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From the Classroom to the Self. Engagement, Relationships and Socio-Affective Reflexivity in the Initial Training of Primary School Teachers

Loredana Perla [1], Ilenia Amati [1], Paola De Lumè [1] and Francesca Minerva [1,*]

[1] Università degli studi di Bari Aldo Moro; loredana.perla@uniba.it; ilenia.amati@uniba.it; p.delume@phd.uniba.it; f.minerva8@phd.uniba.it
[*] Correspondence: ilenia.amati@uniba.it

Abstract: Socio-affective learning in initial teacher education cannot be transmitted as content but must be experienced first-hand, yet relational and emotional dimensions remain marginal in teacher training curricula, which are still oriented toward disciplinary and technical-didactic competencies. This study investigates how a laboratory pathway based on relational, narrative and technologically mediated experiences can foster engagement and socio-affective reflexivity in future primary school teachers. The research involved 208 first-year students of the single-cycle Master's Degree in Primary Education Sciences at the University of Bari Aldo Moro. The pathway comprised a symbolic self-narration activity ("narrative plate"), a *photolangage* experience, a structured debate, and an interaction with the humanoid robot NAO. A semi-structured questionnaire compared in-person activities with the technologically mediated one, considering both engagement and perceived relational authenticity. In-person activities elicited the strongest engagement: 54.3% rated the debate as very stimulating or extremely formative, and 53.9% mentioned the emotional dimension in relation to *photolangage*. NAO was described with a similar vocabulary of engagement and motivation; however, 47.0% disagreed that AI-equipped robots can feel and express empathy, despite a broadly favorable instrumental view of generative AI (70.1%). Participatory engagement and relational authenticity thus appear to be distinct dimensions. Digital tools may support engagement, provided their limits in affective-relational terms are made explicit. Longitudinal studies are needed to examine how this critical awareness evolves.

Keywords: initial teacher education; social and emotional learning; engagement; teacher identity; photolangage; educational robotics

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1. Introduction

The quality of a teacher's work depends not only on disciplinary mastery and didactic technique, but also on the capacity to build relationships, to recognize and regulate emotions, and to create classroom climates in which pupils feel seen and able to participate. Research on Social and Emotional Learning (SEL) has long shown that these capacities are teachable and that they influence learning, participation and well-being (Cohen, 2006). A consequential corollary follows for

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teacher education: if socio-affective competence is to be offered to pupils, future teachers must first develop it in themselves. Socio-affective learning, in this perspective, cannot be treated as content to be transmitted; it must be traversed in the first person, through direct relational experience such as peer confrontation, self-narration and exposure to emotionally significant stimuli.

This principle, although widely shared in the international literature, sits uneasily with the actual organization of teacher training. Relational and emotional dimensions continue to occupy a marginal position in many curricula, which remain oriented predominantly toward disciplinary content and technical-didactic competencies (Osher *et al.*, 2016). The result is a gap between what research recognizes as foundational and what initial training systematically offers. Future teachers may therefore enter the profession with well-developed knowledge about teaching but limited opportunities to explore their own emotional experience of school, their implicit representations of the teacher's role, and the quality of the relationships they wish to build with pupils.

Two strands of literature help to frame this gap. The first concerns engagement. Reeve (2013) has emphasized the value of agentic engagement, in which students contribute actively to the learning process rather than receiving it passively. Activities that require argumentation, listening and constructive contribution are especially suited to this form of engagement, because they place the relational dimension of learning at the center of the experience. The second strand concerns teacher professional identity. Beauchamp and Thomas (2009) show that identity is shaped by personal history, emotions and values, and that self-narration and guided reflection are among the most effective tools for bringing these components to light. Meta-analytic evidence further documents the weight of affective teacher–student relationships on students' school engagement and achievement (Roorda *et al.*, 2011), underscoring why relational competence is a core professional resource.

A third element complicates the picture. Digital and robotic technologies, and generative artificial intelligence (AI) in particular, are entering educational settings at a rapid pace, and recent calls stress the need for critical and conscious use of these tools in schools. Social robots such as NAO, endowed with simulated communicative capacities (voice, movement, contingent response), can readily attract attention and motivation. However, it remains an open question whether the engagement they elicit can be equated with the relational quality of human encounters, and whether future teachers perceive the two as equivalent. There is a risk of the symbolic over-attribution of affective capacities to artificial devices (Perla & Fabris, 2025), which teacher education should help students to recognize and question.

Against this background, the present contribution investigates how a laboratory pathway built explicitly around relational, narrative and technologically mediated experiences can contribute to the development of engagement and socio-affective reflexivity in future primary school teachers. The study adopts an intentionally comparative logic: it contrasts activities based on direct interpersonal mediation with an activity mediated by a humanoid robot, considering both the degree of participatory-motivational engagement and the critical judgment about the authenticity of the affective-relational component experienced. The main aim is to examine whether the two conditions are similar in terms of motivational activation

while differing in perceived relational quality, and to draw implications for the design of initial training pathways.

2. Materials and Methods

2.1 Context and participants

The study was carried out within the General Didactics Laboratory of the first year of the single-cycle Master's Degree Course in Primary Education Sciences at the University of Bari Aldo Moro. A total of 208 students took part. The laboratory was part of the ordinary curriculum, and the questionnaire was administered at the end of the pathway to collect participants' perceptions.

2.2 The laboratory pathway

The pathway comprised four distinct but complementary activities, designed to engage students at the relational, narrative and technological levels. The journey opened with a symbolic self-narration activity based on the metaphor of the "narrative plate," through which students were invited to represent and communicate their subjective view of the professional role and identity of the teacher, bringing to the surface values, expectations and implicit images of the profession. This narrative moment was followed and enriched by a *photolangage* experience, in which participants explored personal views and emotions linked to the act of teaching through carefully selected visual prompts; this step aimed at facilitating the recognition of prior school-related experiences and deep-seated representations of being an educator. Moving from personal reflection to peer interaction, the third activity consisted of a structured debate designed to train argumentation and mutual listening in a collaborative context, requiring students to take an active role and constructively engage with perspectives different from their own. Finally, the pathway concluded with a direct interaction with the humanoid robot NAO, which introduced future teachers to the technological mediation of relational and educational processes, aligning the experience with recent international calls for a critical and conscious integration of artificial intelligence and robotics in school settings.

2.3 Research design

The design adopted an intentional comparative logic, structured around two conditions of relational activation, in order to consider engagement and socio-affective learning both in in-person contexts and in hybrid and digital ones. The first condition grouped the activities involving direct interpersonal mediation (narrative plate, *photolangage*, debate). These are characterized by the absence of technological devices between the subjects and by the centrality of the face-to-face relationship, whether with oneself (autobiographical narration) or with peers (argumentative confrontation). The second condition was represented by the interaction with the NAO robot, taken as the reference condition for technological mediation, in which the relational channel passes through an artificial interface endowed with simulated communicative capacities.

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2.4 Instrument

At the end of the pathway, a semi-structured questionnaire with closed and open-ended items was administered. For both conditions, parallel items were designed to capture two distinct but correlated dimensions: (a) the degree of participatory-motivational engagement elicited by the activity; and (b) the critical positioning regarding the quality and authenticity of the affective-relational component experienced. The questionnaire also included items on perceptions of generative AI and on the possibility that robots equipped with AI may feel and express empathy. Closed items used ordinal agreement or intensity scales.

2.5 Analysis

Data analysis was conducted using a mixed-methods analytical framework combining quantitative descriptive procedures and qualitative content analysis, aimed at capturing both the statistical trends and the thematic richness of participants' perceptions.

Quantitative responses derived from closed-ended questionnaire items were processed through univariate descriptive statistics. Frequencies, percentages, central tendency measures, and dispersion indices were calculated to map the distribution of responses regarding participatory-motivational engagement, critical positioning toward relational authenticity, and attitudes toward generative AI and robotic empathy. Comparative observations across the two experimental conditions (in-person interpersonal mediation versus humanoid robot mediation) were carried out at the descriptive level by contrasting parallel items designed to evaluate engagement and perceived authenticity.

Qualitative data originating from open-ended questionnaire items were analyzed through structural and inductive content analysis. The analysis followed a systematic multi-step protocol: initial familiarization with the text corpus, generation of preliminary analytical codes, categorization into broader thematic units, and final verification against the raw qualitative data. Particular attention was devoted to identifying recurrent terminology, emotional anchors, and conceptual constructs associated with professional identity, empathy, care, and technological mediation. To ensure analytical rigor, the relative frequencies of specific key terms and thematic categories – such as explicit mentions of emotions, relational attunement, active participation, and skepticism regarding artificial empathy – were quantified and mapped. The findings from both quantitative and qualitative streams were subsequently integrated during the synthesis phase, allowing for a nuanced triangulation of how motivational activation and critical reflexivity interact across human and technologically mediated learning environments.

3. Results

3.1 Engagement in in-person activities: the debate

The in-person activities proved to be those most capable of activating engagement. With regard to the debate, more than half of the participants (54.3%) defined the experience as "very stimulating" or "extremely formative" for developing argumentative and listening skills, while the remaining share placed it at a moderate level.

3.2 Emotional reflexivity: *photolangage*

The *photolangage* activity proved particularly effective in fostering emotional reflexivity and facilitating deep introspective processes among the pre-service teachers. A majority of the participants (53.9%) explicitly invoked the emotional dimension when reflecting on what the experience had activated within them, highlighting the capacity of visual prompts to act as powerful evocative levers. Through the narrative mediation of images, students were able to surface, identify, and verbalize complex emotional states that are often difficult to express through literal language alone.

The qualitative content analysis of their responses revealed that the photographic stimuli functioned as a reflective mirror, allowing participants to revisit and re-examine their prior experiences as pupils within the school system. This retrospective gaze enabled them to critically deconstruct their implicit, unconscious representations of the teaching profession – frequently shaped by internalized models, emotional memories, and traditional educational stereotypes. Furthermore, the activity stimulated a heightened awareness of the affective responsibilities inherent in the pedagogical role, encouraging future teachers to reflect on how their own emotional histories might influence their future relational stance, empathy, and classroom climate management.

3.3 Identity and relationship: the narrative plate

The narrative plate activity offered valuable insights into the construction of professional self-understanding, providing a symbolic space where personal values and professional expectations could converge. Quantitative text analysis revealed that 19.1% of participants explicitly incorporated the concept of "identity" into their written accounts, while 10.5% made direct reference to the relational dimension of teaching. Although these percentages represent targeted lexical occurrences, the qualitative content analysis demonstrates that the underlying themes of professional identity and relational responsibility permeated a much broader portion of the students' narratives.

Through the metaphorical medium of the plate, participants projected their internalized models of the teacher's role, moving beyond a purely functional view centered on instruction toward an integrated, person-centered paradigm. In describing their symbolic creations, future teachers consistently associated the emerging professional profile with fundamental ethical and emotional dispositions: care, active listening, open communication, and the capacity for emotional attunement with pupils. The physical process of selection, arrangement, and symbolic representation allowed students to make explicit those implicit values and relational aspirations that rarely find expression in traditional coursework. Consequently, the activity highlighted how early teacher identity is profoundly rooted in a perceived responsibility toward the other, framing relational competence not as an auxiliary soft skill, but as the structural core of pedagogical practice.

3.4 Technological mediation: the NAO robot

The interaction with the NAO robot generated a high level of active involvement and curiosity among the participants, demonstrating the strong motivational appeal of social robotics in educational contexts. When describing their experience with the artificial interface, students recurrently invoked a rich

vocabulary centered on engagement, fascination, novel interest, and playful motivation. To a lesser but scientifically significant extent, participants also associated the robotic mediation with concepts of inclusion and universal design for learning, noting how an artificial agent might serve as a non-judgmental, predictable, and supportive mediator for pupils with diverse learning needs or social-communicative difficulties.

On a descriptive level, the quantitative and qualitative indicators of participatory activation elicited by the NAO robot were remarkably similar to those recorded during the in-person, peer-mediated activities. The humanoid features, dynamic movements, and real-time verbal interactions offered by the robot successfully captured attention and sustained enthusiasm throughout the task. This similarity suggests that, in terms of initial motivational arousal, curiosity, and willingness to participate, technological mediation can match the immediate activating power of traditional face-to-face group dynamics. However, as the qualitative analysis highlighted, this high level of engagement was primarily driven by novelty and technological fascination, raising important questions about whether such motivational activation translates into genuine relational depth or merely serves as a functional lever for classroom participation.

3.5 Perceived authenticity of the affective relationship and views on generative AI

When the question shifted from engagement to the authenticity of the affective relationship, the picture became markedly more cautious. Regarding the possibility that robots equipped with AI can truly feel and express empathy, 47.0% of the sample disagreed or completely disagreed, 30.7% were undecided, and only 21.1% agreed or strongly agreed. At the same time, the overall perception of generative AI on the instrumental level was positive: 70.1% of responses were favorable and 29.9% neutral, with no explicitly negative response.

4. Discussion

The results describe a coherent pattern. Engagement, understood as participatory and motivational activation, appears to be elicited by both the in-person and the technologically mediated activities, and students describe it with a similar vocabulary. Judgments about the authenticity of the affective relationship, however, diverge: participants are markedly more cautious about the capacity of an artificial agent to feel and express empathy. The comparative design therefore shows that participatory engagement and relational authenticity are not overlapping dimensions. Technology can activate the former without thereby satisfying the latter. This is precisely the kind of evidence that only an explicit comparative framework, with parallel items for the two dimensions, allows one to bring to light.

4.1 Theoretical implications

The findings support the view that relational engagement and socio-affective learning cannot be reduced to motivational activation. Motivation can certainly be supported by technological mediation, but socio-affective learning also requires mutual recognition, emotional responsiveness and co-regulation, which a

relationship between historically and affectively situated subjects is able to generate. This is in line with the meta-analytic evidence on the weight of teacher–student relationships for school engagement (Roorda et al., 2011). The high engagement reported for the debate is consistent with the literature on agentic engagement, according to which practices that ask students to take an active rather than merely receptive role support participation (Reeve, 2013). It is in the exercise of argumentation and mutual listening that the relational dimension of learning is concretely experienced.

The results on *photolangage* and the narrative plate are consistent with research on teacher professional identity. Self-narration and guided reflection appear to bring to light emotional and value-based components, such as care, listening and attunement to the pupil, that structure how a future teacher imagines their practice, well beyond technical competencies (Beauchamp & Thomas, 2009). These activities seem to respond to the initial premise of the study: socio-affective competence is built when students traverse it in the first person, rather than when it is transmitted as content (Cohen, 2006). At the same time, the results are also a reminder that such experiences remain marginal in curricula still centered on disciplinary and technical-didactic content (Osher et al., 2016).

4.2 Practical implications

The perceptual gap between engagement and authenticity has direct consequences for course design. Initial training pathways can legitimately integrate digital tools and environments, including robotic ones, as levers of participatory activation. Such integration should, however, be accompanied by a constant and explicit discussion of the limits of these mediations with respect to authentic affective relationships, in order to avoid the risk of their symbolic over-attribution (Perla & Fabris, 2025). The finding that students combine a favorable instrumental view of generative AI (70.1%) with skepticism toward artificial empathy suggests that future teachers already tend to separate the functional-collaborative dimension of technology from the affective-relational dimension of the educational encounter. This is a useful starting point for critical AI literacy in teacher education: the laboratory can build on it, rather than assuming that either enthusiasm or distrust will prevail.

4.3 Limitations and future developments

Several methodological aspects of this study outline its scope and point to future developments. The research focused on capturing pre-service teachers' perceptions at a single point in time via a self-reported post-intervention questionnaire, providing a snapshot of student positioning at an early stage of their training, without measuring long-term changes in classroom practice or socio-affective competence.

The comparative design examined direct interpersonal dynamics alongside an interaction with a specific humanoid robot (NAO). This configuration provided a targeted observation of robotic mediation, though it represents only one instance within the broader landscape of digital and AI-based tools. Additionally, while the sample offered internal consistency by drawing from a single cohort at one university, caution should be exercised when generalizing the results to other institutional contexts.

These considerations open clear avenues for subsequent research. Future studies could adopt longitudinal designs to trace how the critical awareness observed in first-year students evolves through successive years of training and translates into professional practices. Expanding the comparative framework to encompass a wider range of AI-driven tools, incorporating counterbalanced conditions, and integrating direct observational data alongside qualitative metrics will further clarify the relationship between engagement, technology, and relational authenticity in teacher education.

5. Conclusions

This study examined a laboratory pathway for future primary school teachers that combined in-person relational activities (narrative plate, *photolangage*, debate) with an interaction with the humanoid robot NAO. In-person activities elicited high engagement and supported emotional and identity-related reflexivity, while the robotic activity was described with a similar vocabulary of engagement and motivation. Yet future teachers expressed marked caution regarding the ability of AI-equipped robots to feel and express empathy, while acknowledging the instrumental usefulness of generative AI. Participatory engagement and relational authenticity therefore emerge as distinct dimensions.

For initial teacher education, the main indication is twofold: to preserve and strengthen spaces in which socio-affective learning is lived in the first person, and to integrate digital tools as supports for participation while explicitly discussing their limits in the affective-relational domain. Longitudinal research is needed to understand how this critical awareness develops and how it may sustain the care of the relational and emotional dimension in professional practice, an inescapable condition for genuinely inclusive and participatory learning.

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