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# Beside one another, even at a distance: can a digital desk mate exist? Peer Relationships and Educational Proximity in Hybrid Learning Environments

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**Abstract:** Digital transformation is reshaping the forms of proximity through which school experience is built. The desk mate, rooted in the organisation of classroom space between the nineteenth and twentieth centuries, was reinterpreted by pupils as a site of complicity, reciprocity, and micro-resistance. Amid competition and individual evaluation, however, peer solidarity risks weakening, while technological mediation redefines the classroom's relational geography. This paper proposes the "digital desk mate" as a conceptual category for interpreting peer-supported engagement in hybrid and online settings. The analysis, which lacks empirical validation, reconstructs the desk mate's historical and symbolic meaning and places it in dialogue with literature on peer learning, co-regulation, emotional contagion, classroom climate, and belonging. It shows that connection alone cannot reproduce educational proximity: without a stable shared space, digital interaction becomes instrumental rather than relational. A digital counterpart of the desk mate arises only when peer support is intentionally and continuously designed, through stable or rotating partnerships, reciprocal tutoring, persistent micro-groups, informal exchange, and spaces for emotional sharing. Peer proximity should therefore be treated as an educational condition, not a spontaneous by-product of connectivity. It depends less on technology than on the pedagogical quality of the environment, and it sustains attention, persistence, belonging, and active involvement.

**Keywords:** digital desk mate; educational proximity; peer relationships.

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## 1. Introduction[1]

The digital transformation of educational environments does not merely change the tools through which teaching and learning take place. More radically, it reshapes forms of presence, relational geometries, and the ways in which school experience is shared, interpreted, and made meaningful. The structural incorporation of technologies into learning environments has progressively separated educational

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proximity from simple physical contiguity: learners may study together without occupying the same material space, just as they may share the same classroom without experiencing any genuine form of closeness.

This transformation requires attention not only to what digital technologies make possible in the transmission of content, but also to what they produce, attenuate, or alter at the relational level. The contemporary classroom no longer necessarily coincides with a single room. It may extend across platforms, chats, videoconferences, collaborative environments (Rubin, Guth, 2022), forums, and asynchronous temporalities. Presence becomes intermittent; bodily proximity is replaced or supplemented by mediated proximity; and peer relationships take on configurations that are less immediately perceptible and, for that very reason, more dependent on pedagogical intentionality.

Within this changing landscape, the figure of the desk mate is especially significant. Historically rooted in school culture and in the gradual organization of classroom space between the nineteenth and twentieth centuries, it evokes a daily, minute, and lateral form of educational relationship. The double desk, originally introduced in response to organizational, hygienic, and disciplinary needs, was gradually reinterpreted in students' lived experience as a place of reciprocity, complicity, support, and micro-resistance (Chiosso et al., 2009).

The desk mate therefore exceeds the materiality of school furniture. It represents a particular form of presence: someone who learns beside us, shares the risk of error, the uncertainty of an answer, cognitive effort, the time of waiting, and often the relief of not being alone. From this premise, the present theoretical contribution proposes the category of the digital desk mate as an interpretive device for understanding the relational quality of engagement in hybrid and online learning environments.

The analysis is guided by the following question: under what pedagogical conditions can peer relationships retain affective continuity, generative capacity, and participatory force when proximity is technologically mediated? The working hypothesis is that the digital desk mate should not be treated as a merely terminological variant of peer learning, peer support, or co-regulation. Rather, it identifies a dimension that these constructs partly address but do not always make their specific object: the educational quality of being beside another person, understood as the relative stability of a lateral, recognizable, affectively significant, and temporally continuous presence through which the other is experienced not simply as collaborator, tutor, or functional resource, but as someone with whom a portion of the learning experience is inhabited.

Accordingly, the article first reconstructs the historical-pedagogical meaning of the desk mate and situates it within research on peer relations, affective circulation, and co-regulation. It then specifies the conceptual novelty of the digital desk mate, identifies the design conditions that may sustain it in digitally mediated environments, and discusses its implications for educational proximity and student engagement.

## 2. Theoretical Framework: Proximity, Peer Relationships, and Learning

### *2.1. The desk mate as a historical-pedagogical figure*

The school desk is one of the most recognizable objects of educational material culture. Its history forms part of the broader transformation of modern school spaces, in which the arrangement of bodies, the regulation of distance, and the organization of visibility responded to precise disciplinary and pedagogical purposes (Chiosso et al., 2009).

The double desk, however, produced effects that cannot be reduced to the institutional intentions that generated it. Where school organizations had designed a geometry of order, students created a micro-geography of relationships. The shared surface became a place of glances, hesitations, exchanges, imitation, suggestions, solidarity, minor conflicts, and silent alliances. The desk was therefore not only an instrument for positioning bodies; in everyday experience it could become a small relational territory.

From this perspective, the desk mate represents a paradigmatic figure of horizontal educational proximity. The position of the desk mate is laterally different from that of the teacher: it does not occupy the place of authority, primarily embody educational asymmetry, or necessarily intervene as an expert. Its value lies instead in sharing the condition of being a learner. The desk mate is not necessarily the person who knows the answer, but the person who shares the question. This distinction is pedagogically important because it reveals a dimension of school experience that escapes both purely cognitive descriptions and narrowly instructional accounts: learning is also an experience of being there together.

### *2.2. The classroom as an affective and relational space*

Classroom life is characterized by considerable relational, expressive, and emotional complexity. Emotions do not remain confined within the individual who experiences them; they may circulate, intensify, or diminish within the group. Emotional contagion is one of the forms through which this circulation becomes visible: tension, enthusiasm, fear, confidence, anxiety, and trust may spread among peers and indirectly affect the classroom climate and the quality of learning (Oliverio Ferraris, 2025).

Peer relationships consequently perform a non-marginal regulatory function. Another student's calm can contain uncertainty; a gesture of reassurance may reduce perceived risk; recognition from a classmate can sustain participation; and the sharing of difficulty may make error less threatening. The classroom thus appears not only as a cognitive environment but also as an affective field in which individual engagement is continually supported, hindered, or redirected by the quality of relationships.

This observation also complicates strongly individualistic accounts of engagement. Attention, persistence, participation, and perceived self-efficacy do not arise exclusively inside the learner. They are shaped by social signals, expectations, and forms of recognition. The presence of a peer can encourage cognitive risk-taking, contain uncertainty, support attention, and make the vulnerability intrinsic to learning more tolerable and shareable.

### *2.3. Peer learning, peer support, and co-regulation*

Research on peer learning has extensively shown the educational value of horizontal interactions. Peer learning emphasizes the possibility that students learn with and from one another through collaboration, reciprocal explanation, discussion, and the shared construction of knowledge. In hybrid and online environments, this dimension becomes particularly important, although it requires design structures capable of compensating for greater relational discontinuity and the reduced immediacy of social presence (Mendieta-Aragón et al., 2023).

Peer support broadens this perspective by foregrounding forms of assistance that may be informational, emotional, motivational, or practical. From this standpoint, a peer becomes a resource capable of reducing isolation, sustaining a sense of belonging, and accompanying another learner through difficulty. Co-regulation, in turn, challenges representations of learning as an exclusively self-regulated and individual process. Motivation, attention, perseverance, interpretations of difficulty, and perceived efficacy are continually shaped within relationships; learners do not regulate only themselves but may be supported, oriented, and stabilized through shared regulatory processes (Cacciamani, 2008).

These three constructs are indispensable for understanding peer relations, yet they are not equivalent to the concept proposed here. Peer learning identifies a mode of learning with and through peers; peer support identifies the supportive function a peer may perform; and co-regulation identifies a relational process through which cognitive, motivational, or emotional regulation is distributed across participants. The digital desk mate instead focuses on the relational continuity that can make these processes durable, recognizable, and pedagogically meaningful.

## 3. Conceptual Proposal: The Digital Desk Mate

### *3.1. From function to presence*

The theoretical novelty of the digital desk mate lies first of all in shifting attention from the function performed by the peer to the quality of the peer's presence. In peer learning, the central theoretical concern is learning with or through another learner. In peer support, the center is the assistance that a peer can provide. In co-regulation, the center is the process through which cognitive, motivational, or emotional regulation becomes relationally distributed. In the digital desk mate construct, the center is instead the relational structure that can sustain all of these processes: the continuity of being beside another person.

The digital desk mate is therefore not defined primarily by what the peer does, but by how the peer is present. The peer may support, collaborate, co-regulate, explain, listen, or simply share a period of waiting. None of these functions alone defines the construct. Its specificity lies in the relative continuity within which such functions can occur and in the transformation of interaction from an episodic exchange into a recognizable relationship.

### *3.2. A second-order relational category*

The digital desk mate may consequently be understood as a second-order relational category. It does not describe a specific teaching technique, identify a single method, or prescribe one collaborative configuration. Rather, it describes the quality of the relational field within which peer learning, peer support, and co-regulation may acquire greater depth.

This distinction matters. Two students can engage in peer learning without developing a durable relationship. Peer support may occur episodically without reciprocal familiarity. A moment of co-regulation may take place without the other person becoming a recognizable presence over time. The digital desk mate requires something further: a minimal memory of the relationship. The other must cease to be only a temporary function and become an interlocutor sufficiently recognizable to enter the learner's horizon of expectation.

For this reason, the digital desk mate should not be understood as a competing label for established constructs. Its analytical contribution is to name the relational substrate that allows different peer processes to persist beyond a single task. It is concerned less with what peers do together at one moment than with how an educational environment enables them to become reliable presences for one another across time.

### *3.3. Temporality and relational sedimentation*

A second distinctive element is temporality. Educational relationships acquire meaning not only through the intensity of interaction but also through sedimentation. The traditional desk mate became significant because the relationship recurred: days, lessons, errors, waiting, routines, and small rituals were shared. Familiarity emerged through repetition.

The digital desk mate must therefore be conceived as a relationship endowed with relative persistence. Continuity allows trust to develop; trust makes exposure possible; and exposure permits a more authentic sharing of cognitive and emotional vulnerability. Without this temporal dimension, digital environments may generate many interactions but few relationships. Connectivity can multiply contacts while leaving learners without any stable sense of who is actually beside them.

### *3.4. Recognition, expectation, and reciprocal availability*

A third characteristic concerns recognition. A digital desk mate exists when the other person is not merely accessible but recognizable. There is a substantial difference between being able to send a message to someone and knowing who that someone is; between receiving a response and expecting a response from a particular person whose ways of communicating have become familiar.

One of the most important properties of the relationship is therefore reciprocal expectation. A learner knows that the peer may notice an absence, await a contribution, recognize a change in behavior, or remember a previous difficulty. The relationship thereby acquires a depth that technical access alone cannot guarantee. Proximity is no longer reducible to availability on a platform; it becomes the experience of being expected, reached, and recognized.

### *3.5. Shared vulnerability*

A fourth theoretical dimension concerns vulnerability. Learning always entails exposure: admitting that one does not know, attempting a solution, risking error, revising a belief, or entering a field whose rules have not yet been mastered. Within the digital desk mate model, peer relationships become pedagogically significant when they allow this vulnerability not to be experienced in isolation.

The digital companion does not necessarily need to correct the learner or supply the right answer. The peer may simply share the condition of uncertainty. This is precisely where the construct exceeds a purely performative account of peer relations: its function is not only to make learning more efficient, but to make learning more inhabitable. It names a form of relational accompaniment that can give uncertainty a shared rather than exclusively individual form.

### *3.6. A micro-phenomenology of being beside*

The digital desk mate can therefore be defined as a mediated form of horizontal educational proximity characterized by continuity, recognition, reciprocity, availability, and shared vulnerability. The category points to a micro-phenomenology of being beside another learner.

In the physical classroom, this proximity was to a significant extent supported by architecture. In digital environments, it must become an object of pedagogical design. What was once sustained by the material stability of space must now be made possible through the intentional stability of relationships. In this sense, digital mediation does not simply remove the desk; it reveals that the pedagogical value of the desk was never exhausted by the object itself, but resided in the relational possibility that the object helped to sustain.

## 4. Design Conditions for Digital Proximity

If the digital desk mate does not emerge automatically from connectivity, it is necessary to identify the conditions that may support its development. The following conditions do not constitute a fixed instructional model; rather, they translate the proposed construct into design principles for hybrid and online learning environments.

### *4.1. Continuity of relational configurations*

The first condition is continuity. Groups that are constantly recomposed and interactions that remain purely occasional may facilitate information exchange but are less likely to produce familiarity. Relatively stable pairs, persistent micro-groups, or slowly rotating configurations can instead allow a minimal relational memory to develop. Stability should not become rigidity: the goal is not to freeze relationships, but to provide enough time for them to acquire meaning.

### *4.2. Reciprocity rather than fixed asymmetry*

The digital desk mate should not be designed according to an exclusively one-directional logic. If one student is always identified as the person who helps and another as the person who receives help, the relationship risks reproducing an asymmetry closer to traditional tutoring. The specificity of the proposed construct requires reciprocity. Each participant should be able, at different moments, to become both a resource and a recipient of support. Such reversibility protects the horizontal character of the relationship and prevents support from becoming a fixed status distinction.

*4.3. Informal spaces and low-threshold interaction*

A significant part of the historical relationship between desk mates developed in zones not entirely controlled by formal instruction. Digital environments likewise need margins of informality. When every interaction is tied to an assignment, traced, assessed, or instrumentalized toward a product, peer relationships risk becoming purely functional. Low-threshold spaces are therefore needed in which students can ask questions, share uncertainty, compare interpretations, or simply signal their presence without every exchange becoming an assessable performance.

*4.4. Recognizability of the person*

A digital learning environment should allow the peer to be perceived as a person rather than as an indistinct profile. Responsible personalization of presence, continuity of names and communicative identities, and the possibility of developing small relational routines can support the transition from impersonal connectivity to familiarity. The issue is not to maximize exposure or self-disclosure, but to create enough continuity for one learner to recognize another across interactions.

*4.5. Temporalities beyond synchronous co-presence*

Digital proximity should not be modeled exclusively on the simultaneity of the classroom. One of its distinctive possibilities lies precisely in extending relationships across time. Asynchronous messages, brief feedback exchanges, shared traces, comments, and opportunities to resume previous conversations can produce forms of continuity that exceed the duration of a lesson. Such temporal extension can turn the platform from a place of episodic access into a site where relational memory is preserved.

*4.6. Spaces for emotional acknowledgment*

If peer relationships also perform an affective co-regulatory function, digital environments cannot be designed solely around disciplinary content. Learners need occasions in which difficulties, uncertainty, perceptions, and emotional states can be acknowledged without turning educational interaction into an intrusive or therapeutic practice. Emotional recognition belongs to the quality of educational relationships because it allows peers to interpret one another not simply as task performers but as subjects engaged in a demanding process of learning.

## 5. Discussion

The digital desk mate construct has several theoretical and design implications. The first concerns the relationship between connectivity and proximity. Digital transformation has often encouraged an implicit equivalence between being connected and being together. Pedagogically, this equivalence is problematic. The technical availability of a communication channel guarantees neither trust nor belonging nor reciprocity. Educational proximity requires a quality of relationship that cannot be inferred from access alone.

The second implication concerns engagement. If engagement is interpreted exclusively as an individual property—attention, participation, persistence, or investment—a significant part of its genesis is lost. A learner's involvement may also depend on the perception of being expected, recognized, and meaningful to someone else. Engagement therefore has a relational structure. Students do not participate only because a task is intrinsically meaningful; they may also participate because their presence matters within a relationship and because another person is waiting for their contribution.

A third implication concerns the increasingly competitive organization of educational experience. Mantegazza and Seveso (2006) have highlighted contradictions within contemporary schooling that can distance education from its communal dimension. When individual performance, quantification, and comparison dominate the symbolic space of school, peers risk being transformed into benchmarks or competitors. The digital desk mate suggests a different educational anthropology: the other is not primarily the rival against whom one's performance is measured, but the person with whom part of the process of learning can be shared.

From this perspective, the idea of a "happy school" proposed by Frabboni (2014) should not be understood as an irenic ideal of education without difficulty or conflict. Rather, it points toward conditions of conviviality, recognition, and belonging capable of making school experience humanly sustainable. The desk mate, physical or digital, offers a small but significant image of such conviviality: two learners who remain distinct but who are not required to experience the vulnerability of learning in complete isolation.

A fourth implication concerns instructional design itself. Proximity cannot be treated as a spontaneous effect of technology; it must become a design variable. Much work on digital learning has understandably emphasized access, flexibility, interactivity, personalization, and the availability of resources. The digital desk mate construct introduces an additional question: how does an environment make it possible for one learner to become a reliable presence for another? This question differs from asking how often learners interact.

An environment can be highly interactive and relationally poor. It can generate numerous exchanges but little familiarity, enable collaboration without belonging, and facilitate joint work without building any memory of the relationship. This distinction marks one of the main theoretical contributions of the proposal. The digital desk mate does not measure how much students interact; it asks what the other person becomes through repeated interaction.

At the same time, the proposal has limitations. It is a conceptual construct rather than an empirically validated model, and its evidential basis lies in the

convergence of historical reconstruction with research on peer learning, peer support, affective circulation, co-regulation, and belonging. The construct therefore requires future empirical work capable of operationalizing its core dimensions—continuity, recognition, reciprocity, availability, and shared vulnerability—and examining their relationship with engagement, persistence, well-being, and learning outcomes across different age groups and digital settings.

This limitation is also a productive direction for further research. The concept could be explored through qualitative studies of students' lived experience, social-network approaches focused on stable peer ties, mixed-method analyses of relational continuity and engagement, or design-based research comparing environments that deliberately support stable peer proximity with environments organized around more episodic forms of collaboration. Such work would help determine when the digital desk mate is a useful explanatory construct and where its boundaries lie in relation to established frameworks.

## 6. Conclusions

The figure of the desk mate belongs to the educational memory of schooling because it makes visible a fundamental structure of the learning experience: the presence of someone who shares the condition of being a learner without occupying the place of authority. The digitalization of educational environments does not make this figure obsolete. On the contrary, it makes its pedagogical meaning more theoretically visible.

Once proximity is no longer guaranteed by the material organization of space, it becomes possible to distinguish what, in the traditional desk mate, belonged to the desk and what belonged to the relationship. The digital desk mate is intended to name this second dimension. It does not coincide with peer learning, because its core is not primarily reciprocal learning; it does not coincide with peer support, because its meaning is not exhausted by the function of assistance; and it does not coincide with co-regulation, because it describes more than the relational distribution of regulatory processes.

The digital desk mate identifies the relational substrate of sustained proximity within which those processes may emerge and acquire depth. Its minimal unit is not collaboration but recognized presence. Its temporality is not that of the single task but that of continuity. Its purpose is not necessarily to correct, explain, or help, but to make possible the experience of not being alone while learning.

Three conclusions follow. First, technological connection alone cannot reproduce educational proximity. Second, a digital form of the desk mate can emerge when learning environments intentionally create durable structures of reciprocity, recognition, and mutual reliance. Third, engagement in hybrid and online environments should also be interpreted as a relational phenomenon: attention, persistence, belonging, and active participation depend not only on the relationship between learner and content but also on the quality of the human world within which that content is encountered.

The decisive pedagogical question, then, is not how to simulate the school desk digitally. It is how to preserve what the desk made possible almost incidentally: the lateral presence of another person who, by learning beside us, makes the difficulty

of understanding less alien. In this sense, the digital desk mate can be regarded not as nostalgia translated into technological space, but as a conceptual and design category for contemporary education. Educational proximity may never fully coincide with being physically near; it may instead reside in knowing that, across the distance, someone is still learning with us (Pontecorvo, Ajello, Zucchermaglio, 2004).

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