Functional School Maturity Gap: an integrative conceptual framework and systemic pedagogical response to the effects of the immediacy environment on school learning

Theoretical-conceptual article with an empirical research agenda

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Abstract

Recent educational research documents, from independent disciplinary lines, a convergent set of difficulties in the school functioning of contemporary students: erosion of sustained attention, low frustration tolerance, dependence on adults for problem-solving, difficulty managing failure, and affective disconnection from learning. These difficulties do not correspond to recognized clinical profiles or structural neurological deficits, but rather to functional patterns acquired as adaptive responses to an environment characterized by digital immediacy and overprotective parenting. This article proposes the construct Functional School Maturity Gap (FSMG) as an integrative conceptual framework that brings together four lines of empirical evidence—cognitive neuroscience, developmental social psychology, parenting style research, and the psychology of meaning and motivation—into a pedagogically operational diagnosis. Building on this diagnosis, the article presents the MIRA Teaching-Learning Model (Metacognition, Inner life, Resilience, Agency) as a systemic response designed to address all four causal factors simultaneously, grounded in the principles of criterion-referenced assessment documented by international research and compatible with the Spanish LOMLOE regulatory framework. The article concludes by describing a pilot school network whose establishment is planned for the 2026-27 academic year, with the aim of generating empirical evidence on the model's applicability and impact in real school contexts.

Keywords: *acquired functional immaturity; criterion-referenced assessment; metacognition; educational resilience; student agency; digital immediacy; teaching-learning models.*

1. Introduction

1.1. The problem at the outset: an immaturity that existing frameworks do not name

Teachers in primary and secondary schools across Western contexts describe, with striking consistency, a set of difficulties that does not fit the clinical profiles ordinarily handled in educational guidance. These are not, as a rule, students diagnosed with attention-deficit disorder, specific learning difficulties or neurodevelopmental conditions. They are students who, on the surface, function normally, but who show a systematic difficulty in sustaining effort when the result is not immediate, in reading error as information rather than as a verdict, in making decisions with real consequences without turning to an adult, and in connecting academic learning with genuine questions about their own lives.

That difficulty has no clinical name because it is not a clinical condition. Nor does it have an established pedagogical name, because educational research, which has indeed documented the underlying phenomena separately, has not articulated them into an integrating construct with operational capacity for the design of the school response. The present article proposes that construct: the *Functional School Maturity Gap* (FSMG).

The distinction between structural immaturity and functional immaturity is the conceptual point of departure. The former refers to limitations determined by the individual's neurological development —rates of maturation, biological variability, neurodevelopmental conditions—, and addressing it falls mainly to the clinical sphere and specialised guidance. The latter, which is the one this article analyses, is not determined by neurological development: it is *produced* by the environmental conditions in which that development takes place. This distinction is not semantic: it has direct consequences for where the responsibility for the response lies and what kind of intervention is appropriate. What the environment has produced, the environment can modify. And the school is an environment.

1.2. Why now: the convergence of factors and the shift in the point of departure

Functional immaturity in students is not a new phenomenon. What is new is its extent, its intensity and, above all, the convergence of factors that produce it simultaneously and synergistically in the present generation of schoolchildren.

Research on screen time and adolescent cognitive development has documented, through neuroimaging, that prolonged use of digital media designed for instant gratification is associated with functional changes in the brain regions linked to executive control and the reward systems (Lissak, 2018). Haidt (2024), drawing on a review of dozens of longitudinal studies, has documented that the transition towards a smartphone-based childhood —accelerated from 2012 onwards— coincides with a systematic increase in attentional fragmentation, anxiety and the deterioration of relational skills in adolescents across all the Western countries studied. In parallel, research on parenting styles has established that overprotective parenting —termed *helicopter parenting* since its description by Ginott (1969)— predicts higher levels of anxiety and lower self-regulation capacity in adolescents, mediated by the chronic frustration of basic psychological needs (Vigdal & Brønnick, 2022). And the

psychology of meaning and motivation, from Deci and Ryan's (2000) Self-Determination Theory to Damon's (2008) studies on purpose in adolescence, documents that genuine learning requires conditions of autonomy, perceived competence and relatedness that the immediacy environment systematically erodes.

These four lines of research have advanced in parallel, with different methodologies and theoretical frameworks, without a pedagogical construct having so far been proposed to articulate them into an integrated diagnosis. The proposal of the FSMG responds precisely to that gap.

A further precision that intergenerational research makes necessary should be added: the average point of departure of students has changed. Twenge (2013), drawing on cross-sectional meta-analyses with tens of thousands of subjects, documented a systematic generational shift from intrinsic values —sense of community, self-acceptance, affiliation— towards extrinsic values —image, immediate recognition, quick reward. Designing the school experience while ignoring that change is not neutral: it is pedagogically naive.

1.3. The limits of existing frameworks

The pedagogical field has not ignored these problems, but the available responses present significant limitations as an integrating framework in an ordinary school. *Mindfulness* and educational well-being programmes act on symptoms —anxiety, emotional dysregulation— without operating on the learning mechanisms that produce them. Active methodologies —project-based learning, service-learning, the flipped classroom— offer powerful instructional proposals, but they do not articulate an assessment architecture to sustain them or a coherent logic of vertical progression from the early stages to the end of compulsory schooling. The International Baccalaureate (IB) has decades of empirical validation and a soundly grounded criterion-referenced assessment logic; its pedagogical approach is fully applicable in schools under Spanish regulations —indeed, many schools develop it as IB World Schools—, but its adoption as a programme requires a process of authorisation and external certification of high cost that is beyond the reach of most schools. The LOMLOE prescribes competence-based and criterion-referenced assessment, but it does not provide an operational pedagogical model specifying *how* to translate those principles into classroom design with vertical coherence.

The MIRA Teaching-Learning Model does not seek to replace any of these frameworks: it seeks to occupy the space that none of them covers in isolation. A detailed analysis of this complementarity is developed in section 5.

1.4. Nature and scope of the article

The present article is a contribution of a theoretical-conceptual nature. It does not report implementation data of its own; rather, it proposes and grounds a diagnostic construct (FSMG) and a response model (MIRA) on the basis of a review of existing empirical evidence in four disciplinary fields. This decision is methodologically deliberate: the empirical validation of a model requires the model to be sufficiently articulated to be put to the test; that is the work this article carries out.

The literature review underpinning the FSMG construct does not follow the protocol of a systematic review —no inclusion and exclusion criteria have been applied to an exhaustive database—, but rather that of an integrative narrative review, oriented towards identifying the convergences between lines of research that, operating from distinct disciplinary frameworks, describe the same underlying mechanisms. The sources selected are reference works in their respective fields, highly cited and peer-reviewed, and their selection responds to the criterion of relevance to the construction of the central argument.

The article is organised as follows. Section 2 describes the four factors that configure the FSMG and their interactions. Section 3 presents the construct in an integrated way and discusses its specificity with respect to other pedagogical and clinical categories. Section 4 develops the MIRA Model as a systemic response, describing its four conditions, its assessment logic and its architecture of vertical progression. Section 5 analyses the model's compatibility with the relevant regulatory and pedagogical frameworks. Section 6 sets out the limitations of the work and the planned empirical research agenda, including the establishment of a pilot school network for the 2026-27 academic year. Section 7 gathers the conclusions and implications for educational practice.

2. The four factors of the Functional School Maturity Gap

The FSMG is not the sum of four independent problems. It is the result of the synergistic interaction of four factors that operate simultaneously in the life environment of contemporary students and that reinforce one another. This interdependence has direct methodological consequences: no intervention acting on only one of the factors can resolve the pattern as a whole. To be effective, the response must be systemic.

The following sections describe each factor on the basis of the available empirical evidence, with explicit attention to the mechanism by which it affects school functioning and to the reasons why it largely escapes the school's direct control.

2.1. Factor 1: digital immediacy and the erosion of executive control

Research on the cognitive effects of intensive digital technology use in childhood and adolescence has accumulated over the past decade a body of evidence consistent enough to draw pedagogically relevant conclusions.

Lissak (2018), in a review of the literature on screens and brain development, documented that prolonged use of digital media is associated with functional changes in the prefrontal regions linked to executive control —planning, response inhibition, working memory and attention regulation— and in the reward circuits of the limbic system. The mechanism is precise: digital environments designed to maximise time-on-device —social media, video platforms, short-cycle video games— systematically reinforce the pursuit of immediate gratification and weaken the neural network that sustains delay of reward and sustained effort. This is not irreversible damage, but a training effect: the developing brain organises itself functionally in response to the repeated demands of the environment.

This line connects directly with the classic findings on delay of gratification. Mischel's studies and their longitudinal follow-ups established that the capacity to postpone immediate reward predicts academic performance, social competence and stress-management capacity in adolescence with notable strength (Mischel, Shoda, & Peake, 1988). What is pedagogically relevant is that this capacity is not a fixed trait: it is sensitive to the environment and can be eroded —or trained— by the conditions in which the individual lives. A digital ecosystem of instant gratification acts as a systematic trainer in the direction opposite to the one the school needs.

Haidt (2024), in his synthesis of longitudinal studies on the anxious generation, adds a relational dimension to the phenomenon: the substitution of free play and in-person relationships —natural training environments for emotional regulation and frustration tolerance— by digital interactions that offer immediate feedback, avoid real conflict and require no waiting. The result, in pedagogical terms, is not a sick student body, but a student body without practice in the very competences the school takes for granted: sustaining attention, tolerating ambiguity, working without an immediately visible result.

The reason this factor largely escapes the school's control is structural: the digital ecosystem that produces it is the student's habitual environment outside the classroom, and its design responds to commercial logics that have no incentive to change. The school cannot wait for that ecosystem to change. It can, instead, become the one space where students systematically practise the opposite.

2.2. Factor 2: family overprotection and the autonomy deficit

The second factor operates from the family environment and acts on a distinct but complementary dimension: the student's capacity to make decisions with real consequences and to manage error without turning to an adult.

The concept of *helicopter parenting* —overprotective parenting— was described by Ginott (1969) and has been the object of growing systematic research. The systematic review by Vigdal and Brønnick (2022), which analyses 38 studies on the subject, found that overprotective parenting is associated with higher levels of anxiety and depression in adolescents, mediated by the frustration of the basic psychological needs of autonomy and competence described by Deci and Ryan (2000). The mechanism is paradoxical: overprotection, motivated by the desire to shield the child from failure and discomfort, produces exactly the conditions that make the individual more fragile in the face of failure and discomfort.

Lythcott-Haims (2015), drawing on her direct observation as Dean of Students at Stanford University over more than a decade, documented the impact of this pattern on young university students: difficulty making decisions without consulting their parents, low tolerance of failure, and the expectation that adults will resolve obstacles before they have to confront them. What she describes is not an individual pathology, but the predictable outcome of a parenting style that has systematically solved the child's problems before the child had the opportunity to face them.

In the school context, this pattern manifests in recognisable ways: the student who asks the teacher whether they are doing it right before having attempted anything; the one who interrupts work at the

first difficulty instead of exploring alternatives; the one who attributes success to the adult's help and failure to the unfair difficulty of the task. None of these behaviours is a personality trait: they are adaptive responses to an environment that has learned to solve problems before the individual experiences them.

This factor escapes the school's control for a reason different from the first: it belongs to the private, affective sphere of the family, where the school cannot intervene directly. What it can do is not replicate it: avoid the school overprotection that, with the best pedagogical intention, reproduces exactly the pattern it sets out to counteract.

2.3. Factor 3: insufficient emotional management and avoidance of real conflict

The third factor is closely related to the previous two, but operates with greater specificity on the emotional dimension of learning: the capacity to tolerate the discomfort that inevitably accompanies any genuine learning process.

Immordino-Yang's (2015) research on neuroeducation established that emotions are not a secondary or disruptive component of learning: they are a condition of transfer. Learning that activates no emotional response —positive or negative— does not consolidate with the same depth as learning that does. This claim has an uncomfortable consequence: deep learning requires, by definition, a degree of discomfort. Doubt, error, the difficulty of sustaining a complex task without a visible result are forms of functional discomfort that genuine learning cannot avoid. A student who has not developed resources to tolerate that discomfort tends to avoid it —and in avoiding it, avoids learning.

Duckworth (2016), in her research on *grit* —the combination of sustained passion and perseverance in the face of obstacles—, documented that this dimension predicts long-term performance with notable strength and develops through the repeated experience of overcoming difficulties in environments that accompany effort without removing it. Bjork (1994) added the concept of *desirable difficulty*: learning conditions that generate a degree of cognitive effort during the process —and that may reduce immediate performance— produce greater retention and long-term transfer than conditions of comfortable learning. Difficulty, well calibrated, is not an accident of pedagogical design: it is one of its most valuable ingredients.

The problem is not that contemporary students are incapable of managing emotion: it is that they have not had enough practice in contexts where that management was necessary and was accompanied. Unsupervised free play, peer relationships with real conflict, open tasks without a guaranteed result are the natural environments where such practice takes place. Their systematic reduction —through the expansion of screen time, family overprotection, and a school design that frequently removes difficulty before the student has to manage it— produces a practice deficit that manifests in the classroom as risk avoidance, constant validation-seeking and a disproportionate reaction to error.

2.4. Factor 4: emptiness of meaning and amotivation

The fourth factor operates in a dimension that contemporary pedagogy tends to treat with greater caution, owing to its proximity to the philosophical and the existential: meaning. Empirical research, however, has turned it into an object of study with solid results and direct pedagogical consequences.

Frankl (1946/2006) described the existential vacuum as the consequence of a frustrated or blocked search for meaning, and warned that its most frequent manifestations are apathy, addiction and aggressiveness. More than half a century later, Damon (2008), drawing on in-depth interviews with young people, found that only a minority of adolescents had a clear purpose guiding their decisions and efforts, while the majority were in a state of active disengagement —neither in crisis nor committed— or of vague aspirations with no action towards them. Damon links this absence of purpose directly to the culture of immediacy and to a form of parenting that has prioritised immediate well-being over the development of identity and long-term commitment.

Deci and Ryan (2000), from Self-Determination Theory, provide the psychological mechanism that explains how the immediacy environment erodes meaning: when the three basic psychological needs —autonomy, competence and relatedness— are systematically frustrated, intrinsic motivation is replaced by extrinsic motivation or by outright amotivation. The student does things for the grade, out of external pressure, or simply does not do them. What disappears in that process is the experience that one's own effort has a genuine inner direction.

In the school context, the emptiness of meaning manifests in a form of presence that is not visible absence: the student attends, meets the minimum requirements, completes tasks without real involvement and cannot answer, when asked, why what they are learning matters to them. This condition is pedagogically the hardest to reverse, because it does not respond to external incentives —the student already has them, in the form of grades— and does not improve through active methodologies alone if these do not create the conditions for the student to experience real agency and a genuine connection with the content.

2.5. The interaction between factors: why the response must be systemic

The four factors described do not act independently. They reinforce one another in a cycle that, once established, tends to be self-reinforcing.

Digital immediacy erodes the capacity to delay reward (Factor 1), which makes school tasks with a long process feel unbearably slow. That perception activates the search for immediate resolution by the adult (Factor 2), which reinforces dependence and reduces the practice of autonomy. The lack of practice in the autonomous management of difficulty impairs the capacity for emotional regulation in the face of error (Factor 3), which makes partial failures be experienced as total failures. And the accumulated experience that effort produces no results of one's own —because the adult intervenes, because the system rewards minimal compliance, because nothing of what is learned connects with questions of one's own— progressively produces the emptiness of meaning (Factor 4), which closes the cycle by increasing amotivation and, with it, intolerance of any demand for sustained effort.

This systemic nature of the phenomenon has a direct methodological consequence for the design of the school response: one-off interventions acting on only one of the factors —a mindfulness programme for emotional regulation, a service-learning unit to work on meaning, a project methodology to develop autonomy— produce limited and poorly sustainable effects, because they do not modify the architecture of experience that generates the pattern as a whole. An effective response requires an architecture that operates on all the factors simultaneously and coherently. That is the function of the MIRA Model.

3. The FSMG construct: definition, specificity and pedagogical operability

3.1. Formal definition

The Functional School Maturity Gap (FSMG) designates an acquired pattern of functioning —not neurologically determined— that manifests in the school context as a set of cognitive, emotional and motivational difficulties produced by sustained exposure to an environment of permanent immediacy: digital, familial and, frequently, school-based. Its characteristic manifestations are: difficulty in sustaining attention and effort without an immediately visible result; interpretation of error as a sign of failure rather than as information about the process; dependence on the adult for decision-making and the resolution of obstacles; a deficit in emotional regulation in the face of frustration and conflict; and affective disconnection from learning, manifested as an absence of purpose or genuinely inner motivation.

Three clarifications are necessary to delimit the construct rigorously.

The first is the distinction between functional and structural, already established in section 1: the FSMG does not describe what the student *is* in terms of neurological development, but how the student *functions* in response to the conditions in which they have grown up. This distinction places the response where it belongs: in the design of the school environment, not in individualised clinical intervention.

The second is the distinction between FSMG and situational demotivation. Situational demotivation is an adaptive response to specific pedagogical conditions —a teacher who does not connect, a subject perceived as irrelevant, a transitory stage of difficulty— and tends to resolve itself when those conditions change. The FSMG is a cross-cutting pattern that manifests independently of the subject, the teacher or the methodology, because it does not respond to specific pedagogical conditions but to the broader architecture of experience in which the student has been formed.

The third is the distinction between FSMG and cultural or socioeconomic capital deprivation. The difficulties associated with cultural capital deprivation have a different profile —they mainly affect vocabulary, familiarity with academic codes and access to extracurricular formative experiences— and respond to compensatory interventions that the FSMG does not require. Moreover: the FSMG is frequently documented in students of middle and high socioeconomic status, where access to digital technology and family overprotection tend to be more intense, not less. This specificity is relevant so

as not to confuse responses: the FSMG is not treated with content reinforcement or with educational compensation programmes.

3.2. Specificity with respect to clinical categories

A legitimate concern regarding any new construct in the educational field is its potential confusion with established clinical categories, especially when its manifestations may superficially overlap with some neurodevelopmental disorders. It is worth addressing this question with precision.

The FSMG profile may present superficial similarities with Attention-Deficit/Hyperactivity Disorder (ADHD), especially in its attentional manifestations. There are, however, structural differences that distinguish them. ADHD is a neurobiological condition with a documented genetic basis, present from early ages independently of context and relatively stable over time. Its manifestations do not depend significantly on the type of task or the reward environment. The FSMG, by contrast, is context-sensitive: the same student may show sustained attention for hours in a digital activity of high immediate reward and show an inability to sustain attention for twenty minutes in the face of an academic task. This sensitivity to context —and especially to the reward profile— is precisely the fingerprint of immediacy training, not of a neurological deficit of executive control.

The article does not propose that schools carry out a differential diagnosis between FSMG and clinical conditions: that responsibility falls to guidance and mental-health services. What it proposes is that recognising the functional pattern —distinguished from the clinical one— makes it possible to design a pedagogical response that, otherwise, is either omitted (because the problem has no name) or unnecessarily referred to the clinical sphere (because it is not recognised as pedagogically addressable).

3.3. The operational value of the construct: why naming matters

In educational research, the proposal of a new construct is justified if it meets at least one of three conditions: it integrates scattered evidence into a coherent framework that facilitates understanding of the phenomenon; it generates implications for practice that existing frameworks do not produce; or it opens lines of research that would not be formulable without the construct. The FSMG meets all three.

It integrates four lines of evidence —cognitive neuroscience, developmental social psychology, parenting research and the psychology of meaning— that have advanced in parallel without an articulating framework to make them pedagogically operational as a whole. It generates implications for practice that existing frameworks do not produce: specifically, the conclusion that an effective response cannot be one-off or one-dimensional, but must operate as an architecture of school experience. And it opens the possibility of designing instruments to identify the pattern in the school context —distinct from clinical instruments— that allow the prevalence, distribution and response to the intervention model to be tested empirically.

There is an additional dimension of the construct's value worth noting: its function in the conversation between teachers. Research on teaching practice has documented that teachers tend to attribute the

difficulties of students who do not fit known categories to personality or motivation variables —"this student doesn't want to", "he's very immature", "he lacks character"— or to uncontrollable external factors —"it's the screens' fault", "families don't help". None of these attributions produces a pedagogical response. The FSMG offers a shared language that transforms a perception of powerlessness into a diagnosis with implications for design. It does not describe what the student is: it describes how the student functions and, therefore, what kind of environment they need in order to function differently.

4. The MIRA Model as a systemic response

4.1. Design principle: assessment as the point of departure

The MIRA Teaching-Learning Model (Metacognition, Inner life, Resilience, Agency) is not, in the first place, a set of instructional methodologies. It is an architecture of school experience designed to operate on the four factors of the FSMG simultaneously, and its most distinctive structural feature is the point from which it is activated: assessment.

This inversion is deliberate and has a solid empirical basis. Black and Wiliam (1998), in their review of more than two hundred and fifty studies on formative assessment, demonstrated that change in assessment practices produces change in teaching practices, and not the other way round. When the teacher first defines what evidence they will look for, they design tasks coherently with that search. When assessment demands complex thinking, process and reflection, it pulls everything that happens earlier in the classroom towards those same demands. This property —known as positive *backwash* in the assessment literature— turns assessment design not into a grading technique, but into a mechanism for transforming the learning environment.

The operationalisation of this principle in MIRA is the *backward* logic: before designing any sequence of tasks, the teacher defines what evidence demonstrates that the student has travelled the complete learning cycle; from that evidence, they design backwards the progression of activities, the level of scaffolding and the moments of self-assessment. The result of applying this logic systematically, unit after unit, is not only a more rigorous assessment: it is a change in the way the teacher conceives instructional design. As Wiggins and McTighe (1998) note, whose proposal of *backward design* is the most cited formalisation of this principle, inverting the sequence forces the teacher to distinguish between what they want the student to *do* at the end —the performances— and the contents that act as the raw material of those performances. That distinction is what separates design by coverage from design by understanding.

4.2. The four conditions of the model and their empirical basis

The four conditions of MIRA are neither arbitrary categories nor direct imports from any existing model. They are the pedagogical consequence of the integrated reading of the four factors of the FSMG: each condition responds primarily to one of those factors, but operates on all of them simultaneously. This multiple influence —developed in section 4.3— is the core of the systemic design.

Before describing each condition, it is worth clarifying its status in relation to assessment, since the four operate on two planes that should not be confused. On the first, the condition asserts what makes deep learning possible —that the student regulate their process, connect the content with their life, sustain difficulty or produce something real. On the second, the condition is not measured in the abstract: what the criterion-referenced instrument records is the degree to which it becomes visible in the evidence the student produces, by means of descriptors (levels A–D; YES/PARTLY/NO). The condition belongs to the design of the unit; the degree, to the observable evidence. This distinction is especially relevant for Inner life, the condition most exposed to sliding towards the measurement of internal states: keeping it on the side of the observable is what makes it assessable without turning it into directed introspection.

Metacognition (M).

It responds primarily to Factor 1 —erosion of executive control by digital immediacy— and is grounded in the research of Flavell (1979) on cognition and metacognition, of Zimmerman (2000) on self-regulated learning, and of Hattie and Timperley (2007) on the differential impact of feedback. Hattie's (2009) synthesis, integrating more than one thousand eight hundred meta-analyses, places student self-assessment among the factors with the greatest positive effect on learning and metacognitive strategies at a level of large effect. Within the MIRA framework, Metacognition is not a one-off reflection activity at the end of the unit: it is a continuous cycle of planning, monitoring and adjustment that the student learns to operate with growing autonomy across the stages.

Operationalisation in the classroom takes progressively more demanding forms according to the stage: in Early Years education, the guided observation of one's own process through simple bodily and verbal cues; in Primary, structured self-assessment with performance sheets and rubrics of increasing level; in Secondary, the checklist the student completes before submission, indicating precisely where in their work the evidence for each criterion is located. This progression is not cosmetic: it reflects the real development of metacognitive capacity and turns it into an object of systematic training from the age of three.

Inner life (I).

It responds primarily to Factor 4 —emptiness of meaning and amotivation— and rests on three lines of research that converge in the same direction. Deci and Ryan's (2000) Self-Determination Theory establishes that intrinsic motivation —the kind that generates deep and lasting learning— only emerges when the basic psychological needs of autonomy, perceived competence and relatedness with others are satisfied. Marton and Säljö (1976), in their studies on approaches to learning, distinguished between surface learning —oriented towards reproduction— and deep learning —oriented towards understanding and the transformation of one's own perspective—, and documented that the difference between the two lies not primarily in the student's intelligence but in whether or not they perceive an inner reason to understand. Immordino-Yang (2015), from neuroeducation, added the biological dimension: learning that activates no emotional response does not consolidate with the same depth as learning that does, because emotion is a condition of transfer, not an affective complement.

In MIRA, Inner life is not a tutoring activity or an emotional well-being space added at the margin of academic learning: it is the condition that asks, in the design of each unit, whether the student has the opportunity to connect what they learn with a genuinely personal question, with their history, with their identity in formation. Not whether they like the subject, but whether there is some thread between the content and who they are or who they want to be. That question —which can be answered very briefly and in very diverse contexts— is what determines whether or not learning has an inner anchorage.

This connection must be distinguished from the classic concept of meaningful learning. Ausubel (1968) defined meaningfulness as the anchoring of new knowledge in the student's prior cognitive structures: a connection between bodies of knowledge. Inner life does not replace that cognitive meaningfulness, but extends it towards a personal meaningfulness: the connection of the content not only with what the student already knows, but with their experience, their identity in formation and their future purposes. The precision is relevant for the operationalisation of the model, because it delimits what is assessable: not the student's inner life —inaccessible and alien to the function of the school—, but the degree to which that connection becomes visible in what they say, write or produce.

Resilience (R).

It responds primarily to Factor 3 —insufficient emotional management and avoidance of real conflict— and is built on three research frameworks with high empirical strength. Dweck (2006) documented that the *growth mindset* —the belief that abilities develop through effort and strategy and are not fixed traits— robustly predicts the student's response to failure and can be cultivated through specific interventions in the language of teacher feedback. Duckworth (2016), in her research on *grit*, found that the combination of sustained passion and perseverance in the face of obstacles predicts long-term performance across multiple domains and develops through the repeated experience of overcoming calibrated difficulties. Bjork (1994) contributed the concept of *desirable difficulty*: learning conditions that generate cognitive effort during the process produce greater retention and long-term transfer than conditions of facilitated learning.

In MIRA, Resilience is not a value proclaimed in the school's mission statement: it is a competence designed in the classroom. It involves three operational conditions: that the teacher design tasks with calibrated difficulty that the student must sustain without an immediate solution; that feedback be oriented towards process and strategy, not towards the result; and that error be treated explicitly, in the language of the classroom, as information about the process and not as a verdict on ability. A student who has learned to interpret error in this way does not avoid risk: they seek it, because they have experienced that well-managed risk produces the learning that the safe path does not.

Agency (A).

It responds primarily to Factor 2 —family overprotection and the autonomy deficit— and is grounded in Bandura's (1997) research on self-efficacy —the belief in one's own capacity to execute the actions necessary to produce a result— and in studies on authentic learning. Condliffe et al. (2017), in their synthesis of research on Project-Based Learning, documented that projects with a real audience and consequences beyond the classroom produce greater motivation, greater depth of learning and better

retention than projects whose sole recipient is the assessing teacher. Celio et al. (2011), in their meta-analysis on service-learning, found significant positive effects on motivation, critical thinking and civic development when the student produces something that has value beyond the notebook and the examination.

In MIRA, Agency requires a concrete operational criterion: the student produces something real. Not whether they participate actively, not whether they are motivated, not whether they work in a group: whether there exists a product that has existence beyond the classroom and that has been created by the student through genuine decisions. Agency is the pedagogical proof of learning: what cannot be produced with autonomy has not been learned with depth.

4.3. The matrix of influences: why the model is systemic and not modular

A superficial reading of the model might suggest that each condition is a module applicable independently: if the student's problem is emotional management, Resilience is worked on; if it is a lack of motivation, Inner life. This reading is incorrect and pedagogically counterproductive, because it reproduces exactly the problem the model sets out to resolve: the fragmentation of the response into one-off actions that do not modify the architecture of experience.

The four conditions act on the four factors, with differing primary intensity. Metacognition trains the attention that immediacy erodes, but also builds the self-knowledge that the emptiness of meaning requires. Inner life works on the affective connection with learning, but also reduces the dependence on the adult that overprotection generates, because a student who knows why what they are doing matters to them does not need continuous external validation. Resilience counters the interpretation of error as a threat, but also trains the tolerance of delay that immediacy destroys. Agency generates an experience of purpose, but also compels the self-regulation and real conflict that overprotection systematically avoids.

> *The MIRA Model is not a specific antidote for each factor of the FSMG: it is an architecture of experience that acts on all of them simultaneously and synergistically. That is, precisely, its power.*

This multiple and simultaneous influence is what turns the model into an architecture of experience rather than a set of techniques. And it is also what demands team coherence: the model does not work if one teacher works on Metacognition and another removes all difficulty from tasks, because the effect of the Resilience that one builds is undone by the excessive scaffolding of the other.

4.4. Vertical progression: from ages 3 to 16

One of the model's distinguishing features with respect to other pedagogical frameworks is the existence of a vertical progression of descriptors and self-assessment instruments from Early Years education to the end of compulsory secondary education (ESO), which guarantees the coherence of metacognitive learning throughout schooling.

This progression responds to an empirically documented principle: the competences the model works on —metacognition, emotional regulation, agency, connection with meaning— are not acquired in

one stage and automatically transferred to the next. They require deliberate, sustained practice in contexts of increasing demand. If the student develops a self-assessment habit in Primary with instruments adapted to their maturity and that habit disappears in the transition to Secondary because the teachers of the new stage have no reference to the previous work, the accumulated metacognitive capital is lost. The vertical progression of MIRA turns that transition into a bridge, not a rupture.

In practice, the progression is articulated through stage-adapted self-assessment instruments that share the same conceptual architecture and scale in the autonomy demanded of the student: from the guided observation of one's own process in Early Years education to the complex rubric with evidence-location that the Secondary student completes before submission. The coherence between instruments allows Secondary teachers to receive real information about the level of metacognitive autonomy of the student arriving from Primary, which makes an informed instructional design possible instead of a blind response.

5. Regulatory compatibility and positioning with respect to reference pedagogical frameworks

5.1. Compatibility with the LOMLOE

The MIRA Model is fully compatible with the regulatory framework established by Organic Law 3/2020 amending the Organic Law on Education (LOMLOE) without requiring any structural adaptation. This claim is not a statement of intent: it has a precise technical correlate in three dimensions.

The first is competence-based assessment. The LOMLOE prescribes that the assessment of learning take as its referents the assessment criteria established in the curricula, expressed in terms of performance and not of memorised content. MIRA's criterion-referenced assessment system —with level descriptors A-D for each condition of the model— operates exactly on this logic: the criteria are public, known in advance, performance-oriented and applied through the teacher's professional judgement on accumulated evidence. The five operational principles of criterion-referenced assessment in MIRA —public criteria, assessment on accumulated evidence, professional judgement guided by descriptors, student self-assessment and internal team moderation— are an operational concretion of the principles the LOMLOE establishes for competence-based assessment.

The second is the student's exit profile. The key competences established by the LOMLOE find a direct correspondence in the four conditions of the model: the competence of learning to learn is the curricular correlate of Metacognition; the personal, social and learning-to-undertake competence finds its pedagogical expression in Resilience and Agency; the competence in cultural awareness and expression dialogues with Inner life in its dimension of identity and meaning. This correspondence is not forced: it responds to the fact that both the model and the regulatory framework share as their referent the research on deep learning and transferable competences.

The third is formative assessment. The LOMLOE emphasises the formative function of assessment as a guide for the learning process, not solely as a grading instrument. The MIRA Model operates

structurally on this function: student self-assessment, the teacher's criterion-referenced feedback and team review are formative-assessment mechanisms integrated into the design of each unit, not added at the end of the process.

5.2. Compatibility with international pedagogical frameworks

The power of the MIRA Model as a pedagogical reference lies not only in its regulatory compatibility with the Spanish context, but in the fact that the principles underpinning it are valid in any education system that has adopted a competence-based approach. This universality of the principles allows a comparative positioning with the international pedagogical frameworks of greatest empirical validation, in particular the International Baccalaureate (IB) and the European competence frameworks.

With respect to the IB, MIRA's relationship is not one of imitation but of shared sources. Both frameworks are built on the same principles of criterion-referenced assessment —documented by Wiggins and McTighe (1998), Black and Wiliam (1998) and Hattie (2009)— and apply the *backward* logic as the architecture of instructional design. The differences are of scope, not of principle: the IB is a complete curricular programme with an international accreditation structure and sustained cost; MIRA is a teaching-learning model applicable within any national curriculum, without external accreditation and with direct compatibility with the LOMLOE. A school that implements MIRA does not gain IB certification, but operates on the same pedagogical principles that make it valuable. A school that already has the IB can use MIRA as the framework that vertically articulates, from Early Years onwards, what the IB works on at the Baccalaureate stage.

With respect to the European frameworks, the four conditions of MIRA have direct correlates in the competence frameworks of Portugal (Perfil dos Alunos, 2017), France (Socle commun, 2015) and Chile (Bases Curriculares), among others. In all these cases, the relationship is one of conceptual correspondence: the national frameworks describe which competences to develop; MIRA describes how to create the pedagogical conditions for that development to occur systematically and assessably. This distinction —between a competence framework and an operational pedagogical model— is what delimits MIRA's own space in the international pedagogical landscape: it does not compete with the regulatory frameworks but operationalises them.

5.3. What MIRA resolves that none of the reference frameworks resolves separately

An honest comparative analysis requires identifying not only what the model shares with existing frameworks, but what it contributes specifically. There are three dimensions in which MIRA occupies a space that the reference frameworks do not cover individually.

The first is Resilience as an explicit and assessable pedagogical condition. None of the reference frameworks analysed —neither the IB, nor the European frameworks, nor the LOMLOE itself— has specific level descriptors for error management, perseverance in the face of difficulty and the growth mindset as a competence assessable with criteria differentiated by performance level. MIRA is the only framework that turns Resilience into a condition with A-D descriptors assessable by stage, which

allows it to cease being a value declared in the mission statement and become a competence with observable evidence.

The second is the unified vertical progression from Early Years to ESO. The regulatory frameworks establish competences by stage, but the coherence between stages depends on each school's coordination. MIRA provides an explicit progression architecture —with stage-adapted self-assessment instruments and transition protocols between cycles— that turns vertical coherence into a structural feature of the model and not a contingent result of teacher coordination.

The third is operability without external accreditation. The IB requires a process of authorisation and certification with a significant economic and management cost that makes its adoption as a programme unviable for most schools, even when its pedagogical approach is fully compatible with Spanish regulations. MIRA applies the same pedagogical principles without any requirement of external accreditation, which makes it universally replicable in any school operating under the LOMLOE.

6. Limitations of the work and empirical research agenda

6.1. Nature and limits of the contribution

The present article makes a conceptual contribution: it proposes a diagnostic construct (FSMG) and a pedagogical response model (MIRA) grounded in the integration of existing empirical evidence. This conceptual nature imposes limits that it is worth declaring explicitly, both out of methodological honesty and because the precise delimitation of what the article does not demonstrate is the condition for correctly formulating what remains to be investigated.

The first limitation concerns the FSMG construct itself. The article proposes the construct and argues for its coherence on the basis of the convergence of four lines of research, but it does not provide a validated identification instrument or prevalence data. The FSMG is described in a clinically recognisable way for teachers, but its psychometric operationalisation —the development of an instrument that allows the pattern to be identified reliably and distinguished empirically from clinical conditions and situational demotivation— is a pending task. As long as that operationalisation does not exist, the construct has heuristic and organising value, but not the status of a measurable variable. The article holds that this heuristic value justifies the proposal in itself, but does not claim that it substitutes for empirical validation.

The second limitation concerns the literature review. The grounding of the model rests on an integrative narrative review, not on a systematic review with an exhaustive search protocol and explicit inclusion and exclusion criteria. This decision is appropriate for the article's objective —identifying convergences between disciplinary fields to build a framework—, but it implies that the selection of sources, though guided by criteria of relevance and robustness, is not exempt from the bias inherent in any narrative review. The article's conclusions about the model's coherence should not be read as a quantification of the weight of the evidence, but as a reasoned articulation of its convergent direction.

The third limitation, and the most important, concerns the model's effectiveness. The article argues why the MIRA Model should be effective —on the basis of the documented effectiveness of each of its components separately— but it does not provide evidence of its effectiveness as an integrated model in real school contexts. The effectiveness of the parts does not guarantee the effectiveness of the whole: it is perfectly possible that a model well grounded in each component produces, in its joint implementation, smaller effects than expected, or effects different from those foreseen, for reasons of implementation, of interaction between components or of fit to context. This is the question the article deliberately leaves open and that the research agenda that follows is designed to answer.

6.2. Research agenda: the pilot school network

In response to the foregoing limitations, and in particular to the need to test empirically the applicability and impact of the model, a network of schools is being established whose pilot implementation is planned for the 2026-27 academic year. This network's purpose is to generate evidence on the functioning of the model in real school contexts, with a research design that recognises from the outset the difference between the conceptual coherence of a proposal and its effective behaviour in practice.

The planned design envisages the implementation of the model following a structured process of continuous improvement in annual cycles, in which each school systematically documents both the changes observed in students —response to the self-assessment instruments, involvement with the task, error management, quality and autonomy of the productions— and the impact on teaching practice —changes in task design, in feedback practices and in the team's assessment culture. The collection of evidence is guided by common instruments that allow comparison between schools and between stages, a necessary condition for distinguishing the effects attributable to the model from those attributable to the particular context of each school.

The pilot network is explicitly conceived as a device for generating transferable knowledge, not as a demonstration of the model's merit. This distinction has methodological consequences: the systematic documentation of resistances, implementation difficulties and components that do not work as expected is a constitutive part of the design, not an undesired by-product. A pilot that documented only its successes would not generate usable knowledge; honesty about what does not work is the condition of transferability.

The research questions the pilot network is designed to address include, at least: to what extent the model is sustainably implementable in schools with diverse teaching cultures and without extraordinary resources; which school conditions —size, leadership, prior assessment culture— favour or hinder implementation; which components of the model produce the most consistent changes and which prove hardest to sustain; and, in a later phase that will require designs of greater methodological demand, what effects the model produces on the dimensions of learning it sets out to develop.

6.3. Complementary lines of research

Beyond the pilot network, the full development of the research agenda associated with the model would require at least three additional lines. The first is the development and psychometric validation of an instrument to identify the FSMG in the school context, which would allow both the testing of the phenomenon's prevalence and the measurement of the model's effect on it. The second is the study of the model's transferability to education systems with competence frameworks different from the Spanish one, taking advantage of the conceptual compatibility with the frameworks of Portugal, France, Chile and other systems with a competence-based approach. The third, of greater complexity and temporal horizon, is the longitudinal study of the model's effects on students' trajectories, the only design capable of testing the model's central hypothesis: that the competences it develops —metacognition, emotional regulation, agency, connection with meaning— have sustained effects beyond the implementation period.

7. Conclusions and implications for practice

7.1. Synthesis of the contribution

This article has proposed the Functional School Maturity Gap (FSMG) as an integrative conceptual framework that articulates four lines of empirical evidence —from cognitive neuroscience, developmental social psychology, parenting-style research and the psychology of meaning— into a pedagogically operational diagnosis of a phenomenon that teachers observe with growing consistency but that lacked an articulating construct. The defining feature of the construct is its functional, not structural, character: the difficulties it describes are not determined by the individual's neurological development, but produced by the environmental conditions —of digital immediacy, family overprotection and, frequently, school design— in which that development takes place. This distinction places the responsibility for the response where it can be effective: in the design of the school environment.

On the basis of that diagnosis, the article has presented the MIRA Teaching-Learning Model as a systemic response designed to operate on the four factors of the FSMG simultaneously. The model is distinguished by three features: the inversion of the point of departure of instructional design, which is activated from assessment through the *backward* logic; the articulation of four conditions —Metacognition, Inner life, Resilience and Agency— that act on all the factors with differing primary intensity, which gives the model its systemic and non-modular character; and a vertical progression of descriptors and instruments from Early Years education to the end of ESO, which guarantees the coherence of metacognitive learning throughout schooling.

The compatibility analysis has shown that the model is fully compatible with the LOMLOE without structural adaptation, that it shares with the International Baccalaureate the research sources on criterion-referenced assessment without requiring its structure or its accreditation, and that it occupies its own space in the pedagogical landscape: that of an operational model translating the principles the regulatory frameworks prescribe into a classroom architecture applicable without extraordinary resources.

7.2. Implications for educational practice

Even acknowledging that the empirical validation of the model is pending, the conceptual framework developed in this article has three practical implications that do not depend on that validation and that can guide schools' reflection from now on.

The first is a change in the attribution of students' difficulties. Recognising the FSMG as a functional pattern shifts the explanation of difficulties from the terrain of personality or individual motivation —"this student doesn't want to", "he lacks character"— and from the terrain of uncontrollable external factors —"it's the screens' fault"— towards the terrain of the design of the school environment, which is where the school has the capacity to act. This shift does not minimise the weight of external factors: it recognises that, although the school cannot modify digital immediacy or family dynamics, it can become the space where students systematically practise the opposite.

The second is the insufficiency of one-off responses. The systemic nature of the FSMG implies that interventions acting on a single factor —an emotional well-being programme, an isolated active methodology, a one-off action on meaning— produce limited effects because they do not modify the architecture of experience that generates the pattern. The practical implication is that an effective response requires school-wide coherence, not juxtaposed individual initiatives. This coherence is a structural condition, not a desirable complement.

The third is the role of assessment as a lever of transformation. The evidence on positive *backwash* has a direct practical implication: a school that wants to transform its teaching practice is more likely to achieve it by first changing how it assesses than by first changing which methodologies it employs. Well-implemented criterion-referenced assessment —with public criteria, assessment on evidence, student self-assessment and team moderation— is not a grading technique: it is the mechanism that pulls the rest of the system towards deep learning.

7.3. Final consideration

The proposal of this article can be summed up in a distinction worth keeping clear: it does not offer a new theory of learning, but a new articulation of what research has already established separately, oriented towards making it operational in the school response to a contemporary phenomenon. The value of a contribution of this nature lies not in the novelty of its components —which are, deliberately, known and validated— but in the coherence of the framework that integrates them and in that framework's capacity to transform a diffuse perception of difficulty into a diagnosis with implications for design. The validation of that transformative capacity falls to the empirical research that this article leaves posed as its natural continuation.

Declarations

Statement on the use of generative artificial intelligence. During the preparation of this work, the author used generative artificial intelligence tools (Claude, by Anthropic) as support for language editing, translation into English and the layout of the document. After using them, the author reviewed and edited the content as necessary and takes full responsibility for the content of the publication.

The conception of the constructs (FSMG and MIRA), the argument and the conclusions are the exclusive work of the author; the artificial intelligence tools do not figure as authors and are not credited with any intellectual contribution.

Conflict of interest statement. The author is the creator and developer of the MIRA Teaching-Learning Model and of the Functional School Maturity Gap (FSMG) construct proposed and analysed in this article, which constitutes an intellectual interest inherent in the nature of the work. The author is also the author of the book *MIRA Aprendizaje*, not yet published, and responsible for the website miraaprendizaje.org. The MIRA pilot school network is made up of schools that participate voluntarily and autonomously. Beyond the foregoing, the author declares that, at the time of writing this article, he has no financial or commercial conflicts of interest in relation to its content.

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References

Ausubel, D. P. (1968). Educational psychology: A cognitive view. Holt, Rinehart & Winston.

Bandura, A. (1997). Self-efficacy: The exercise of control. W. H. Freeman.

Bjork, R. A. (1994). Memory and metamemory considerations in the training of human beings. In J. Metcalfe & A. P. Shimamura (Eds.), Metacognition: Knowing about knowing (pp. 185–205). MIT Press.

Black, P., & Wiliam, D. (1998). Assessment and classroom learning. Assessment in Education: Principles, Policy & Practice, 5(1), 7–74. https://doi.org/10.1080/0969595980050102

Celio, C. I., Durlak, J., & Dymnicki, A. (2011). A meta-analysis of the impact of service-learning on students. Journal of Experiential Education, 34(2), 164–181. https://doi.org/10.1177/105382591103400205

Condliffe, B., Quint, J., Visher, M. G., Bangser, M. R., Drohojowska, S., Saco, L., & Nelson, E. (2017). Project-based learning: A literature review. MDRC.

Damon, W. (2008). The path to purpose: Helping our children find their calling in life. Free Press.

Deci, E. L., & Ryan, R. M. (2000). The “what” and “why” of goal pursuits: Human needs and the self-determination of behavior. Psychological Inquiry, 11(4), 227–268. https://doi.org/10.1207/S15327965PLI1104_01

Duckworth, A. (2016). Grit: The power of passion and perseverance. Scribner.

Dweck, C. S. (2006). Mindset: The new psychology of success. Random House.

Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry. American Psychologist, 34(10), 906–911. https://doi.org/10.1037/0003-066X.34.10.906

Frankl, V. E. (2006). Man's search for meaning (I. Lasch, Trans.). Beacon Press. (Original work published 1946)

Ginott, H. G. (1969). Between parent and teenager. Macmillan.

Haidt, J. (2024). The anxious generation: How the great rewiring of childhood is causing an epidemic of mental illness. Penguin Press.

Hattie, J. (2009). Visible learning: A synthesis of over 800 meta-analyses relating to achievement. Routledge.

Hattie, J., & Timperley, H. (2007). The power of feedback. Review of Educational Research, 77(1), 81–112. https://doi.org/10.3102/003465430298487

Immordino-Yang, M. H. (2015). Emotions, learning, and the brain: Exploring the educational implications of affective neuroscience. W. W. Norton.

Lissak, G. (2018). Adverse physiological and psychological effects of screen time on children and adolescents: Literature review and case study. Environmental Research, 164, 149–157. https://doi.org/10.1016/j.envres.2018.01.015

Lythcott-Haims, J. (2015). How to raise an adult: Break free of the overparenting trap and prepare your kid for success. Henry Holt.

Marton, F., & Säljö, R. (1976). On qualitative differences in learning: I—Outcome and process. British Journal of Educational Psychology, 46(1), 4–11. https://doi.org/10.1111/j.2044-8279.1976.tb02980.x

Mischel, W., Shoda, Y., & Peake, P. K. (1988). The nature of adolescent competencies predicted by preschool delay of gratification. Journal of Personality and Social Psychology, 54(4), 687–696. https://doi.org/10.1037/0022-3514.54.4.687

Twenge, J. M. (2013). The evidence for generation me and against generation we. Emerging Adulthood, 1(1), 11–16. https://doi.org/10.1177/2167696812466548

Vigdal, J. S., & Brønnick, K. K. (2022). A systematic review of "helicopter parenting" and its relationship with anxiety and depression. Frontiers in Psychology, 13, 872981. https://doi.org/10.3389/fpsyg.2022.872981

Wiggins, G., & McTighe, J. (1998). Understanding by design. Association for Supervision and Curriculum Development (ASCD).

Zimmerman, B. J. (2000). Attaining self-regulation: A social cognitive perspective. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), Handbook of self-regulation (pp. 13–39). Academic Press. https://doi.org/10.1016/B978-012109890-2/50031-7