A PEDAGOGY OF CARE IN THE ARTIFICIAL INTELLIGENCE ECOSYSTEM

Francesca De Vitis
University Telematic Pegaso
francesca.devitis@unipegaso.it

Double Blind Peer Review

Citation
De Vitis, F. (2026). A pedagogy of care in the artificial intelligence ecosystem. *Italian Journal of Health Education, Sport and Inclusive Didactics, 10*(4).

Doi: https://doi.org/10.32043/gsd.v1i4.1903

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gsdjournal.it
ISSN: 3103-5744

ABSTRACT

The advent of Generative AI reshapes how adolescents learn, communicate, and construct identities. Conversational systems raise a core pedagogical question: how can computational responses be distinguished from authentic educational relationships? Grounded in UNESCO's (2023) human-centered approach, this study adopts a hermeneutic phenomenological methodology to provide an original conceptual synthesis. By analyzing the interpretive categories of 'artificial empathy', 'digital holding', and the 'digital lifeworld', the paper examines how simulated algorithmic responsiveness diverges from authentic human presence. Through a theoretical dialogue with Winnicott, Mortari, and Bertolini, it argues for a pedagogy of care within the digital ecosystem, demonstrating that AI must support - rather than replace - the educational dimensions of listening, reciprocity, and ethical responsibility that underpin human development.

KEYWORDS

Generative artificial artificial intelligence; pedagogy of care; digital ecosystem; artificial empathy; phenomenologycal pedagogy.

Received 2026-07-11
Accepted 2026-10-27
Published 2026-10-30

1. Introduction

The emergence of generative artificial intelligence in educational settings and in adolescents' everyday lives represents a transformation that cannot be understood merely as a technological innovation. The distinctive feature of the current digital landscape is that these systems no longer simply support cognitive activities or facilitate access to information; rather, they participate in communicative interactions in which language acquires an apparently relational dimension. The possibility of engaging in dialogue with artificial agents capable of producing context-sensitive, adaptive, and personalized responses makes the boundary between communication and relationship between response and recognition, and between the simulation of closeness and authentic presence increasingly difficult to define. This transformation is particularly significant during adolescence, a developmental stage in which personal identity is constructed through processes of differentiation, belonging, and mutual recognition. Adolescents undertake the developmental task of identity formation through an ongoing negotiation between their inner world and the social environments in which they are embedded. From this perspective, digital technologies are not merely external tools used by individuals; they become part of the symbolic and relational environments through which individuals interpret themselves and their relationships with others (Erikson, 1974). Generative artificial intelligence introduces a further level of complexity into this landscape. Whereas earlier digital environments reshaped the ways in which individuals present themselves, communicate, and experience social belonging (boyd, 2014; Livingstone, 2019), AI-based conversational systems enable interactions that may be perceived as dialogical and, in some cases, emotionally meaningful. The resulting pedagogical challenge therefore extends beyond the appropriate use of

technology to the meaning these experiences acquire within processes of human formation. A new horizon thus emerges for educational research, which is called upon to interpret the growing presence of artificial intelligence in adolescents' lifeworlds without losing sight of the centrality of human relationships as the primary locus of education. This challenge becomes particularly relevant considering the *Guidance for Generative AI in Education and Research* (UNESCO, 2023) which advocates integrating artificial intelligence into educational systems through a *human-centred approach*. According to this perspective, the educational value of AI technologies should not be assessed solely in terms of efficiency or personalization, but rather in relation to their capacity to foster autonomy, participation, creativity, and human development. Against this background, the present article advances the theoretical assumption that generative artificial intelligence makes a pedagogy of care more necessary than ever. The more technologies become capable of simulating linguistic expressions of listening and empathy, the more educational reflection is called upon to clarify what distinguishes an authentically formative relationship from a merely functional interaction. The study adopts a theoretical-interpretive approach grounded in hermeneutic phenomenology to explore the meaning of educational care within the AI ecosystem. Rather than empirically investigating the effects of AI on adolescents, it seeks to examine the conceptual categories required to understand the transformation of educational experience in contemporary digital environments. Three research questions emerge from this initial analysis: 1) what pedagogical criteria allow us to distinguish mere technological availability and computational efficiency from authentic educational presence within AI-mediated interactions? 2) In what ways can the theoretical constructs of holding, care, and lifeworld be epistemologically integrated to interpret adolescents' relational dynamics when interacting with

artificial agents? 3) Under what pedagogical and ethical conditions can generative AI support, rather than undermine, adolescents' autonomy and identity formation? By engaging with the work of Donald W. Winnicott, Luigina Mortari, and Piero Bertolini, the article develops an interpretive framework in which identity, relationship, care, and meaning making constitute the fundamental dimensions for understanding the pedagogical implications of the digital age. Crucially, these three perspectives are not merely juxtaposed, but integrated based on their epistemological complementarities: Winnicott's construct of 'holding' provides the developmental foundation to understand the adolescent's need for a secure base; Mortari's pedagogy of care operationalizes this as an intentional ethical practice rather than a simulated response; and Bertolini's approach offers the overarching phenomenological lens to interpret how meaning is constructed within the digital lifeworld, establishing a rigorous threshold between technological simulation and authentic presence.

2. Adolescence, Artificial Intelligence, and the Transformation of the Educational Relationship

The possibility of interacting with systems capable of producing natural language, processing complex information, and generating responses consistent with the communicative context introduces a profound transformation in the relationship between the subject, knowledge, and relational experience (Floridi, 2023). Unlike previous technologies, which were primarily oriented toward the transmission or management of information, generative systems appear to assume a dialogical dimension, offering users an

experience characterized by communicative continuity, adaptation, and an apparent form of understanding.

This transformation is particularly significant during adolescence, a crucial developmental stage in which, as Erikson (1974; 1977) highlights, personal identity is constructed through processes of mutual recognition, belonging, and the negotiation of the relationship between the self and the social context. Contemporary adolescents grow up within an ecosystem in which analogical and digital dimensions are deeply intertwined. Online platforms, virtual environments, and, more recently, AI-based conversational systems constitute spaces in which meanings, forms of belonging, and self-representations are negotiated (boyd, 2014; Livingstone, 2019).

The emerging pedagogical question therefore concerns not only the usefulness or risks of artificial intelligence, but also the ways in which these technologies transform the experience of relationship itself. If generative systems can simulate linguistic forms associated with listening, understanding, and emotional support, it becomes necessary to reflect on the educational meaning of empathy and on the conditions that make a relationship genuinely formative.

In this scenario, it is pedagogically vital to define "artificial empathy" as a purely computational simulation of affective alignment based on statistical pattern recognition, which lacks ontological depth. This must be analytically distinguished from "authentic presence," which involves ethical commitment, intentionality, and reciprocal vulnerability between two human subjects. While adolescents may subjectively experience an artificial interaction as emotionally meaningful, this phenomenal perception should not mask the structural difference between algorithmic adaptation and intersubjective recognition.

In this sense, educational research is called upon to clarify what distinguishes a technologically effective response from an educational relationship grounded in care, capable of fostering personal growth, autonomy, and the construction of meaning. The hypothesis advanced here is that generative artificial intelligence makes a pedagogy of care even more necessary: the more technologies become capable of simulating closeness, the more education must question the value of authentic presence. From this perspective, the concept of care assumes a central role. Care makes it possible to interpret the relationship between adolescents and artificial intelligence not exclusively through the categories of efficiency and innovation, but through those of responsibility, presence, and recognition of the other. This article therefore proposes a theoretical-pedagogical interpretation of adolescence within the ecosystem of generative artificial intelligence through engagement with three fundamental perspectives: Donald Winnicott's theory of relationship and the facilitating environment, Luigina Mortari's pedagogy of care, and Piero Bertolini's phenomenological-pedagogical approach.

3. Generative Artificial Intelligence and Education: The UNESCO Human-Centred Approach

The *Guidance for Generative AI in Education and Research* published by UNESCO in 2023 represents one of the main international references for understanding the relationship between artificial intelligence and education. The document adopts a balanced position: it acknowledges the transformative potential of generative AI while emphasizing the need to maintain a perspective grounded in human-centredness, the protection of

rights, and educational responsibility (UNESCO, 2023). Within the architecture of this study, UNESCO Guidance serves not merely as an institutional point of reference, but as a critical normative framework. It provides the socio-ethical parameters required to regulate technological innovation, ensuring that digital tools remain subordinate to human development rather than dictate their pedagogical trajectory. According to this approach, artificial intelligence can contribute to improving access to educational resources, supporting forms of personalized learning, and fostering new modes of knowledge production. However, these opportunities must be assessed by considering their effects on the holistic development of the person rather than solely on performance or the efficiency of processes. This point is particularly relevant because the introduction of AI into educational contexts risks being interpreted through a predominantly instrumental model, in which technological innovation is automatically equated with pedagogical progress. The UNESCO perspective instead invites us to maintain a fundamental distinction: technology may be highly advanced from a technical standpoint without necessarily generating a meaningful educational experience. Human development and education involve dimensions that exceed the mere processing of information: motivation, identity construction, sense of belonging, relational capacities, and the development of critical judgement. The perspective of care makes it possible to introduce precisely this missing dimension. If artificial intelligence is considered merely as a tool for improving learning, there is a risk of reducing education to a process of performance optimization. If, instead, it is situated within a pedagogical perspective, AI becomes an element to be interpreted in relation to the fundamental question of education: what kind of human experience do we seek to make possible through technology?

4. From Availability to Presence: The Winnicottian Concept of *Holding* as a Pedagogical Key in the Age of Artificial Intelligence

Among the authors who provide particularly significant insights for interpreting the question of relationship in the age of generative artificial intelligence, Donald W. Winnicott occupies a central position. Although his work belongs to the psychoanalytic field, his theory has profound pedagogical relevance because it places the relationship between subject and environment at the core of human development, showing how growth is inseparable from the quality of the relationships that accompany it.

Winnicott's (1970) fundamental contribution lies in overcoming an individualistic conception of development, demonstrating that the Self does not constitute itself autonomously but emerges within a relational context capable of providing continuity, support, and recognition. His famous statement that there is no such thing as a baby does not deny the child's individual existence; rather, it emphasizes that the human subject is constituted from the very beginning within a relationship. The child gradually becomes capable of perceiving themselves as separate individuals because they have first experienced a reliable environment capable of sustaining the continuity of their existence.

This insight is particularly relevant for understanding adolescence within the digital ecosystem, since adolescence is also a phase in which the Self is continuously re-elaborated through relational experiences. The search for autonomy does not eliminate the need for recognition; on the contrary, it makes the presence of environments capable of supporting identity exploration even more necessary. In this context, generative artificial intelligence introduces a new form of communicative environment:

conversational systems can provide immediate responses, adapt to users' language, and produce interactions that assume an apparently personal character.

However, the Winnicottian perspective makes it possible to raise a crucial pedagogical question: can a communicative environment coincide with a relational environment? This question requires distinguishing between availability and presence. An artificial system can be available almost continuously, provide responses without fatigue, and simulate forms of listening and understanding; yet educational presence cannot be reduced to mere availability, since it involves the engagement of one subject toward another and the possibility of an authentic experience of recognition.

From this perspective, Winnicott's concept of the *good enough environment* becomes particularly relevant. Through this notion, the author refers to an environment capable of responding to the fundamental needs of the person without eliminating the experience of frustration. An effective educational environment is not one that anticipates every difficulty or provides every solution, but rather one that enables the subject to progressively develop autonomous capacities. This conception has significant implications in the current digital landscape, where support risks being interpreted as the immediate availability of answers. Artificial intelligence appears to offer precisely this possibility: rapid, personalized, and continuous access to information and suggestions.

However, personal growth does not occur through the simple elimination of uncertainty, as adolescents also need to encounter limits, waiting, the otherness of others, and the complexity of real situations. The good enough environment is educational because it supports without replacing. This distinction helps clarify the role of technology: an artificial system can

accompany learning processes, facilitate access to knowledge, and provide supportive tools, but it cannot assume the environmental function through which individuals develop trust in the world and in their own possibilities.

Within this perspective, Winnicott's concept of *holding* represents a further element of particular interest for a pedagogical reflection on artificial intelligence. *Holding* refers to the capacity of the environment to support the subject through a reliable presence, offering not only responses to needs but also continuity of experience and a sense of existential security. From an educational perspective, this function can be understood as the dimension of the relationship through which adolescents perceive that they can face difficulties and transformations without losing a sense of personal coherence.

A teacher, educator, or significant adult performs a *holding* function when they do not simply provide solutions but accompany the subject in the construction of meaning. The difference from an artificial system therefore becomes evident: artificial intelligence can produce a reassuring response, whereas an educational relationship generates an experience of recognition. In the first case, there is a functional simulation of closeness; in the second, a transformative relationship.

This distinction does not imply denying the value of interactions with artificial systems but rather placing them within a pedagogical horizon in which technology remains a tool in the service of human formation and does not become the model of educational relationships.

5. Care as Educational Responsibility in the Age of Digital Adolescence

Within the contemporary digital ecosystem, characterized by the increasing integration of artificial intelligence systems into communicative, cognitive,

and educational processes, it is now widely acknowledged that the central pedagogical question concerns the ways in which technologies transform the conditions of relationships, learning, and identity construction. The diffusion of conversational systems capable of producing coherent, personalized, and linguistically attentive responses introduces a new configuration of educational interaction, in which it becomes necessary to question the meaning of presence, empathy, and care. From this perspective, Luigina Mortari's (2006) contribution provides a relevant theoretical framework for distinguishing communicative effectiveness from the relational quality of educational experience.

This framework epistemologically expands Winnicott's developmental model: while holding describes the environmental foundation required for the emergence of the Self, Mortari's pedagogy of care operationalizes this relational security into an intentional ethical practice. Within the digital ecosystem, care becomes the process through which the technical 'holding' offered by a machine is scrutinized and evaluated against human relational standards.

Drawing on Mortari's conception that caring means being concerned with the other in such a way as to promote their "flourishing", the educational perspective remains oriented not toward replacing the subject's agency but toward fostering their developmental possibilities. Care therefore implies a cognitive and ethical stance that requires interpreting the other's situation, understanding both explicit and implicit needs, and accompanying their process of growth.

This perspective becomes particularly relevant when examining Generative Artificial Intelligence, especially in relation to adolescent experience, a life phase characterized by heightened vulnerability. Vulnerability constitutes a

fundamental dimension of human existence: individuals develop through relationships and encounter moments in which recognition, support, and guidance are essential. Adolescence makes this condition particularly visible, as it is marked by the tension between processes of individuation and the need for belonging, between the search for autonomy and the need for identity confirmation. Digital environments amplify this ambivalence, offering opportunities for expression and participation while also generating new forms of exposure and fragility (Livingstone, 2019), through interactions increasingly characterized by immediate responses that are not necessarily mediated by processes of self-reflection and self-regulation.

Within a digital environment often oriented toward the immediacy of solutions, care introduces a critical criterion: technology acquires educational value not when it eliminates complexity, but when it supports the person's capacity to engage with complexity autonomously and consciously. From this perspective, artificial intelligence becomes pedagogically problematic when automated responses replace the reflective processes through which individuals understand themselves and construct their relationship with the world. Care, in fact, does not produce dependency but autonomy.

This issue becomes particularly evident in relation to the ability of conversational systems to simulate linguistic forms associated with empathy. Although such systems can identify emotional signals and adapt communication styles in an apparently supportive manner, it remains necessary to distinguish between the simulation of empathy and the authentic experience of care. Educational empathy does not consist merely in providing an appropriate response; rather, it presupposes an encounter between subjects and the recognition of the other in their irreducible uniqueness. As Mortari (2015) emphasizes, care originates from recognizing

the other as a person rather than as an object of intervention. An artificial system may process information related to the user's emotional experience, but it cannot assume the ethical and relational responsibility that characterizes the act of caring. Technology can therefore support and potentially enrich educational relationships, but it cannot coincide with them, since care remains grounded in reciprocity, responsibility, and the recognition of each person's uniqueness. This difference does not represent a marginal limitation, but rather the central point for understanding the educational role of artificial intelligence: technology can support relationships, but it cannot become the relationship itself.

6. Inhabiting the Digital Lifeworld: Bertolini's Phenomenological Perspective on Artificial Intelligence and Education

The phenomenological perspective (Bertolini, 1988; 1993) makes it possible to overcome an exclusively instrumental conception of technology, according to which artificial intelligence would constitute merely a functional device aimed at achieving predefined objectives. AI systems, in fact, should not be understood solely as tools through which individuals acquire information or perform specific tasks; rather, they increasingly become part of the experiential horizon within which subjects interpret themselves, others, and the surrounding world. Therefore, the fundamental pedagogical question does not concern only the operational and functional potential of artificial intelligence, but also the meaning that interactions mediated by these systems assume within adolescents' processes of identity construction and personal development.

From this perspective, the phenomenological concept of the lifeworld (*Lebenswelt*) assumes a central theoretical role in understanding the presence of artificial intelligence within the everyday experience of younger

generations. The lifeworld does not coincide with the mere set of objective conditions in which the subject is situated; rather, it represents the pre-reflective and symbolic horizon of meanings through which individuals organize, interpret, and give significance to their experiences. Digital environments and, in particular, conversational systems based on artificial intelligence have now become an established component of this horizon, transforming the ways in which adolescents communicate, learn, produce meanings, and construct relationships. The digital domain no longer constitutes a separate or complementary dimension in relation to everyday experience; it has become a structural component of the lived world in which new forms of relationships with oneself, others, and knowledge take shape.

However, acknowledging this integration does not imply an uncritical acceptance of technological processes. A phenomenological approach instead requires an analysis of the meaning that these experiences assume for the subject and of the transformations they produce in the ways individuals inhabit the world. The same artificial intelligence system may generate profoundly different experiential configurations: it may function as a mediating resource capable of expanding individuals' cognitive and creative possibilities, supporting processes of autonomy and fostering reflective practices; alternatively, it may become a substitute environment for intersubjective relationships, reducing opportunities for encounters with others and for the shared construction of meanings. From this perspective, pedagogical attention cannot be focused exclusively on the technical characteristics of the tool but must address the quality of the experience that subjects construct through such technologies and integrate into their educational trajectories.

In this sense, Bertolini's digital lifeworld deeply overlaps with Winnicott's structural environment: when AI shifts from being a mediating resource to a substitute environment, the adolescent is deprived of the genuine intersubjective friction necessary to achieve authentic autonomy. It is precisely within this experiential tension that Mortari's pedagogy of care becomes crucial, serving as the intentional ethical practice needed to reorient the digital Lebenswelt toward meaningful human-centered trajectories.

From this point of view, digital education cannot be interpreted as a form of technical literacy aimed solely at acquiring operational skills, but rather as a process of meaning-making education, intended to develop individuals' ability to critically understand their relationship with technologies. Educating for artificial intelligence means accompanying adolescents in interpreting the role these systems assume within their experience, the needs they seek to address through them, the possibilities they expand, and the relational, cognitive, and emotional dimensions that may instead be impoverished. Consistent with Bertolini's perspective (1988), education does not consist in promoting a passive adaptation of the subject to the technological environment, but in fostering the capacity to attribute meaning to reality and consciously transform it. In the age of artificial intelligence, the pedagogical challenge therefore lies in educating subjects capable of inhabiting their digital lifeworld while preserving the reflective, relational, and ethical capacities that constitute the foundation of human experience and personal development.

7. Safeguarding the Human in the Age of Artificial Empathy

In conclusion, the theoretical path developed through Winnicott, Mortari, and Bertolini makes it possible to outline a unified perspective in which the person is understood not as an autonomous and self-sufficient entity, but as a subject

who is constituted through relationships, care, and the attribution of meaning to experience. Within this framework, Generative Artificial Intelligence does not represent merely a technological innovation, but rather a cultural device that challenges the very foundations of education, raising a crucial question: what remains specifically human in a context where certain forms of communication, listening, and response can be artificially simulated?

The pedagogical response to this question cannot be sought in a dichotomy between human beings and machines, nor in the mere identification of the limitations of technology. Rather, it requires the recognition of those dimensions of educational experience that cannot be reduced to communicative effectiveness or information-processing capabilities. The combined contribution of Winnicott, Mortari, and Bertolini highlights how educational relationships are founded on three indispensable conditions: the presence of a relational environment capable of supporting the process of self-constitution; a practice of care grounded in ethical responsibility toward the other; and a lived experience interpreted through processes of meaning-making. These dimensions constitute the irreducible core of education.

Artificial intelligence can certainly expand educational possibilities, support cognitive and creative processes, provide new forms of access to knowledge, and facilitate learning processes. However, it cannot assume the fundamental educational function of accompanying a person in the construction of their relationship with themselves, with others, and with the world. Human development, in fact, does not coincide with the availability of relevant answers, but requires recognition, reciprocity, and responsibility: elements that belong to the intersubjective dimension of educational relationships.

For this reason, the emergence of artificial intelligence does not make the pedagogy of care less relevant; on the contrary, it makes it even more

significant. The more environments increase in which relationships can be reproduced through automated forms of interaction, the more necessary it becomes to educate individuals to distinguish between response and recognition, between the simulation of empathy and the authentic experience of care, between the permanent availability of a system and the responsible presence of another human being. A pedagogy of care within the digital ecosystem does not therefore adopt an oppositional stance toward technology; rather, it proposes an orienting criterion: technology can become genuinely educational only when it remains embedded within an anthropological project centered on the promotion of human autonomy, responsibility, and dignity.

From this perspective, the educational challenge of the age of artificial intelligence does not consist in preserving an abstract idea of humanity opposed to technology, but in safeguarding those relational and experiential conditions through which human beings continue to constitute themselves. The future of education will therefore depend not only on the sophistication of the tools we are able to develop, but also on our capacity to orient their use toward genuinely formative purposes. The more technologies become capable of simulating forms of listening, dialogue, and empathy, the more pedagogy will be called upon to question the meaning of presence, responsibility, and care. The decisive question will not be what artificial intelligence will be able to replace, but rather what education will continue to safeguard: the human capacity to recognize the other, attribute meaning to experience, and construct one's own being-in-the-world through authentic relationships.

In light of the conclusions outlined, it is necessary to acknowledge the structural limitations inherent in the purely theoretical and conceptual nature

of this study, notably its reliance on a deliberately selected body of philosophical literature and the lack of qualitative empirical evidence capable of documenting concrete interactions in educational contexts. As highlighted in contemporary pedagogical literature, educational research requires a two-way continuity between theoretical speculation and empirical investigation.

It is therefore hoped that future research will integrate qualitative empirical methodologies to explore the ways in which artificial empathy and digital support are negotiated, perceived and incorporated into contemporary life practices.

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