THE ALGORITHM CANNOT CARE, BUT IT CAN SUPPORT CARE: RETHINKING AFFECTIVE EDUCATION IN AI-MEDIATED LEARNING ENVIRONMENTS

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ABSTRACT
This theoretical contribution examines the boundary between educational care and algorithmically simulated responsiveness in AImediated learning environments. Through critical conceptual analysis of relational care ethics, selected educational studies, and teacher AIcompetence frameworks, it argues that an affectively appropriate AI response is not itself evidence of a caring relationship. AI may nevertheless assist educators with feedback and accessible support, subject to human judgement and safeguards. Digital Affective Literacy (DAL) is defined as a proposed teacher competence for interpreting affective inferences, assessing effects on dialogue and student agency, making pedagogically justified choices, and governing ethical risks. Its four provisional dimensions are distinguished from adjacent literacies and linked to candidate observable practices. The framework requires empirical validation.

KEYWORDS
Education; digital affective literacy; AI; ethics; inclusive education.

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1. Introduction: The Pedagogical Challenge at the Intersection of Care and Computation

The rapid integration of artificial intelligence (AI) technologies into educational systems is changing educational practice. The proliferation of intelligent tutoring systems, adaptive learning platforms, large language models, and conversational agents is changing how teaching and learning take place—including those dimensions of educational life most resistant to formalization: affective engagement, relational attunement, and the ethics of care.

The consequences of this transformation extend beyond the familiar debates about academic integrity and personalized learning. At the deepest level, the integration of AI into educational environments raises a question that is simultaneously philosophical, ethical, and pedagogical: can algorithmic systems participate meaningfully in the affective dimensions of education, or does their intervention necessarily introduce a simulation that, however sophisticated, distorts or displaces the authentic relational encounter upon which genuine educational care depends? This question has acquired renewed urgency in the wake of advances in affective computing and natural language generation that allow AI systems to infer affective cues and generate responsive language (Picard, 1997). In a systematic review of 146 studies on AI in higher education, Zawacki-Richter and colleagues (2019) found that educators' perspectives received limited attention—a gap that this contribution seeks to address.

Some AI systems also generate affectively responsive language. They may adjust their tone to a learner's words or to inferred affective cues and offer encouragement without knowing how that learner feels. Their apparent patience and availability can be useful, but should not be confused with a teacher's commitment to a learner. These functions may offer opportunities for differentiated support in inclusive education, although their effects on caring relationships remain to be established (Barajas Motta et al., 2025). They may also create misleading expectations of reciprocity; Turkle (2011) offers a caution about such expectations, rather than direct evidence about AI tutors.

This contribution advances three interconnected arguments. First, that within the relational ethics of care used here, an affectively appropriate output from a current AI system is not sufficient evidence of educational care, which also requires accountable human judgement and a response from the learner. Second, that this relational limit does not entail a dismissal of AI's educational value; AI can meaningfully support care processes when deployed within a

human relational framework that preserves the educator's role as the relational center of educational life. Third, that realizing this supportive potential requires educators to develop Digital Affective Literacy (DAL): a proposed professional competence enabling critical discernment between simulated and genuine affective engagement, purposeful deployment of AI in service of relational educational goals, and ethical stewardship of students' affective development.

1.1. Methodological approach

This article uses critical conceptual analysis, not a systematic review or an empirical design. It brings care-ethics texts into dialogue with selected peer-reviewed studies and reviews of affective educational technologies, inclusive education, and teacher AI competence, together with UNESCO's normative frameworks. Sources were selected for their relevance to three questions: what counts as care within the relational tradition adopted here; what the cited evidence can and cannot show about AI support; and which professional judgements are needed when a tool infers or simulates affect. The analysis first derives criteria for care, then compares those criteria with AI functions, and finally proposes DAL as a provisional competence construct. Empirical studies delimit plausible uses and risks; they do not provide pooled effects or causal evidence for the framework. Because the selection is purposive, the article cannot estimate the prevalence of benefits or harms across settings.

2. The Ethics of Care as Foundational Pedagogical Framework

The theoretical architecture of care ethics in education has an influential articulation in the work of Nel Noddings, whose Caring: A Feminine Approach to Ethics and Moral Education (1984) established the conceptual foundations upon which subsequent philosophical and pedagogical elaborations have built. Noddings conceived of care not as a sentiment or disposition but as a fundamentally relational practice—a mode of ethical engagement grounded in the asymmetrical but genuinely reciprocal encounter between the "one-caring" and the "cared-for." The distinctive characteristic of this encounter is what Noddings (1984) termed "engrossment" and "motivational displacement": the one-caring receives the other—their perspective, needs, and feelings—with genuine attentiveness and allows those received contents to redirect their own motivational energy. Crucially, care is not a unilateral act; it is completed only when the cared-for recognizes and responds to it. This relational completion—requiring both parties—is the criterion by which genuine caring relationships are distinguished from mere caring-about at a distance.

The implications of this framework for the evaluation of AI in affective education are far-reaching. An AI system can be designed to attend to

indicators of student need and generate responses calibrated to those indicators. But this functional approximation does not by itself establish the "engrossment" that Noddings describes. The caring relationship, in Noddings's account, transforms both parties: it is an encounter in which both the one-caring and the cared-for are genuinely at stake. Current AI systems do not assume a teacher's continuing responsibility for how a response affects a particular learner. Within this relational account, that lack of accountability is a decisive limit on treating generated responses as care.

In The Challenge to Care in Schools (2005), Noddings elaborated her framework into a vision of the school as a caring institution, describing four components of moral education: modelling (teachers demonstrating caring behaviors in practice), dialogue (genuine two-way exchange in which both parties are invested), practice (students given real opportunities to care for others), and confirmation (the teacher's affirmation of the student's best self, grounded in knowledge of the particular student). These four components collectively define the caring school as one in which relationships are not the backdrop to learning but its very substance—a vision that an algorithmic system cannot instantiate on its own.

Joan Tronto's (1993) political analysis of care ethics extended Noddings's framework to encompass the structural conditions that make caring possible or impossible. Tronto identified four phases of care: caring about (recognizing that a need exists), taking care of (assuming responsibility for meeting that need), care giving (the direct activity of meeting the need), and care receiving (the response of the cared-for that completes the care cycle). This typology is analytically productive in the context of AI-mediated learning: AI systems may help detect a possible need or organize a response; educators and institutions must still interpret the signal, assume responsibility, act, and attend to the learner's account of what followed.

Virginia Held (2006) situated care ethics within a broader political philosophy, insisting on the relational ontology of persons: we are fundamentally constituted by our interdependencies rather than preceding them as autonomous subjects. This claim has direct implications for educational technology design. If students are relational beings, learning environments—including those mediated by AI—must be evaluated not only by their capacity to deliver personalized cognitive content but by their capacity to sustain the relational fabric within which personhood develops. An AI-mediated environment that optimizes for individualized content delivery while neglecting relational quality may be technically sophisticated while remaining educationally impoverished in the most fundamental sense.

A related, though distinct, perspective appears in Vygotsky's (1978) sociocultural theory of development, which established that higher psychological functions emerge from social interaction before being internalized by the individual. The zone of proximal development concerns the difference between what a learner can do independently and what they can do with adult guidance or in collaboration with more capable peers. While adaptive AI systems have been proposed as technological approximations of this scaffolding function (Luckin et al., 2016), the question of whether algorithmic scaffolding can replicate the relational quality of genuine pedagogical support remains theoretically unresolved and empirically contested. In Good Education in an Age of Measurement (2010), Gert Biesta further cautioned against the "learnification" of education—the progressive reduction of educational purpose to measurable learning outcomes that evacuates education of its ethical and relational dimensions. For Biesta, education properly conceived encompasses three inseparable functions: qualification, socialization, and subjectification—the cultivation of students' capacity to act as genuine subjects. AI-mediated education should therefore be evaluated for its effects on subjectification as well as qualification. Velasquez and colleagues' (2013) review of caring and nurturing pedagogies indicates why the quality of educational relationships warrants attention; it does not show that a particular AI system can reproduce them.

3. Affective Computing and the Ontology of Simulated Empathy

Rosalind Picard's (1997) work helped establish affective computing as a field concerned with emotion in human–computer interaction. Picard's foundational definition of affective computing as "computing that relates to, arises from, or deliberately influences emotion" established the program for a generation of research into the detection, modeling, and generation of emotional responses in artificial systems. In two studies with computer tutors, D'Mello and Graesser (2012) observed recurring transitions among confusion, frustration, boredom, and engagement or flow during complex learning. These states are not directly readable from a facial expression or other signal: their interpretation depends on context, and facial emotion inference has important limits (Barrett et al., 2019).

The most pedagogically proximate expression of affective computing is the empathic pedagogical conversational agent: an AI system designed to simulate empathic responsiveness to students' emotional states through natural language. Ortega-Ochoa and colleagues' (2024) systematic literature review of these systems selected 13 studies and identified dialogic learning, personalized feedback, and affective responses as design considerations. Some studies reported promising performance or perception outcomes, but this small, varied

evidence base cannot establish durable relational benefits or exclude novelty effects.

The critical question, however, concerns the status of what these systems produce. Functional responsiveness—a system detecting a cue and generating a contextually appropriate reply—can be observed and assessed. Within Noddings' and Tronto's relational accounts, care additionally involves responsibility for the learner, openness to correction, and attention to the learner's response. A student may find an AI reply supportive; this matters educationally, but does not by itself show that the system has entered a reciprocal caring relationship. The distinction is an ethical criterion for present educational practice, not an empirical test of machine consciousness.

Sherry Turkle's (2011) analysis raises a related concern about relationships with digital companions. In Alone Together, Turkle warned that the availability of digital companions can reshape expectations of human relationships. Applied to education, this suggests a risk worth investigating, not evidence that AI tutors have already reduced students' willingness to relate to teachers. The educational value of simulated responsiveness therefore depends on whether it supports, rather than displaces, human dialogue and accountability.

Affective AI also raises questions of surveillance, error, and fairness. Emotion labels may be wrong or unequally reliable across learners; educational algorithms can reproduce bias (Baker & Hawn, 2022). Students should be able to know when an inference is made, contest it, and reach a human educator. Sensitive data collection should be proportionate to a stated pedagogical purpose, with accessible alternatives where feasible.

4. AI as a Meaningful Support for Care in Inclusive Educational Contexts

The relational critique of simulated empathy does not entail a wholesale dismissal of AI's role in affective education. On the contrary, existing research suggests possible forms of educational support, including in inclusive settings, while evidence of sustained affective or relational benefit remains limited.

Ouyang and Jiao's (2021) influential typology of AI paradigms in education provides the conceptual framework for understanding AI's supportive potential without reducing it to replacement. Ouyang and Jiao identified three paradigms: AI-directed learning, with the learner as recipient; AI-supported learning, with the learner as collaborator; and AI-empowered learning, with the learner as leader. From the perspective of care ethics, the second and third paradigms offer more promising orientations when educators remain responsible for interpretation and students retain agency; this is a normative reading of the typology, not an empirical ranking of outcomes. For example, an

AI tool may draft differentiated prompts that a teacher reviews and discusses with a learner before use.

Qiu (2025) surveyed 1,115 university students learning English as a foreign language in China through convenience sampling and analysed cross-sectional associations with structural-equation modelling. Perceived teacher support accounted for 55% of the variance in reported emotions, and teacher support together with self-efficacy accounted for 57%. These associations in one sample do not establish causation, the effect of an AI tool, or transferability to other ages and settings. They nevertheless direct attention to the teacher–student relationship when evaluating AI-enhanced learning.

The argument for AI's supportive role is particularly relevant to inclusive education. Barajas Motta and colleagues' (2025) systematic review of 103 studies on teacher preparation for inclusion identified pedagogical, technological, attitudinal, institutional, and policy barriers and described emerging AI-supported approaches. The authors characterize these approaches as incipient; their review does not establish that real-time affective monitoring or AI-supported scaffolding is effective across inclusive classrooms. A lesson offered in alternative formats can be checked against accessibility and learning goals; assigning a learner an inferred emotional state raises a different evidential and ethical problem.

Jafari (2024) used qualitative interviews with 18 experts and faculty members to examine human considerations in AI learning environments, including negative emotions, fairness, and accessibility. Those findings inform design choices rather than proving that a system can care. Celik and colleagues' (2022) review similarly identifies opportunities for teacher planning, feedback, and assessment alongside limits in reliability and implementation. Taken together, these studies support a conditional position: AI may extend timely educational support when its outputs are checked, its use is accessible, and a teacher remains available to interpret needs and respond.

5. Digital Affective Literacy: A Proposed Competence for Educators in AI-Mediated Environments

The preceding analysis has argued that AI's educational value in affective contexts is conditioned on the educator's capacity to deploy it within a genuinely caring relational framework. This capacity is not automatic; it is a professional competency that must be deliberately cultivated, theoretically grounded, and institutionally supported. This section develops the concept of Digital Affective Literacy (DAL) as a proposed professional competence through which educators can navigate AI-mediated affective education critically, purposefully, and ethically. DAL is defined here as the educator's capacity to

interpret, evaluate, and govern the affective consequences of AI use while retaining responsibility for a learner's relational and educational welfare. Its object is the situation in which a system infers affect or produces an affect-like response; its outcome is a justified pedagogical decision, including when to decline the tool or return to human conversation.

The conceptual foundations of DAL extend and integrate two existing traditions. The first is the UNESCO (2024) AI Competency Framework for Teachers, which specifies 15 competencies across five dimensions—a human-centred mindset, ethics of AI, AI foundations and applications, AI pedagogy, and AI for professional learning—at the progression levels Acquire, Deepen, and Create. DAL narrows the focus to a teacher's judgement about affective inference and simulated responsiveness within a particular caring relationship; it does not replace the broader UNESCO framework. Mikeladze and colleagues' (2024) critical review of AI competence frameworks for educators showed variation in the scope and construction of teacher AI-competence frameworks; it does not establish that all earlier frameworks lack ethical or relational content.

The second tradition is critical digital literacy scholarship. Jones (2022) argued compellingly that the critical dimension of digital literacy must extend beyond cognitive analysis of digital content to encompass the affective dimension of digital engagement: the capacity to recognize, reflect upon, and navigate the emotional dynamics of digital interaction. This argument is directly applicable to affective AI in education, where both students and educators engage in interactions whose emotional character is produced algorithmically but potentially experienced as supportive. The capacity to navigate these interactions reflexively—appreciating their functional value without confusing simulation for authentic encounter—is one element of the DAL proposed here. Ciampa and colleagues (2023) discuss opportunities and challenges for digital literacy education with ChatGPT, including the evaluation of AI-generated content, bias, misinformation, and overdependence on these tools.

Recent proposals make the relationship to adjacent concepts more precise. Henriksen and colleagues (2025) examine generative AI and social-emotional learning in teacher education; Palmquist and colleagues (2026) integrate social-emotional competencies into a broad account of AI literacy. Righi and Taddei (2026) also use the phrase digital affective literacy in a REN Conference abstract. The present article therefore does not claim priority for the term. Its more specific contribution is to treat simulated affective responsiveness as an object of teacher judgement and to connect care ethics with observable decisions. Whether this specification is distinct from existing frameworks requires empirical study. Social-emotional learning addresses the development

of emotional and relational competencies; DAL focuses more narrowly on how a teacher judges an AI system's affective claims and generated responses in a specific educational relationship.

The ethical foundations of DAL are grounded in the normative frameworks of Floridi and Cowls (2019) and UNESCO (2021). Floridi and Cowls's (2019) five principles—beneficence, non-maleficence, autonomy, justice, and explicability—each acquire specific pedagogical content in the context of affective AI education. Beneficence demands that AI affective systems genuinely serve students' holistic well-being, not merely measurable learning outcomes. Non-maleficence requires attention to privacy, surveillance, error, and possible dependence on simulated responsiveness. Autonomy insists that AI deployment preserve students' capacity for self-directed affective growth. Justice demands testing for unequal effects, including errors in emotion inference and algorithmic bias (Barrett et al., 2019; Baker & Hawn, 2022). Explicability requires that educators be accountable to students and communities for how AI is shaping the affective dimension of educational experience. UNESCO's (2021) Recommendation provides a related, broader framework for governing AI, including human oversight, fairness, and data protection. In practice, these principles require minimal collection of sensitive data, clear explanations and ways to contest an inference, accessible non-AI routes to support, and accountability for consequential decisions.

Digital Affective Literacy comprises four interrelated competencies. Epistemic literacy encompasses the capacity to understand how affective AI systems function, what emotional indicators they process, and what cultural biases may be present in their design. Critical discernment refers to the educator's capacity to distinguish between algorithmically simulated responsiveness and genuine relational engagement—and to communicate this distinction to students in pedagogically appropriate ways. Purposeful deployment is the capacity to integrate AI tools strategically in service of relational and affective educational goals, considering whether a tool supports collaboration and learner agency in the sense described by Ouyang and Jiao (2021). Ethical stewardship encompasses the educator's capacity to ensure that AI deployment respects students' dignity, autonomy, and affective development, and to remain the ultimate moral agent responsible for the relational quality of the educational environment. These four dimensions are proposed for examination, not presented as an empirically validated scale.

Each dimension can be linked to a candidate indicator: checking an AI emotion label against the student's account (epistemic literacy); asking whether generated feedback supports dialogue (critical discernment); recording why a tool was selected or declined (purposeful deployment); and documenting

consent, data limits, and human follow-up (ethical stewardship). Teacher education could test these judgements with cases and classroom observations. Validation would require expert review, comparison with existing AI-literacy and socio-emotional measures, and evidence from varied learners and institutions.

6. Conclusions: Repositioning the Educator as the Irreplaceable Caring Presence

This contribution has developed a theoretical argument about AI-supported educational care. Within the relational account of Noddings (1984, 2005) and Tronto (1993), an affectively appropriate algorithmic output is not sufficient evidence of care: an educator remains responsible for interpreting need, responding, and attending to the learner's account. AI may nevertheless assist with feedback and accessible options when teachers and institutions remain answerable for its use. DAL names the proposed competence needed to make those decisions.

At the pedagogical level, teacher preparation should connect knowledge of affective AI with relational judgement, accessibility, and the ability to question automated inferences. At the institutional level, governance should make data practices transparent, provide human routes to support, and review disparate effects (Floridi & Cowls, 2019; UNESCO, 2021). These implications are normative proposals drawn from the care-ethics framework, not measured effects of a DAL programme.

The analysis has limits: its selection of literature is purposive rather than exhaustive, and the cited studies involve different technologies and populations. The proposed DAL dimensions and indicators require empirical validation and comparison with existing competence frameworks. Future research should investigate how educators develop and exercise DAL competencies in practice; how students experience the distinction between algorithmic and genuine affective engagement; and how institutional environments support or constrain the educator's capacity to maintain genuine caring presence within AI-mediated environments. Studies should also examine privacy and bias alongside students' own accounts of support, agency, and trust.

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