedded, namely shared use, adult mediation that acknowledges and builds on children's emotional experiences, the link with non-digital mediators, and the organisation of space. The analysis suggests an ecological-relational interpretation of engagement as an outcome emerging from the interaction between the child, peers, adults, materials, languages, spaces and technologies; as a form of participation, engagement can support social and

emotional development. Promoting it can also help to realise, from the earliest years of life, the right to digital literacy (Valtin, 2023).

From this perspective, the most significant pedagogical issue concerns the type of experience one aims to facilitate: within the integrated 0–6 system, technologies can be assessed in terms of their capacity to expand children's agency, support cooperation, promote emotional expression and strengthen a sense of belonging.

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