CO-WRITING AND GENERATIVE AI-SUPPORTED STORYTELLING FOR EMOTIONAL EXPLORATION

Lucia Ariemma[1]
University of Campania "Luigi Vanvitelli"
lucia.ariemma@unicampania.it

Fernando Sarracino
University of Naples "Suor Orsola Benincasa"
fernando.sarracino@unisob.na.it

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ABSTRACT
This paper illustrates an action-research project conducted with first and second-grade primary school students, focusing on the use of generative AI as a mediator for exploring identity and emotional experiences. The activity positioned the children as protagonists in a collaborative storytelling process, where their narratives and reflections were translated—through guided prompting—into a tangible digital output: the creation of an AI-generated comic strip. In this context, the machine was not employed as a mere technical executor, but rather as a "digital mirror" capable of reifying the children's emotional abstractions into visual images and narrative sequences. The objective of the intervention was twofold: first, to foster literacy in the emerging languages of Artificial Intelligence among young learners; and second, to utilize the iconic-textual product as a springboard for profound introspective reflection within the classroom group.

KEYWORDS
Generative AI; primary school; digital storytelling; shared narration; emotional education.

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1. Introduction

The evolution of artificial intelligence and its integration into educational settings are profoundly reshaping contemporary pedagogical research, moving beyond traditional transmissive approaches to embrace a holistic learning paradigm (Cimino et al., 2025). From this perspective, educational inquiry no longer views technology merely as a channel for transmission or executive automation. Instead, it explores how the intersection of generative artificial intelligence, collaborative writing, socio-emotional education, and AI literacy (Su & Yang, 2022; Swiecki et al., 2022) can move beyond simply evaluating the impact of ICT on children's learning, shifting the research focus toward the cognitive, relational, and ethical processes that characterize the co-construction of knowledge (Dai & Ke, 2022; Swiecki et al., 2022). Consequently, research finds in this convergence a suitable conceptual framework to promote student agency, empower learners to consciously guide and manage their own learning, and foster hybrid learning regulation alongside the development of critical competencies essential for inhabiting and navigating an algorithmic society (Markauskaite et al., 2022; Molenaar, 2022).

In the educational and scientific context of primary and early childhood education, research on Artificial Intelligence tends to focus primarily on technical-computational skills and educational robotics, such as the Five Big Ideas framework (Hoffman et al., 2022) or the use of PopBots (Williams et al., 2019). In parallel, the broader pedagogical debate is often polarized between "apocalyptic" stances, which highlight the risks of emotional alienation and relational deprivation, and "integrated" perspectives, which celebrate AI as a co-pilot for learning. Within this landscape, there is a lack of practical pedagogical tools designed for the early years of primary school that can

connect technological exploration with the affective, relational, and emotional dimensions.

This study aims to fill this gap by proposing a synergistic integration of generative AI, collaborative writing (co-writing), emotional education, and AI literacy. Within this pedagogical framework, generative AI is not used as an oracle or a simple graphic executor, but functions as a "digital mirror" and a "reflective device" (Sarracino & Ariemma, 2025), objectifying children's emotional abstractions into visual-narrative sequences and turning prompt construction into an opportunity for introspective reflection. Furthermore, the process of co-writing and prompt negotiation allows children to demystify technology, empirically understanding how the machine operates on logical-statistical foundations and lacks authentic cognitive "eros" and self-awareness (Bruzzone, 2024).

1.1 Apocalyptic and integrated

The contrast between "apocalyptic" and "integrated", a conceptual binomial introduced by Umberto Eco (1964) to describe the reactions of intellectuals to the birth of mass culture, is proposed again today in an almost specular way and with a similar polarization towards artificial intelligence (AI).

On the one hand, today's digital-age "doomsayers" view the advent of generative AI and advanced language models with profound fear and aristocratic rejection, viewing them as an existential threat not only to jobs and the economy, but to the very essence of human identity and creativity (Lanier, 2018). From this perspective, for example, the automation of cognitive processes is seen as a factor of alienation and cultural impoverishment, capable

of generating widespread misinformation and destroying critical thinking through the algorithmic standardization of knowledge (Zuboff, 2019).

On the other hand, contemporary "integrated" people manifest an uncritical and techno-solutionist optimism, embracing artificial intelligence as the ultimate tool for solving humanity's greatest complexities, from curing diseases to climate change to maximizing production efficiency (Brynjolfsson & McAfee, 2014). For supporters of this vision, AI does not replace humans but amplifies their potential in a logic of human-machine symbiosis, where the algorithm acts as a co-pilot in scientific and artistic development (Diamandis & Kotler, 2020).

This contrast between apocalyptic and integrated also extends to the relational dimension and, consequently, to reflection on the need to create affective-relational literacy paths.

The 'apocalyptic' Gabriele Gobbo (2026), for example, emphasizes that the pervasive adoption of Artificial Intelligence (AI) risks obscuring a fundamental dimension of human development: emotional and relational. Even before educating new generations about algorithmic interaction, the popularizer emphasizes, schools have a moral and pedagogical duty to structure systematic courses dedicated to affective and emotional education. The advent of increasingly anthropomorphic and simulative computing models could inhibit the development of relational skills, which are increasingly mediated by algorithms and interfaces that, while simulating human interaction, cannot actually replicate it: delegating interaction or the mediation of knowledge to automated tools, without first strengthening students' internal ecosystems, can lead to a progressive alienation in which individuals struggle to distinguish the depth of human relationships from the transactional superficiality of the responses provided by machines (Gobbo, 2026). The current debate on the pervasiveness of artificial intelligence (AI) in educational contexts highlights the

need to circumscribe the human dimensions that are ontologically irreducible to the computational processes of machines. According to Daniele Bruzzone (2024), elements such as self-awareness, free will, the capacity for doubt, and the complex sphere of feelings constitute human prerogatives that cannot be replaced by any software. The specificity of the human being does not reside exclusively in a mind understood as a data processor, but rather in its corporeal and "embodied" nature, which allows the subject to experience himself through intersubjective relationships (Gallese & Morelli, 2024). From this perspective, education cannot be interpreted as a mechanical or linear task, since "becoming human" is authentically realized only through encounters and relationships with others. From an epistemological perspective, learning is not a mere cognitive process, but requires emotional engagement, defined as the "eros" of knowledge, capable of fueling wonder, curiosity, and desire. Excessive delegation to algorithmic technologies risks compromising fundamental cognitive faculties and favoring the transition from deep attention to superficial hyperattention, with a consequent erosion of syntax, vocabulary, and the ability to produce logically coherent thoughts (Stiegler, 2014; Chamorro-Premuzic, 2024). For these reasons, emotional education is not an accessory or subordinate element to scientific-technological programs, but rather an indispensable prerequisite for informed digital citizenship. Knowing how to recognize one's own emotional states, developing empathy for others, managing the frustration of mistakes, and cultivating critical thinking represent fundamental barriers to the risks of social and emotional isolation associated with the uncritical use of technology. The core of current pedagogical reflection must therefore be based on the assumption that emotional literacy constitutes the biological and psychological foundation upon which any other form of specialized knowledge can be built. When students interact with artificial intelligence systems capable of personalizing learning content in real time,

there is a real risk of eliminating the dimension of confrontation, constructive conflict, and failure—elements that historically develop only within the classroom and through the emotional mediation of the teacher. Schools, therefore, cannot limit themselves to training efficient technology workers, but must preserve their original function as an anthropological space for growth and socialization (Gobbo, 2026).

On the other hand, the integrated approach emphasizes how conversational AI can act as a facilitator of self-awareness, offering students a non-judgmental environment in which to express anxiety or uncertainty and identify self-regulation strategies. This process is not limited to an automated response, but activates a metacognitive function that allows students to observe and understand their internal state from an external perspective. At the same time, the use of interactive simulations and AI-supported narrative scenarios fosters the development of empathy and perspective-taking, allowing students to explore relational conflicts in protected contexts. However, as both Troia (2025) and Bruzzone (2024) point out, AI remains devoid of conscience and an authentic "eros" of knowledge; therefore, its reflective utility is strictly subordinated to intentional pedagogical design and constant teacher mediation.

However, just as originally highlighted by Eco in the context of the mass media, both positions present strong analytical limits: the apocalyptic ones tend to fetishize the past and ignore the concrete opportunities for democratization of knowledge offered by new technologies, while the integrated ones sin of political blindness, underestimating the risks linked to algorithmic biases, the concentration of oligopolistic power in the hands of a few Big Tech companies and the absence of ethical and regulatory governance (Crawford, 2021). Overcoming this sterile dichotomy requires today, as then, a critical approach

that rejects both nostalgic technophobia and fideistic enthusiasm, focusing instead on pragmatic regulation and a conscious use of AI that places human dignity and social equity at its center (Russell, 2019): the current human condition, in fact, is part of a reality defined as on-life (Floridi, 2015), characterized by the fusion between the online and offline worlds, where the individual acts as a techno-sapiens immersed in a pervasive digital ecosystem (Panciroli & Rivoltella, 2023).

The effectiveness of this approach is confirmed by European frameworks such as the Life Comp, which identifies emotional regulation and self-awareness as key learning skills, and DigComp 2.2, which in Competence 4.3 highlights the proactive use of technologies to protect mental and physical health. AI, as a metacognitive resource, must be incorporated into an "emotional learning" curriculum that integrates human debriefing sessions to avoid educational delegation and ensure that the technological experience translates into authentic growth in the student's subjectivity.

Furthermore, artificial intelligence (AI) can act as a "reflective device" or mirror, capable of objectifying the mental representations of future teachers and stimulating profound metacognitive processes (Sarracino and Ariemma, 2025). This mirror function is activated when students are confronted with AI output, which is often perceived as excessively linear and simplified compared to the complexity of reality. This discrepancy between algorithmic logic and lived experience acts as a metacognitive catalyst, prompting students to critically articulate their mental models, stereotypes, and professional expectations that would otherwise remain latent. The process of rewriting machine-generated narratives in the first person constitutes a "reflection for action," forcing students into an interpretative negotiation in which they must integrate their own strategies and manage their feelings of inadequacy. From this perspective,

AI can be used not as an oracle or source of truth, but as a cognitive interface that allows us to "see ourselves acting" in hypothetical scenarios, promoting the awareness that identity is not a static condition, but a dynamic process that is constantly defined within concrete situations and contexts of action (Sarracino & Ariemma, 2025).

1.2 Does AI harm children?

The integration of Artificial Intelligence (AI) into children's daily lives and education is a complex phenomenon that academic literature describes as a "double-edged sword," characterized by a precarious balance between transformative potential and significant risks (Chen & Lin, 2023, as cited in Salwan Education Trust, 2023; Su & Yang, 2022). While AI offers unprecedented opportunities for personalizing learning, supporting creativity, and including students with disabilities, it poses crucial challenges that can negatively impact children's cognitive, physical, and emotional development (UNICEF, 2024; Cimino et al., 2025). The risks do not necessarily stem from the technology itself, but from excessive, uncritical, or unmediated use. Key concerns include physical health risks, such as eye strain and disrupted sleep patterns due to excessive screen time, as well as potential "cognitive laziness" that could result from delegating critical thinking and problem-solving processes to machines (Oruç et al., 2024; Dung, 2025). In terms of social development, excessive reliance on voice assistants or smart toys risks reducing face-to-face human interactions, which are essential for developing empathy and interpersonal skills (Changmeng Dong, 2025). Furthermore, children's tendency to anthropomorphize AI, viewing it as a trusted "friend," may lead them to share sensitive personal information, raising serious ethical issues related to privacy and data security without informed consent (ICS, 2025; Cimino et al., 2025).

There is also a danger that early exposure to biased AI models could reinforce stereotypes or prejudices, as children often lack the digital literacy skills needed to critically filter algorithmic output (Hashem et al., 2025; Rodrigues, 2025). However, research suggests that these harms can be mitigated if AI is used as a supplement, not a replacement, for human interaction and physical play (Azzopardi, 2025; Yang, 2023). In summary, AI is not inherently harmful, but requires early "AI literacy" for both children and their caregivers, supported by "ethical guardrails" and "strict safeguards," to ensure that the technology serves as a catalyst for growth rather than a hindrance to healthy child development (Ng et al., 2022; Su et al., 2023).

Implementing Artificial Intelligence (AI) literacy for children is a multidisciplinary educational process aimed at developing an integrated set of technical skills, ethical attitudes, and critical abilities necessary to interact effectively and safely with technology (Ng et al., 2022; Su et al., 2023). A methodological framework of reference is the "Five Big Ideas of AI" (perception, representation and reasoning, learning, natural interaction, and social impact) (Hoffman et al., 2022), which allows for the translation of complex algorithmic concepts into accessible, play-based pedagogical activities (Touretzky et al., 2019; Su & Yang, 2024). Among the most widely accepted teaching strategies, Digital Story Writing (DSW) promotes the exploration of AI through narrative inquiry, facilitating understanding of technological principles while enhancing learners' linguistic and creative skills (Ng et al., 2022). Likewise, embodied and multimodal learning leverages physical movement and sensory perception to help children form correct mental schemas about how sensors work and how human biases are reflected in data (Yang et al., 2024). The integration of project-based learning (PBL) and gamification approaches through interactive tools promotes children's agency and problem-solving skills

in real-world contexts (Ng et al., 2022; Su & Yang, 2023). Furthermore, the use of social robotics also allows preschoolers to interact with intelligent agents, learning that AI is a programmable tool and not a human entity, thus mitigating the tendency toward anthropomorphization (Williams et al., 2019, as cited in Cimino et al., 2025). A fundamental pillar of this process is early ethics education, which must stimulate the development of critical thinking essential for evaluating the credibility of algorithmic outputs and recognizing the intrinsic limitations of technology (Cimino et al., 2025; Dong, 2025; Dung, 2025). Finally, the effectiveness of these programs depends inextricably on the systemic training of teachers, so that they move from the role of knowledge providers to that of inquiry facilitators, and on the active support of parents in their role as mediators of technological exploration in the home (Dong, 2025; Ng et al., 2022).

2. Theoretical Framework

Writing is one of the most complex cognitive processes. The convergence of generative AI tools and collaborative environments can provide advanced scaffolding that redefines narrative practices and research on text production (Gayed et al., 2022; Swiecki et al., 2022). Through inquiry-based learning approaches like digital story writing, learners use intelligent systems to explore real-world scenarios, formulate complex problems, and articulate creative solutions across orientation, conceptualization, and investigation cycles (Ng et al., 2022). Integrating language assistants and generative models can act as a thought partner, reducing the cognitive load associated with surface-level drafting and allowing students to focus on conceptual structuring, critical revision, and expressive experimentation (Gayed et al., 2022; Kangasharju et al., 2022). Furthermore, adopting daily routines can highlight writing as a socio-

cultural communication tool in teacher-student interactions (Zhang et al., 2026). At the same time, in Computer-Supported Collaborative Learning environments, AI can facilitate the negotiation of meaning, co-regulation, and peer knowledge co-construction (Tan et al., 2022). AI-driven analytical tools can also offer automated formative feedback on rhetorical and argumentative text structures, fostering student autonomy and critical thinking (Khosravi et al., 2022).

Integrating socio-emotional education into AI research addresses the essential need to view cognitive development as inseparable from a child's affective and relational domain (Cimino et al., 2025; Vidanaralage et al., 2022). Using smart robotic toys and conversational agents in early childhood settings has proven to be a primary catalyst for developing non-cognitive skills, promoting collaborative inquiry, emotional regulation, and theory of mind (Su & Yang, 2022). Through affective computing and analyzing emotional responses in gamified environments, educational research gains suitable tools to assess motivational factors, frustration, or boredom, thereby tailoring learning paths to each student's mental models (Vidanaralage et al., 2022). Nevertheless, scientific literature firmly reiterates that technology and artificial agents must serve purely as support structures, never replacing the empathetic, affective, and pedagogical guidance of human educators (Uszkai, 2024).

To ensure that interactions with smart technologies result in an empowering experience, educational research stresses the urgent need for systematic AI literacy programs starting from early grades (Yang, 2022). AI literacy goes beyond technical training, acting as a comprehensive civic competency that encompasses understanding core machine learning concepts, applying tools responsibly, critically evaluating outputs, and understanding ethical implications (Laupichler et al., 2022). Promoting AI literacy demystifies

technology, helping students recognize that algorithmic systems do not possess genuine intelligence or feelings, but instead process data statistically and remain prone to hallucinations and errors (Ng et al., 2022). In this context, ethical considerations around transparency, privacy protection, and countering algorithmic bias are central to building independent critical thinking (Creane, 2024; Swiecki et al., 2022). Additionally, using techno-aesthetic experiences, artistic workshops, and co-drafting ethical charters allows students to exercise informed judgment and actively participate in defining the social responsibilities of AI (Guarcello & Longo, 2024).

Systematically combining generative AI, collaborative writing, socio-emotional education, and AI literacy radically transforms research methods in education, moving beyond traditional, static pre-test/post-test evaluation models (Saint et al., 2022; Swiecki et al., 2022). Advanced analytical methodologies allow researchers to track and model the temporal trajectories of collaborative learning and real-time self-regulation (Nasir et al., 2022; Saint et al., 2022). Concurrently, adopting participatory action research and arts-based methods supports the co-design of situated, context-aware educational interventions (Guarcello & Notaro, 2024; Markauskaite et al., 2022).

2.1 The development of literacy processes in the digital sphere: the arrival of AI Literacy

The epochal transition from analog writing culture to the bit-based digital dimension involves a process of coding in which reality, originally situated in a specific social context, is translated into a digital object. This phenomenal configuration, being structured in binary strings, requires specific technological infrastructures to be decoded and interpreted (Midoro, 2015). This

paradigmatic shift, which marks the transition from traditional literacy to digital literacy, requires the adoption of a perspective oriented towards technological innovation and cognitive flexibility in the face of change. This orientation finds its maximum expression in the dynamics of lifelong learning, understood as a continuous learning process (Midoro, 2015). In this scenario, knowledge sharing is based on the co-construction of meanings negotiated within a community, where reality itself is mediated and represented through culturally shared symbolic systems (Bruner, 1997).

Since these systems are intrinsically arbitrary, the transition from the empirical world to the digital ecosystem constitutes a true transcoding of meaning, definable as "an oriented transformation between signs belonging to two different systems of signification" (Traini, 2020, p. 93); a paradigmatic example of this phenomenon can be found in the conversion from natural language to Natural Language Processing (NLP) models.

Within this theoretical framework, any artifact that conveys cultural content and meaning is to be considered a text in all respects. Consequently, this category also includes the products of Generative Artificial Intelligence (Generative AI). Although Generative AI generates output on a purely statistical basis by computing semantic co-occurrences, it operates on textual corpora that effectively constitute cultural sedimentations. Such datasets, as representative samples of a given human production, inevitably reflect the cognitive biases, prejudices, and value systems intrinsic to the context in which they are extracted. Culture is therefore configured as a specifically human activity, within which "learning and thinking are always situated in a cultural context and always depend on the use of cultural resources" (Bruner, 1997, p. 17).

Paradoxically, machine learning is also epistemologically oriented and conditioned by these situated dynamics. Ultimately, if Information and Communication Technologies (ICT) define the technical infrastructure, the related competence (ICT literacy) is not limited to the mere technical ability to interface with devices, but requires the development of critical skills for the conscious use of these tools (Midoro, 2015).

In the information and communication technology (ICT) landscape, we are witnessing the convergence of multiple forms of literacy, considered essential for the structured development of technological skills. Within this theoretical framework are digital literacy, information literacy, media literacy, data literacy, and, more recently, AI literacy.

Specifically, digital literacy is configured as a true "umbrella" construct that encompasses modern forms of literacy (defined as New Literacies), taking on the connotation of a transversal life skill or life skill (Karpati, 2011). This skill reflects the set of knowledge and skills that the individual possesses as an active member of a fully digitalized society and in constant interaction with algorithmic media (Panciroli & Rivoltella, 2023). In this context, the ability to consciously use and actively produce digital artifacts formally qualifies the user as a digital literate (Midoro, 2015).

While information literacy focuses primarily on the processes of searching, retrieving, and critically analyzing information, media literacy focuses on the analytical examination of media content (Panciroli & Rivoltella, 2023). To optimize these synergies, UNESCO has promoted a strategy of theoretical and methodological convergence aimed at unifying the two constructs within a single framework called Media and Information Literacy (MIL) (UNESCO, 2020). The latter is considered the most comprehensive conceptual framework for

countering disinformation, as it fosters lifelong learning, critical thinking, and the development of advanced digital skills.

The epistemological transition from media to data literacy is based on the principle of non-transparency of the media: an effective media education must in fact provide the interpretative keys necessary to decode what lies beyond the visible surface (Panciroli & Rivoltella, 2023). Conversely, while the media are partially opaque, data are structurally invisible to non-experts. In this respect, data literacy shares with Explainable AI (XAI) the need to interface with data flows, although XAI specifically focuses on deconstructing the internal mechanisms and opaque phenomena of machine learning (such as the black box problem).

In this sense, media literacy and data literacy appear intrinsically connected in promoting critical thinking applied to the evaluation of media and data. The integration of these two dimensions—which translates into the development of computational thinking and coding in the data field, and the prevention of misinformation in the media field—allows for advancement towards a further and more complex skill: critical data literacy (Špiranec et al., 2019).

Finally, the emergence of AI literacy responds to the current need to develop a set of both technical and transversal skills, essential for operating in an ecosystem pervaded by artificial intelligence (AI Literacy Framework, 2025). AI literacy enables students to proactively and co-design with generative systems, enabling them to critically evaluate not only the benefits and potential applications, but also the systemic risks and profound ethical implications associated with them (AI Literacy Framework, 2025). This multidimensional construct offers a holistic view of the skills essential for decoding and navigating today's complex technological reality.

2.2 Co-writing

Collaborative work is an open and dynamic process, based on ongoing negotiation between group members to pursue common goals, redefining the centrality of the collective dimension over the purely individual one (Ariemma, 2024; Trentin, 2008). To fully understand the dynamics of co-writing, it is necessary to refer to the cognitive model of individual writing developed by Flower and Hayes in the early 1980s, which identifies three fundamental macro-processes: planning information, drafting the text, and critical review of the paper (Trentin, 2008). In co-writing, these individual activities are integrated and extended within a collective context, characterized by substantial interaction throughout all phases of composition, shared decision-making power, and joint responsibility for the final document (Storch, 2013).

This social and iterative process is structured into a series of closely interrelated activities that include initial brainstorming for idea generation, defining the structural index, drafting, content and stylistic revision, rewriting, and, finally, final editing by a supervisor (Trentin, 2008). While shared writing can be a highly rewarding experience thanks to the virtuous interweaving of different perspectives, it can also generate frustrating dynamics and lead to the production of fragmented or incoherent texts if conflicts or poor internal coordination prevail (Lingard, 2021). To ensure the logical coherence of the work, adopting a clear operational strategy is crucial; In this regard, Ede and Lunsford (2001) have categorized five modes of collective writing: writing entrusted to a single author on behalf of the group, sequential writing in turns, parallel writing - which can be implemented through a strictly horizontal approach or structured by skill levels -, simultaneous reciprocal writing, and mixed mode (Trentin, 2008).

The effectiveness of these strategies depends on the flexible assignment of specific roles within the team, including the author, the technical consultant, the supervisory editor, the reviewer, the team leader, and the facilitator, typically embodied by the teacher (Trentin, 2008). When this collaborative framework opens to the integration of audio and visual codes, Co-Writing organically evolves towards Digital Storytelling, transforming group members into true directors and producers of their own narrative.

3. Metodology

The methodological framework of the study adopts a Participatory Action Research (PAR) design, historically rooted in the recursive cycle of action and reflection formulated by Kurt Lewin (1946). In the contemporary pedagogical context, this approach aligns with the theoretical-practical PAR model outlined by Paolo Orefice (2006), which views educational inquiry as a mechanism for the democratic creation of knowledge aimed at local development and the enhancement of learning communities. Procedurally, the research was structured according to the three interconnected sequences model proposed by B. Cunningham (1976), in which each phase includes systematic moments of evaluation and critical reflection.

The empirical design of the study aims to transform teaching practices and foster a deep understanding of the cognitive, socio-emotional, and metacognitive processes triggered by interaction with generative Artificial Intelligence. The study was conducted at Suor Orsola Benincasa University within the activities of the Robotics Laboratory established at the Department of Educational, Psychological, and Communication Sciences. This took place at the request of the 33rd "Risorgimento" Primary School District of Naples—

which handled parental consent for field trips, participation in laboratory activities, and data processing—for children attending first and second grade. The activity involved a convenience sample of students aged between 6 and 8 years.

During the observation phase, university researchers served as participant observers, technology operators managing the LlamaGen.Ai application, and facilitators of prompt engineering and digital literacy. Classroom teachers acted as pedagogical and affective mediators, ensuring emotional support, relational continuity, and a collaborative environment within the group. The students took on the role of active co-researchers in the co-writing and critical evaluation of the work.

The laboratory intervention was structured following the phases of Cunningham's model. In the first planning sequence, researchers and teachers identified comics as a hybrid symbolic-iconic language suitable for overcoming the literacy limitations typical of early schooling, and selected the technological tool (the LlamaGen.Ai application). The second research and action sequence developed through: the reading of a welcoming comic pre-generated with AI using a researcher-created prompt to illustrate the activities; the exploration of pre-understandings through the "Draw AI" graphic task; guided collaborative writing (co-writing) using worksheets to define characters and plot; the children's manual graphic transposition of the story; and the subsequent entry of the text into LlamaGen.Ai for the automated generation of the digital comic strip. The third action and reflection sequence took place during a debriefing and critical discussion session, where students compared their manual drawings with the algorithmic outputs.

The action phases were organized into a structured laboratory sequence composed of several interconnected stages:

a) welcoming students through an introductory AI-generated comic that illustrated the planned activities;

b) exploring pre-understandings by asking children to draw their idea of AI ("Draw AI");

c) narrative co-writing mediated by guided worksheets for the negotiation and shared definition of characters and plot;

d) manual graphic transposition of the story by the students onto comic grids;

e) entering the shared text into LlamaGen.Ai for the automated generation of the digital strip;

f) debriefing and critical discussion, in which students compared their manual drawings with the algorithmic panels.

In line with the cyclical nature of PAR, the collected empirical data were used to inform pedagogical reflection and redesign. Data collection ensured the triangulation of sources through field notes, audio recordings and verbatim transcripts of narrative negotiations and debriefings, manual graphic artifacts ("Draw AI" and paper comics), digital artifacts generated by the machine, semi-structured interviews, and post-intervention focus groups with teachers. Methodological alignment with action research principles is evidenced by the use of reflective tools during the final reflection and redefinition phase. Furthermore, the alignment between the declared Action Research design and the empirical data presented is clearly demonstrated by how findings gathered at the end of each observational cycle directly guided operational decisions in the subsequent phase: field notes and intermediate reflections gathered during digital comic creation allowed researchers to progressively adjust prompt instructions, optimize interaction times with the machine, and introduce targeted forms of scaffolding for students.

To ensure a holistic assessment of experiential and cognitive processes, a multimodal data collection approach was adopted. This included field notes from participant and non-participant observations, documentation of classroom interactions, and student-produced analog and digital artifacts (prompts, narratives, drawings, generated comics, and worksheets). The empirical material was analyzed using qualitative Thematic Analysis through open and axial coding. This made it possible to identify thematic categories related to the anthropomorphism of AI, the negotiational dynamics of co-writing (Storch, 2013; Trentin, 2008), and students' aesthetic-emotional preferences. Finally, the rigor and credibility of the findings were ensured through data triangulation, independent cross-coding conducted by the two researchers (investigator triangulation), and the transparent traceability of the entire analytical process.

3.1 The laboratory

The workshop was conducted with children from the first and second grades of primary school at the 33rd CD Risorgimento in Naples.

The activity was divided into several phases:

- We welcome the children: a comic strip was created using the LlamaGen.Ai application. The comic strip presented the activities that would be completed together. The choice to use comic strips was linked to the hybrid nature of this language, which combines the symbolic medium (language) and the iconic medium (images), ensuring that even first-year children could easily visualize the planned path.



Figure 1: Panels from the welcome comic

- Let's Draw AI: The children were asked to freely represent what AI represents to them. The drawings were varied, from robots to video game controllers, from smartphones to TVs.

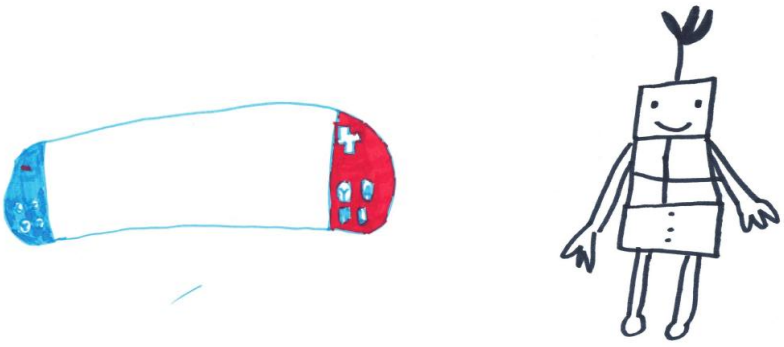


Figure 2: Children draw AI

- Let's write the story together: with the help of "cards," the children chose the characters and began telling a story together. Through subsequent additions, they eventually arrived at the final draft of the story.
- Let's draw the story: the children were given sheets of paper formatted into boxes to accommodate the comic strips and were asked to draw the story they had created together.

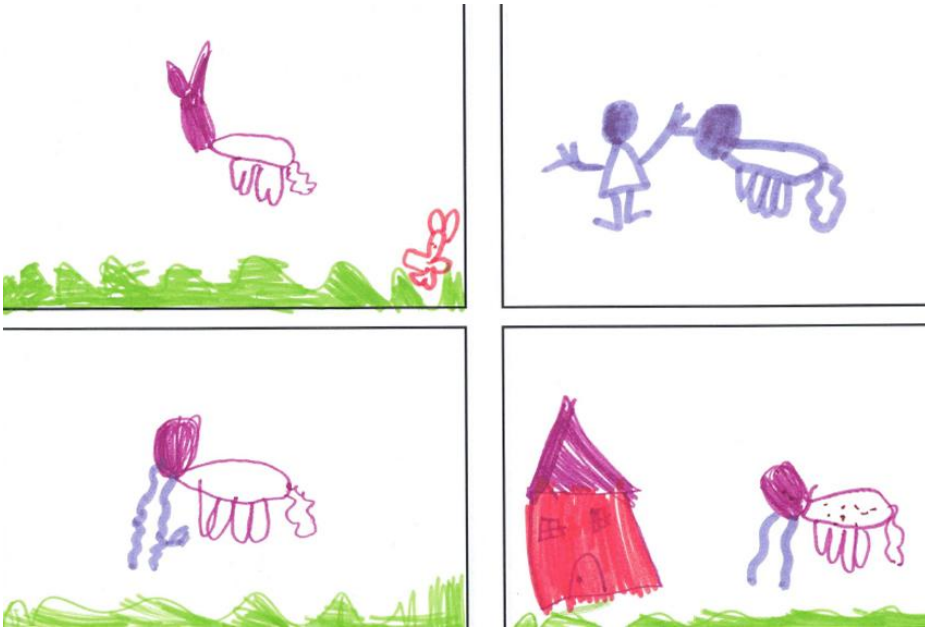


Figure 3: Children's drawings

- We feed the story to the AI: The story was fed to LlamaGen.Ai and asked to make the comic.



Figure 4: The AI comic

- The comparison: The children compared their own drawings with those produced by the AI and chose their favorite. Contrary to what might have been expected, the children did not prefer the "perfect" drawing generated by the AI. The emotion that their own representation (or that of a classmate) can evoke is not comparable to that which AI can evoke.

4. Data Analysis

The analysis of the empirical material collected during the Participatory Action Research (PAR) intervention utilized an inductive qualitative approach based on Thematic Analysis, integrated with the principles of participatory data analysis. Consistent with the recursive and spiral nature of Lewin's action-reflection cycle and the procedural sequence of Cunningham's model, the analytical process was not conceived as a static post-laboratory phase. Instead, it was designed as a dynamic, circular, and reflective process carried out alongside field activities.

The dataset analyzed comprised five integrated qualitative sources: a) field notes and observational journals written by researchers during classroom sessions; b) full transcripts of collaborative writing (co-writing) and debriefing sessions conducted with the students; c) semi-structured interviews and focus groups conducted with classroom teachers to explore pedagogical impact, relational dynamics, and the socio-emotional development of the group; d) manual visual artifacts, including individual drawings representing AI ("Draw AI") and hand-drawn comic strips created by the children; e) digital artifacts generated by the LlamaGen.Ai application.

Integrating interviews and focus groups with teachers provided key observations regarding affective mediation, the management of classroom

negotiation dynamics, and the pedagogical sustainability of the intervention. Data analysis developed through a systematic sequence of open and axial coding, conducted independently by two researchers. The trustworthiness and rigor of the qualitative interpretations were ensured by data triangulation, independent cross-coding between researchers (investigator triangulation), and shared validity checks with teachers and participants during guided reflection moments. This process led to the identification of three main emerging thematic categories:

Anthropomorphism and Demystification of AI. Drawings from the "Draw AI" phase and related discussions revealed an initial tendency among children to attribute human features or video-game characteristics to technology. However, when faced with the precision of algorithmic responses, students understood that the machine operates on computational and logico-statistical bases, lacking self-awareness, embodied intelligence, and the ability to understand their priorities.

Narrative Co-construction. Examining dialogue during story drafting and teacher testimonies from interviews confirmed that collaborative writing functioned as a metacognitive tool. The need to create a shared narrative forced students to clarify their emotional representations and mediate between different perspectives, supported by teachers acting as discussion facilitators.

Value of Intersubjectivity. During the debriefing session and final teacher focus groups, children showed a clear preference for comic strips hand-drawn by their peers over the graphic perfection of digital outputs. Teachers emphasized that the children perceived the imperfections of manual drawing as a channel for authentic emotion and interpersonal connection that algorithms cannot

replicate. This confirms AI's function as a "digital mirror" and reflective tool that stimulates empathy and socialization.

These main categories should not be understood as proven empirical outcomes of the workshop, but rather as hypotheses and theoretical frameworks within the perspective that defines AI as a "digital mirror" and "reflective device" (Sarracino & Ariemma, 2025).

The evidence gathered suggests that the discrepancy between the linear rigidity of algorithmic outputs and the emotional richness of manual work provides a pedagogical opportunity to foster early metacognitive and introspective reflection in children (Troia, 2025). Similarly, the concept that AI-mediated storytelling supports emotional awareness and identity development represents a promising pedagogical implication: interaction with the machine appears to act as a catalyst that highlights the irreplaceable value of intersubjective relationships and empathy within the classroom (Gobbo, 2026).

5. Conclusions

In conclusion, the workshop demonstrates how the integration of Artificial Intelligence (AI) can act as a catalyst for balanced child development, provided that the human and relational dimension is maintained. Learners' emotional engagement emerged as a discriminating factor: the fact that children preferred the graphic representations produced by their peers to the technical "perfection" of algorithmic outputs confirms that the emotion linked to subjectivity and intersubjectivity remains an irreducible human prerogative. From an epistemological perspective, this shift was crucial for fostering awareness of the potential and limitations of AI; by confronting the often

excessive linearity of machines, children were able to experience the lack of authentic cognitive "eros" and self-awareness in software, demystifying technology and correctly framing it as a "reflective device" rather than an omniscient entity.

In this scenario, collaborative writing has proven to be a powerful pedagogical tool with two purposes. On the one hand, it fostered understanding of AI's characteristics and limitations: negotiating prompts and co-constructing the narrative allowed children to test the machine's boundaries, understanding that it operates on statistical and logical bases to produce output, rather than on authentic understanding. On the other hand, shared writing has acted as a catalyst for the development of social skills and empathy. As highlighted in the literature, the process of co-creation and story relay forces participants to actively listen, manage conflicts of interpretation, and value the perspectives of others, transforming the activity into an anthropological space for growth and socialization. Ultimately, AI within a co-writing framework does not replace human interaction, but rather enriches it, allowing children to acquire informed digital citizenship rooted in the depth of intersubjective connection.

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