

Are You Ready?

Hybrid Learning, AI, and the Lessons We Almost Learned



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The Email Nobody Wanted to Send Again

Imagine if you will this hypothetical situation which could be arriving to an inbox near you very soon. Late on a Friday afternoon, a school principal in the Gulf sits at her desk composing a message she had hoped never to write again. The subject line reads: *Transition to Online Learning — Effective Immediately*. She had written a version of this email once before, in March 2020, and the memory of what followed, the chaos, the blank screens, the slow unravelling of everything her school had built, still carried a particular weight. She remembers the maths teacher who cried in a staff meeting after three weeks of teaching to a grid of black rectangles. She remembers the Year 4 boy whose parents both worked and who simply vanished from the system for six days before anyone noticed. She remembers the performance data from September that year, when students returned to campus and the scale of what had been lost became sickeningly clear.

Now it could be happening again. Not a pandemic this time, but a regional security crisis, the kind of disruption that arrives without a roadmap, without a predictable arc, without the strange collective solidarity that COVID had briefly provided and without the incentive to remain. Parents may be pulling children from school. Some families may be leaving the country. Staff members are anxious, distracted, checking their phones between lessons. The instruction is measured but unmistakable: prepare for the possibility that campuses may need to close at short notice. Be ready to pivot.

The principal stares at the draft. She knows what the last pivot had looked like. She also knows, and this is the part that gnaws at her, that most of the profession had quietly agreed never to speak of it again. The pandemic-era experiment in remote and hybrid learning had been, by almost any honest measure, a failure. Not a failure of effort, teachers had worked heroically, often from kitchen tables, often while managing their own children, but a failure of design. Schools had taken the architecture of face-to-face teaching and projected it through a webcam, as though the medium were neutral, as though a forty-five-minute lesson delivered on Zoom to thirty teenagers was pedagogically equivalent to the same lesson delivered in a room where you could see who was confused, who was bored, and who had quietly stopped trying.

The research confirmed what teachers already knew in their bones. Engzell, Frey and Verhagen (2021), studying the Netherlands, a country with world-leading broadband access, equitable school funding, and a lockdown of only eight weeks, found that students made little or no academic progress during remote learning, and that learning loss was up to 55% greater among students from disadvantaged backgrounds. Dorn et al. (2021), in McKinsey's longitudinal analysis, estimated that American students were, on average, five months behind in mathematics and four months behind in reading by the end of the 2020–21 school year. These were not marginal effects. They compounded and therefore were the kind of numbers that reshape life trajectories.

And yet, and this is the part that nobody in education quite knows what to do with, the evidence also shows that hybrid and blended learning, *when properly designed*, can outperform purely face-to-face instruction. Means et al. (2013), in a landmark meta-analysis commissioned by the US Department of Education, found that students in well-designed blended learning environments performed modestly but consistently better than students receiving exclusively face-to-face instruction. The effect was not enormous, but it was real, and it was robust across contexts. The problem during COVID was not that hybrid learning cannot work. It was that what schools delivered during COVID was not hybrid learning at all. It was, as Hodges et al. (2020) carefully distinguished, *emergency remote teaching*: a stopgap, not a strategy. The difference between the two is roughly the difference between a field hospital and an operating theatre. Both involve medicine. Only one is designed to produce reliably good outcomes.

So here is the principal's dilemma, and it is the dilemma facing every school leader in every disruption-prone context in the world right now: how do you build the operating theatre before the next emergency arrives? How do you design a model of hybrid learning that is pedagogically robust, emotionally grounded, culturally responsive, and operationally sustainable, rather than simply surviving the crisis and hoping for the best?

There is, however, something different this time. Something that was not available to schools in March 2020 and that changes the calculus in ways we are only beginning to understand. Artificial intelligence, not as a vague promise or a Silicon Valley pitch deck, but as a practical, deployable capability that can generate adaptive content, personalise learning pathways, provide real-time formative assessment, and serve as a co-facilitator in classrooms where the teacher is stretched between two worlds simultaneously.

The question this article sets out to answer is whether that changes everything, or whether we are about to make the same mistakes in better-looking packaging. Because the uncomfortable truth is this: the problem with hybrid learning was never the technology. It was us.

The Great Zoom Experiment

There is a photograph, widely shared in the early weeks of the first UK lockdown, of a primary school teacher sitting in front of her laptop in what appears to be a spare bedroom. Behind her is a hastily assembled display: a whiteboard balanced against a bookshelf, some laminated phonics cards blu-tacked to a wardrobe door, and a hand-drawn sign reading *Miss Carter's Classroom*. She is smiling. The children on the other side of the screen, most of them, anyway, are smiling too. It was, at the time, shared as an example of resilience, of teachers rising to the moment. And it was. But it was also, in retrospect, a photograph of a profession being asked to do something impossible and being praised for how gracefully it absorbed the blow.

What happened in schools between March 2020 and the staggered returns of 2021 was not, in any meaningful pedagogical sense, an experiment in online learning. It was something closer to a mass improvisation, millions of teachers worldwide attempting to translate an inherently relational, embodied, context-dependent practice into a medium that stripped away most of the conditions under which that practice works. Hodges et al. (2020) were among the first to insist on the distinction, coining the term *emergency remote teaching* to separate what schools were doing from the carefully designed, iteratively tested, pedagogically grounded practice of genuine online learning. The distinction matters enormously, because when researchers later measured the outcomes of the pandemic period, they were not measuring whether online learning works. They were measuring what happens when you remove every condition that makes learning work and then ask teachers to carry on regardless.

The results were devastating, and they were not evenly distributed. Andrew et al. (2020), tracking inequalities in children's home learning experiences during the first English lockdown, found that children from the highest-income households spent over five hours per day on educational activities, while children from the lowest-income households spent fewer than four, a gap that compounded over weeks into months of divergent development. Bacher-Hicks, Goodman and Mulhern (2021), using internet search data as a proxy for household engagement with schooling, found that online learning engagement was dramatically lower in lower-income zip codes across the United States, even after controlling for school quality and prior achievement. The pandemic did not create educational inequality, but it turbocharged it with a ruthless efficiency that no policymaker had anticipated.

Betthäuser, Bach-Mortensen and Engzell (2023), in what remains the most comprehensive meta-analysis of pandemic learning loss to date, synthesised findings from 42 countries and confirmed a consistent pattern: learning deficits were real, substantial, and disproportionately concentrated among already-disadvantaged students. The average learning deficit was equivalent to approximately 35% of a typical school year's progress. In mathematics, the losses were even steeper. And crucially, the evidence suggested that these deficits had not, by the time of analysis, been recovered. They were not a temporary dip. They were a structural shift.

Why did it go so badly? The temptation is to blame the technology: patchy broadband, outdated devices, the grim inadequacy of early Zoom. But the technology, while imperfect, was not the primary culprit. The deeper failure was pedagogical. Schools, operating under impossible time pressure, did the only thing that seemed logical: they replicated the existing timetable online. If a student normally had a fifty-minute English lesson at 9am on Tuesday, they now had a fifty-minute Zoom call at 9am on Tuesday. The teacher talked. The students, some of them, listened. The lesson was recorded. Homework was submitted through a learning management system. The architecture of the school day was preserved in digital form, like a building's facade propped up after the interior has collapsed.

Larry Cuban (2001) identified this pattern decades before anyone had heard of COVID-19. In *Oversold and Underused*, his landmark study of technology adoption in American schools, he documented a recurring cycle: new technologies are introduced with transformative rhetoric, adopted with enthusiasm, and then used to do precisely what schools were already doing, only more expensively. Radio was going to revolutionise education. Then television. Then personal computers. Then interactive whiteboards. In each case, the technology was absorbed into existing practice rather than prompting a redesign of that practice. Cuban called this *pedagogical inertia*: the tendency of educational institutions to bend new tools to old purposes rather than allowing new tools to reshape what teaching looks like. The pandemic was the most dramatic confirmation of his thesis in the history of schooling.

The consequences extended far beyond test scores. Kim and Asbury (2020), interviewing teachers in England during the first six weeks of lockdown, documented a profession in acute distress, not primarily because of the technology, but because of the severing of relationships. Teachers described feeling that they had lost sight of their students as human beings. Without the incidental corridor conversation, the body language that signals confusion or distress, the texture of a classroom in which thirty different emotional states coexist in real time, teaching became a broadcast rather than a dialogue. One teacher in the study described the experience as feeling like she was "posting letters into a void." The relational infrastructure that Hattie (2023) identifies as the single most powerful lever in education, the quality of the teacher-student relationship, with an effect size that dwarfs almost every other intervention, had been dismantled overnight.

And then there was the dual-delivery problem. When schools began partial re-openings, many teachers found themselves expected to teach students in the room and students at home simultaneously. The camera pointed at the whiteboard. The microphone picked up the teacher's voice but not the students' questions. The online students could see the back of the teacher's head. The in-room students resented the disruption of the teacher constantly checking the chat. It was, by any honest account, the worst of both worlds: a model that served neither cohort well, exhausted teachers, and produced learning outcomes that were often worse than either purely face-to-face or purely online delivery (Raes et al., 2020). Bower et al. (2015) had already mapped the design principles required for effective blended synchronous learning, the technical term for teaching in-room and remote students at the same time, but their research assumed careful planning, deliberate pedagogy, appropriate infrastructure, and trained staff. During COVID, none of those conditions obtained.

The cumulative weight of the evidence points to a conclusion that should unsettle anyone involved in education planning: the pandemic did not prove that hybrid learning fails. It proved that *unredesigned* hybrid learning fails. It proved that you cannot take a practice optimised for physical co-presence and run it through a video call without losing most of what makes it effective. And it proved that the students who pay the highest price for that failure are the ones who were already furthest from the centre, the students with the least support at home, the weakest connectivity, the most fragile relationship with school.

What it did not prove, and this is the point that gets lost in the collective trauma of 2020, is that the challenge is unsolvable. Means et al. (2013) showed that blended learning *can* work. Garrison, Anderson and Archer (2000) provided a robust theoretical framework, the Community of Inquiry model, for understanding how cognitive presence, social presence, and teaching presence must be deliberately designed into online and hybrid environments. Laurillard (2012) mapped the specific learning types that transfer well to digital environments and those that require physical co-presence. The knowledge existed. The profession simply did not have the time, the training, or the institutional support to use it.

The question now is whether we have learned anything. Because the next disruption is not hypothetical. For many schools in the Middle East, it is already here.

Different Crisis, Different Rules

In March 2020, the world received roughly two weeks' warning. The virus was coming. Schools would close. The timeline was compressed, but the basic shape of the disruption was legible: campuses would shut, learning would move online, and at some point, weeks, maybe months, all the students would return. There was, amid the panic, a strange clarity. The enemy was biological, the response was universal, and the shared experience of lockdown created a temporary solidarity that made the impossible feel almost manageable. Teachers became heroes. Parents became co-teachers. Communities applauded from balconies. The narrative, however strained, held together.

Regional conflict offers no such clarity.

When schools in parts of the Middle East began preparing contingency plans recently, the operating conditions were fundamentally different from anything the COVID playbook had anticipated. The disruption was not binary, open or closed, but graduated and unpredictable. A school might operate normally on Monday, shift to hybrid delivery on Tuesday after a security advisory, return to full attendance on Wednesday, and then close entirely on Thursday following an escalation that nobody had forecast twelve hours earlier. The rolling, partial, ambiguous nature of the threat has created a planning environment that Masten (2014) would recognise from her work on resilience in the face of chronic adversity: the challenge is not a single shock to absorb but a sustained state of uncertainty that erodes the institutional systems designed to cope with it.

This distinction, between acute disruption and chronic instability, is not merely semantic. It reshapes every aspect of how hybrid learning must be designed. During COVID, schools could plan a transition. They could train staff on Zoom, distribute devices, establish timetables, and communicate with parents over a defined period. The transition was chaotic, certainly, but it was a transition, a movement from one state to another. Conflict-driven disruption, by contrast, demands what military planners call *standing readiness*: the capacity to shift between operational modes at any moment, without the luxury of a preparation window. Reimers and Schleicher (2020), writing the OECD's framework for pandemic educational response, assumed a sequential model: assess,

plan, implement, review. In a context of rolling insecurity, those phases collapse into one another. You are assessing and implementing simultaneously, often with incomplete information, while the ground shifts beneath you.

The human dimensions are different too, in ways that the pandemic literature does not adequately capture. COVID was frightening, but it was impersonal, a pathogen that did not discriminate by nationality, politics, or geography, at least not in its initial phase. Regional conflict is none of those things. It is deeply personal. Families are afraid not of an invisible microorganism but of events they can see on their screens, sometimes events they can hear from their windows. Children arrive at school, on the days school is open, carrying anxieties that are specific, vivid, and resistant to the normal pastoral toolkit. Masten and Narayan (2012), reviewing decades of research on child development in contexts of war and terrorism, document a pattern of cumulative stress responses that are qualitatively distinct from the generalised anxiety of a health crisis. Children in conflict-adjacent environments exhibit heightened vigilance, disrupted sleep, difficulty concentrating, and a preoccupation with safety that makes the cognitive demands of schooling feel secondary or even irrelevant. The Inter-Agency Network for Education in Emergencies (INEE, 2010) is unequivocal on this point: in crisis contexts, the first function of education is protection (physical, psychological, and social) and the second is learning. Schools that reverse this order, prioritising curriculum coverage over emotional safety, risk compounding the harm.

This has immediate implications for hybrid learning design. A model built around content delivery, the Zoom lesson, the recorded lecture, the worksheet uploaded to Google Classroom, fails not only pedagogically but pastorally. A child sitting alone in a bedroom, watching a teacher talk about quadratic equations while a news ticker scrolls on the television in the next room, is not learning. They are enduring. And a teacher delivering that lesson, knowing that half of the class is in this condition, faces a burden that no learning management system was designed to address. Immordino-Yang and Damasio (2007) demonstrated, through neuroimaging studies, that emotional engagement is not a peripheral feature of learning but a prerequisite for it, that the neural systems governing emotion and cognition are not separate but deeply intertwined. In a context where emotional regulation is compromised by external threat, the conditions for cognitive processing are fundamentally degraded. No amount of adaptive content or AI-powered personalisation can override a nervous system in a state of heightened alert.

The staffing dimension adds another layer of complexity. During COVID, teachers were generally at home, safe, and available. Exhausted, certainly, but physically present and operationally deployable. In a regional security situation, the workforce itself may be disrupted. Some teachers will have left the country for their own safety or that of their families. Others will be present but psychologically compromised: distracted, anxious, grieving. Darling-Hammond and Hyler (2020) documented the strain on teacher wellbeing during the pandemic and argued that any model of crisis-era education must treat teacher resilience as a design variable, not an afterthought. In conflict-adjacent contexts, this argument intensifies. A school that asks its teachers to project calm, maintain routines, and deliver high-quality instruction through a screen while their own world feels unstable is asking for a performance of professionalism that few training programmes have ever prepared anyone to deliver.

Then there is the parent dimension. During COVID, parents were, broadly speaking, on the same side as schools: frustrated, perhaps, and overwhelmed, but united by a shared understanding that the situation demanded compromise. The social contract between home and school, while strained, remained intact. In a conflict situation, that contract can fracture along different lines. Some parents may want their children in school for normalcy and safety. Others may want them at home, close, visible. Some may have left the country and placed their children with relatives who have no relationship with the school. Trust, which Sahlberg and Walker (2021) identify as the foundational

condition for effective schooling in the Finnish model, becomes fragile precisely when it is most needed. A hybrid learning model that fails to account for this, that assumes parents will simply log their children in at the appointed hour, is building on sand.

The regulatory environment compounds the difficulty. Education authorities in the Gulf, KHDA in Dubai, ADEK in Abu Dhabi, faced an unenviable challenge during both COVID and subsequent regional disruptions: how to define what constitutes adequate educational provision when the normal conditions of provision have evaporated. During the pandemic, KHDA moved rapidly to establish distance learning expectations, and many schools in the UAE were rightly credited with a more organised response than their counterparts in other parts of the world. But the frameworks developed for COVID assumed a sustained period of remote delivery, weeks or months of online learning, with inspection criteria adjusted accordingly. A conflict-driven disruption that oscillates between modes does not map neatly onto those frameworks. Harris and Jones (2020), writing on school leadership in disruptive times, argue that effective crisis leadership requires *adaptive capacity*, the ability to make sound decisions with incomplete information, to hold multiple contingencies simultaneously, and to communicate clearly even when the situation is unclear. That capacity cannot be improvised. It must be developed before the crisis arrives.

Bronfenbrenner (1979) understood, long before anyone was thinking about hybrid learning, that a child's development is shaped by concentric systems, the immediate family, the school, the community, the wider society, and that disruption at any level ripples inward. A regional security crisis disrupts all of these systems simultaneously. The child's home may feel unsafe. The school may be intermittently closed. The community may be fragmenting as families leave. The wider society is consumed by events that are beyond anyone's control. In this context, the design challenge for hybrid learning is not primarily technological. It is ecological. The question is not "how do we get content to students who are not in the building?" but "how do we maintain the web of relationships, routines, and emotional anchors that make learning possible, even when the physical infrastructure that normally holds those things together has been disrupted?"

That question has no simple answer. But it does have a more sophisticated answer than the one we gave in 2020. And it begins with the recognition that hybrid learning, if it is to work in a conflict-adjacent context, must be designed from the inside out, starting with the emotional architecture, building upward through the relational infrastructure, and only then layering on the technology.

The Co-Teacher Who Never Existed Before

In 1984, Benjamin Bloom published a paper that has haunted education ever since. The finding was elegant and devastating: students who received one-to-one tutoring outperformed students in conventional classrooms by two standard deviations, a gap so large that the average tutored student performed better than 98% of their traditionally taught peers. Bloom called it the 2 Sigma Problem, and he framed it as a challenge: could we find a method of group instruction that produced results comparable to individual tutoring? The paper generated decades of research, hundreds of attempted solutions, and no definitive answer. The mathematics of the problem were unyielding. One-to-one tutoring was effective precisely because it was one-to-one: responsive, adaptive, attuned to the individual learner's pace, misconceptions, and emotional state. Scaling that to a classroom of thirty was, Bloom acknowledged, functionally impossible with existing resources (Bloom, 1984).

For forty years, the 2 Sigma Problem sat in the literature like an unsolved equation. And then, in the space of roughly eighteen months, generative AI arrived in schools and made the question live again.

It is important to be precise about what AI can and cannot do in a hybrid learning context, because the discourse oscillates between utopian fantasy and reflexive dismissal, and neither serves school leaders trying to make operational decisions under pressure. The utopian version, AI as the perfect tutor, infinitely patient, endlessly adaptive, available to every student at any hour, is seductive but incomplete. The dismissive version, AI as a plagiarism machine that undermines academic integrity, is, as many education systems outside the United States have already demonstrated, a failure of imagination dressed up as a concern about standards (Kasneci et al., 2023). The reality is more interesting and more difficult than either camp allows.

Consider the specific problem that defeated teachers during COVID: the dual-delivery impossibility. A teacher standing in a classroom with fifteen students present and fifteen students at home on a video call cannot meaningfully teach both groups simultaneously. The in-room students get a diminished version of face-to-face teaching, constantly interrupted by the teacher's attempts to monitor the chat. The online students get a diminished version of remote teaching, watching a lesson designed for a physical room through a fixed camera pointed at a whiteboard. Neither group receives anything approaching the adaptive, responsive interaction that Bloom identified as the mechanism behind tutoring's extraordinary effect. The teacher is not teaching two groups. The teacher is failing two groups in parallel.

AI does not solve this problem by replacing the teacher. It solves it by making the teacher's absence from one group less catastrophic. When the teacher turns their full attention to the in-room cohort for a twenty-minute discussion, the online cohort is not abandoned to a worksheet or a recording. Instead, they are engaged with an adaptive platform that generates tasks calibrated to their individual level, provides immediate feedback on their responses, adjusts difficulty in real time based on their performance, and flags to the teacher (for later review) which students are struggling with specific concepts. The AI is not tutoring in the full, rich, relational sense that Bloom described. But it is performing the adaptive, responsive, personalised functions that a worksheet cannot, and it is doing so at a scale that no human teaching assistant could match.

Mollick and Mollick (2023), in their analysis of AI-implemented teaching strategies, describe this as the difference between AI as *content delivery* and AI as *pedagogical infrastructure*. Content delivery is what most ed-tech has offered for two decades: a more efficient way to transmit information. Pedagogical infrastructure is something qualitatively different, a system that supports the conditions under which learning occurs, handling the adaptive, diagnostic, and generative functions that would otherwise require a human being's undivided attention. In a hybrid model, this distinction is transformative. The teacher is not choosing between the in-room group and the online group. The teacher is orchestrating a system in which both groups are learning through different but complementary pathways, converging periodically for the synchronous interactions that only a human can lead.

The practical manifestation of this looks something like the microlearning ecosystem model that has gained traction in Finland, Singapore, and parts of Latin America over recent years. Rather than a single, monolithic lesson delivered identically to all students, the school day is structured as a sequence of short, targeted learning activities, micro-tasks of between ninety seconds and five minutes, generated or curated by AI and validated by the teacher before deployment. These tasks are adaptive: a student who demonstrates mastery moves to a more challenging variant, while a student who struggles receives scaffolded support without waiting for the teacher to notice their confusion in a room of thirty. The teacher's role shifts from content delivery to orchestration: scanning real-time analytics, identifying patterns, deciding when to intervene personally and when to let the system work, and crucially, providing the contextual, cultural, and emotional intelligence that no algorithm possesses (Luckin et al., 2016).

This is not speculative. Holmes, Bialik and Fadel (2019), in *Artificial Intelligence in Education*, document implementations across multiple countries where AI-driven adaptive platforms have demonstrably improved learning outcomes, particularly for students who were previously underserved by one-size-fits-all instruction. Zawacki-Richter et al. (2019), in a systematic review of AI applications in higher education, found consistent evidence that intelligent tutoring systems improve performance in well-defined domains like mathematics and language learning, though with important caveats about the quality of implementation and the role of the teacher in mediating the technology. The evidence is not that AI works magic. It is that AI, when embedded within a thoughtfully designed pedagogical system with strong teacher oversight, can perform specific adaptive functions that would otherwise be impossible at scale.

For hybrid learning in a crisis context, this changes the operational calculus significantly. The teacher preparing for a day in which half the class may be at home no longer faces the impossible choice of 2020, teach to the room and abandon the screen, or teach to the screen and lose the room. Instead, the teacher designs a day in which asynchronous, AI-supported learning provides a robust foundation for both cohorts, and synchronous time (shorter, more intentional, more dialogic) is allocated to the interactions that demand human presence. The AI handles the what: the content, the practice, the adaptive sequencing. The teacher handles the why and the how: the meaning-making, the motivation, the moral and emotional dimensions that algorithms cannot touch.

But here is where the argument must complicate itself, because AI in a crisis context carries a specific risk that the literature on AI in education has only begun to address.

Bjork and Bjork (2011) introduced the concept of *desirable difficulty*, the principle that learning is most durable when the process of acquiring it involves effort, retrieval, and a degree of productive struggle. The brain encodes information more deeply when it has to work for it. This is why testing improves retention more than re-reading, why spaced practice outperforms massed practice, and why the effortful process of solving a problem from first principles produces more robust understanding than watching someone else solve it fluently. The principle is among the most replicated findings in cognitive science, and it has a direct and uncomfortable implication for AI-assisted learning: the more seamlessly AI removes friction from the learning process, the greater the risk that it removes the friction that makes learning stick.

Sparrow, Liu and Wegner (2011) demonstrated this with information retrieval: when people know they can look something up later, they invest less cognitive effort in encoding it now. Fisher, Goddu and Keil (2015) extended the finding to comprehension: access to internet search creates an inflated sense of one's own understanding, a phenomenon they termed the *illusion of explanatory depth*. Ward et al. (2017) showed that even the passive presence of a smartphone (turned off, screen down) measurably reduces available cognitive capacity, because the brain is allocating resources to the awareness that information is accessible. Each of these findings describes a version of the same underlying mechanism: when the environment signals that cognitive effort is unnecessary, the brain obliges by providing less of it.

AI tutors represent the most powerful version of this signal yet devised. They do not merely store information for later retrieval. They actively anticipate the learner's needs, pre-empt their errors, smooth the path to the correct answer, and present understanding in a form so polished and accessible that the student may never experience the productive confusion that genuine learning requires. Kahneman (2011) distinguished between System 1 thinking (fast, intuitive, effortless) and System 2 thinking (slow, deliberate, cognitively demanding). AI is exquisitely designed to optimise System 1. It makes information retrieval instant, problem-solving frictionless, and comprehension feel effortless. But System 2, the mode in which deep understanding, critical analysis, and original thought occur, requires exactly the kind of friction that AI is engineered to eliminate.

In a crisis context, this risk is amplified. Students who are anxious, distracted, and emotionally dysregulated are already operating with reduced cognitive capacity. Their System 2 resources are depleted by the background demands of monitoring threat, managing fear, and processing uncertainty (Immordino-Yang and Damasio, 2007). The temptation for students, for teachers, for entire school systems under pressure to demonstrate that learning is continuing, is to lean harder on AI, to let the algorithm carry more of the cognitive load, to accept polished outputs as evidence of understanding. The student submits a well-structured response. The teacher, stretched across two cohorts in an unstable environment, accepts it. The platform logs it as mastery. And the learning that was supposed to happen, the effortful, messy, human process of wrestling with an idea until it becomes yours, never actually occurs.

This is not an argument against using AI in hybrid learning. The alternative, the 2020 model of teachers trying to be in two places at once with no adaptive support, is demonstrably worse. It is an argument for a specific kind of disciplined design: one that uses AI to handle the mechanical, adaptive, diagnostic functions that free the teacher to focus on the irreducibly human work of building understanding, while simultaneously ensuring that AI does not become a bypass around the cognitive effort that understanding requires. Seldon and Abidoye (2018) frame the question sharply: will AI liberate humanity or infantilise it? In a hybrid classroom during a regional crisis, the answer may depend entirely on whether the teacher retains the authority and the awareness to use AI as a scaffold for thinking rather than a substitute for it.

The distinction sounds clean in theory. In practice, at 8:47 on a Tuesday morning, with twelve students in the room, fourteen on the screen, a parent emailing about a security concern, and an AI platform generating adaptive tasks in real time, it is anything but. Which is why the design of the emotional and relational architecture matters at least as much as the design of the technological infrastructure.

The Thing on the Other Side of the Screen

There is a story that circulated among school leaders in the Gulf during the early weeks of COVID that has stayed with me since. A Year 3 teacher, conducting a morning registration via Google Meet, noticed that one of her students, a boy who was normally boisterous, reliably disruptive in the best possible way, had joined the call but turned his camera off. She asked him to switch it on. He said his internet was slow. She let it go. The next day, same thing. Camera off, internet slow. On the third day, she called his mother, who broke down in tears. The family had moved into a single room in a relative's apartment. The father had lost his job. The boy was ashamed of what the camera would show.

The teacher did something that no platform could have prompted and no algorithm could have generated. She told the boy, privately, that lots of people in the class preferred cameras off, and that she had a special job for him: he would be the class voice reporter, giving a spoken summary at the end of each session. Camera not required. For the remaining weeks of remote learning, the boy was the most engaged student in her class. He never turned his camera on. He never needed to.

This story is not an edge case. It is the centre of the argument. Everything else, the pedagogical frameworks, the AI infrastructure, the station rotations and micro-credentials, is scaffolding. The load-bearing wall of effective education, in any medium, is the relationship between the teacher and the child. And the central failure of pandemic-era hybrid learning was not technological or even pedagogical. It was relational. We broke the connection and then wondered why the learning stopped.

Hattie's (2023) updated meta-synthesis, now encompassing over 2,100 meta-analyses, continues to identify teacher-student relationships as one of the highest-impact influences on learning outcomes, with an effect size that places it above class size, above homework, above almost every structural variable that education policy tends to obsess over. The mechanism is not mysterious. A child who trusts their teacher takes intellectual risks. A child who feels known, whose teacher notices when they are confused, or upset, or pretending to understand, engages more deeply with difficult material. A child who believes that their teacher sees them as a person rather than a data point will persist through the productive struggle that Bjork and Bjork (2011) identified as the engine of durable learning. Remove that relationship, and you remove the condition under which everything else works.

Durlak et al. (2011), in a meta-analysis of 213 school-based social and emotional learning programmes involving over 270,000 students, found that effective SEL interventions improved academic performance by an average of eleven percentile points, a finding remarkable not only for its size but for its implication. The interventions did not teach more content. They did not extend instructional time. They created the emotional conditions under which existing instruction became more effective. The students did not learn more because they were taught more. They learned more because they felt safer, more connected, and more capable of managing the emotional demands of intellectual work.

During COVID, those conditions collapsed. Loades et al. (2020), in a rapid systematic review of the impact of social isolation on children's mental health, found significant increases in anxiety, depression, and loneliness among children and adolescents during school closures, effects that were more pronounced among children with pre-existing vulnerabilities but that were present across the population. Colao et al. (2020), writing in *The Lancet*, argued that the closure of schools removed not only the academic function of education but its protective function, the daily contact with trusted adults, the routine that anchors a child's sense of normality, and the informal surveillance through which teachers notice the early signs of neglect, abuse, or psychological distress. Schools are not merely places where learning happens. They are, for many children, the most stable institution in their lives. When that institution goes virtual, the stability goes with it.

The implications for hybrid learning design in a conflict-adjacent context are profound and specific. A child logging in from home during a period of regional insecurity is not simply a student accessing content remotely. They are a young person whose world feels uncertain, whose family may be frightened, and whose capacity for the kind of sustained cognitive engagement that learning requires is compromised by circumstances entirely beyond their control. Immordino-Yang and Damasio (2007) were categorical on this point: the neural processes governing emotion and cognition are not separate systems that can be independently managed. They are deeply entangled. A student in a state of emotional dysregulation is not choosing to disengage from learning. Their nervous system is redirecting resources away from higher-order cognition and toward threat monitoring. No amount of adaptive content will override that redirection. Only the felt presence of a trusted human being can begin to restore the conditions for learning, and that felt presence is precisely what hybrid learning, by its nature, makes difficult.

Turkle (2015), in *Reclaiming Conversation*, documented the impoverishment of empathy in digitally mediated communication. Her research showed that screen-based interaction strips away the micro-cues (the slight furrow, the barely perceptible hesitation, the quality of eye contact) through which human beings communicate emotional states. Teachers in a physical classroom read these cues constantly, mostly without conscious awareness. A teacher who notices that a normally talkative student has gone quiet, or that a normally calm student is fidgeting, is drawing on a form of perceptual intelligence that has no technological equivalent. In a hybrid model, this intelligence is halved. The teacher can read the room, or the teacher can read the screen. They cannot fully do

both. And the screen, with its fixed angles, poor resolution, and tendency to flatten affect, is a radically impoverished medium for the kind of emotional attunement that pastoral care requires.

So what does a pastorally grounded hybrid model look like in practice? The schools that performed best during COVID, and the evidence on this is consistent across contexts, were not the ones with the best technology. They were the ones that prioritised the relationship and built everything else around it. Borup et al. (2020), studying academic communities of engagement in blended and online settings, found that the single most important predictor of student success was the presence of consistent, personalised, non-academic contact, the check-in that says *how are you*, not *have you submitted your homework*. The frequency of contact mattered more than the sophistication of the platform. The warmth of the interaction mattered more than the precision of the feedback algorithm.

In practice, this means that the synchronous component of a hybrid learning model, the time when teacher and students are together in real time, whether physically or through a screen, should not be used primarily for instruction. It should be used primarily for connection. A twenty-minute synchronous session that begins with a two-minute wellbeing check-in, moves into a ten-minute teacher-led discussion of a concept that students have already encountered asynchronously, and ends with a five-minute collaborative task designed to make every student visible, contributing, responding, being acknowledged by name, will produce better learning outcomes over time than a forty-five-minute Zoom lecture in which the teacher talks and the students attend in body but not in spirit. The content can be delivered asynchronously, through recordings, readings, and AI-curated tasks. The connection cannot. It requires real time, real attention, and the irreducible human capacity to notice when something is wrong and respond with care rather than data.

This has implications for teacher training that most systems have not yet confronted. Darling-Hammond and Hylar (2020) argue persuasively that pandemic-era professional development focused overwhelmingly on the technical (how to use Zoom, how to set up Google Classroom, how to manage breakout rooms) and almost entirely neglected the relational. Teachers were trained to operate platforms. They were not trained to project warmth through a camera, to read a grid of faces for signs of disengagement or distress, to facilitate a discussion in which some participants are in the room and others are in their bedrooms, or to manage their own emotional state while delivering a lesson under conditions of personal uncertainty. Trust and Whalen (2020) make the same point: emergency remote teaching exposed a gap in teacher preparation that predated the pandemic but that the pandemic made impossible to ignore. If hybrid learning is to become a standing capability rather than a crisis response, teacher education must treat the relational and emotional dimensions of screen-mediated teaching as core competencies, not optional extras.

There is one more dimension to the emotional architecture that deserves attention, and it concerns the teachers themselves. Kim and Asbury (2020) documented the psychological toll of COVID-era teaching with granular, painful specificity: teachers describing feelings of inadequacy, guilt, isolation, and a persistent sense that they were failing their students despite working harder than they ever had before. In a conflict-adjacent context, those feelings are compounded by the teacher's own exposure to the same stressors affecting their students. A teacher who is personally anxious about regional security, who has colleagues who have left the country, who is processing the same news cycle as their students, is being asked to perform a dual role: be the steady presence that children need, while managing their own unsteadiness in private. Hargreaves and Fullan (2012), writing about professional capital in teaching, argue that sustainable educational excellence depends on the emotional resources available to teachers, not just their knowledge or their skills, but their capacity to remain present, empathic, and resilient under pressure. Any hybrid learning model that treats teacher wellbeing as peripheral to the design, as a human resources concern rather than a pedagogical one, has misunderstood the system it is trying to build.

Brackett (2019), whose RULER framework for emotional intelligence has been implemented in schools across multiple countries, insists that emotional skills are not innate traits but learnable competencies, and that they must be practised, not merely understood. A school preparing for hybrid delivery in an unstable context needs to invest not only in platform training and content curation but in structured emotional preparation for staff: how to regulate your own state before going on camera, how to create rituals of connection that work across physical and virtual spaces, how to recognise the signs of secondary traumatic stress in yourself and your colleagues, and how to ask for help in a professional culture that often equates asking for help with admitting weakness.

The emotional architecture is not a layer added on top of the pedagogical model. It is the foundation on which the model stands. Get it wrong, and the most sophisticated AI-curated, station-rotated, Community-of-Inquiry-aligned hybrid system in the world will produce nothing but polished data and hollow learning. Get it right, and even an imperfect technological setup can sustain genuine education through a crisis, because the child on the other side of the screen knows that someone is there, that someone sees them, and that the connection is real even when the medium is not.

What Monday Morning Should Look Like

There is a particular kind of document that circulates in schools during a crisis. It is usually two pages long, produced under pressure, and titled something like *Contingency Plan for Remote Learning*. It lists platform names, login procedures, timetable adjustments, and communication protocols. It tells teachers which lessons to deliver synchronously and which to set as independent work. It tells parents where to find resources and whom to email if something goes wrong. It is, in its way, a perfectly competent administrative document. And it is almost entirely useless as a pedagogical one.

The problem is not that contingency plans are unnecessary, they are essential. The problem is that they describe logistics when what is needed is architecture. They tell you *how the school will operate* but not *how learning will happen*. They assume that the fundamental design of the school day remains unchanged and that the contingency is merely a matter of routing that design through a different delivery channel. This assumption, as five sections of this article have argued, is precisely what failed in 2020 and will fail again unless it is replaced with something deliberately, structurally different.

What follows is a framework, not a contingency plan, for hybrid learning in a context of rolling disruption. It is built on the evidence base explored above, draws on Garrison, Anderson and Archer's (2000) Community of Inquiry model, Laurillard's (2012) learning type taxonomy, and the operational insights of Bower et al. (2015) and Horn and Staker (2015), and it is designed for the specific conditions that schools in conflict-adjacent and disruption-prone environments face: unpredictable oscillation between modes, emotionally compromised students and staff, partial attendance, and the availability of AI as an adaptive infrastructure that did not exist during the pandemic.

The framework operates across five interdependent tiers. They are not sequential steps, they function simultaneously, each reinforcing the others. Remove any one, and the system degrades. The tiers are: asynchronous foundation, synchronous connection, AI-powered differentiation, teacher curation and validation, and pastoral infrastructure.

Tier 1: The Asynchronous Foundation

The single most important design decision in a hybrid learning model is what *not* to do synchronously. Every minute of live teacher time spent delivering content that could have been delivered asynchronously is a minute stolen from the interactions that only live teacher time can support. This is the flipped classroom principle (Bergmann and Sams, 2012), but in a hybrid context it is not a pedagogical preference. It is a structural necessity.

The asynchronous foundation consists of the content layer, the explanations, demonstrations, worked examples, readings, and introductory activities through which students first encounter new material. In a well-designed hybrid system, this layer is identical for all students regardless of whether they are physically in school or learning from home. It is delivered through short, focused recordings, no longer than eight to ten minutes per segment, consistent with Mayer's (2020) principles of multimedia learning, supplemented by curated readings, interactive tasks, and AI-generated micro-activities calibrated to the learning objectives for that day.

The asynchronous layer serves two critical functions. First, it equalises the starting point. Every student, wherever they are, has access to the same foundational content before the synchronous session begins. The in-room student who was distracted by a corridor conversation and the online student whose internet dropped out for three minutes during a live explanation are both disadvantaged by a synchronous-first model. An asynchronous-first model eliminates that vulnerability. Second, it liberates synchronous time. If the teacher does not need to spend twenty minutes explaining a concept that a recording could explain more efficiently, with the added benefit that the student can pause, rewind, and revisit, then that twenty minutes becomes available for discussion, questioning, collaborative work, and the pastoral interactions that the evidence identifies as the highest-leverage use of teacher time.

The asynchronous layer is not homework. It is the first phase of the learning sequence, designed to be completed during the school day, or, for students at home, during designated learning hours, and its completion is the prerequisite for meaningful participation in the synchronous session that follows.

Tier 2: Synchronous Connection

The synchronous session is the heartbeat of the hybrid model, and its design must reflect what it is for. It is not for content delivery. It is for connection, consolidation, and the kind of responsive, dialogic interaction that no recording or algorithm can replicate.

In practice, this means shorter, more focused live sessions than the traditional lesson. A forty-five-minute Zoom call is not a synchronous session. It is a lecture with cameras. The evidence from Garrison and Vaughan (2008) on the Community of Inquiry model and from Raes et al. (2020) on synchronous hybrid learning both point to the same conclusion: effective synchronous sessions in blended environments are characterised by high levels of interaction, structured opportunities for every participant to contribute, and a clear relationship between what students have done asynchronously and what is being explored together in real time.

A twenty- to twenty-five-minute synchronous session, structured around three phases, accomplishes more than a forty-five-minute broadcast. The first phase, two to three minutes, is a wellbeing check-in: a brief, ritualised moment of human contact that establishes social presence and gives the teacher a rapid read on who is struggling. The second phase, twelve to fifteen minutes, is a teacher-led discussion, debate, or collaborative task directly linked to the asynchronous material. This is the cognitive core: the space where the teacher probes understanding, surfaces misconceptions, facilitates peer interaction, and models the kind of thinking that Vygotsky (1978) described as

occurring in the zone of proximal development, the space between what a learner can do alone and what they can do with the support of a more knowledgeable other. The third phase, three to five minutes, is a rapid formative check: a question, a poll, a short task that gives both the teacher and the student a clear signal of where understanding stands. This check feeds directly into Tier 3.

Critically, the synchronous session does not attempt to serve both cohorts simultaneously. Following the station rotation logic of Horn and Staker (2015), the teacher conducts one synchronous session with the in-room group and a separate, parallel or staggered session with the online group. While one group is in the synchronous session, the other is engaged in AI-supported independent or collaborative work. The teacher is never split. Each group receives the teacher's full attention for a focused, intensive period, rather than the teacher's fragmented attention for an extended one.

Tier 3: AI-Powered Differentiation

This is the tier that was structurally impossible in 2020 and that transforms the operational viability of the model. During the periods when the teacher is focused on one cohort, the other cohort is not left idle, unsupervised, or working through a generic worksheet. They are engaged with an adaptive AI platform that performs three functions simultaneously.

First, the platform provides personalised practice. Drawing on the student's performance data, from the asynchronous tasks, from previous sessions, from the formative checks, the AI generates tasks at an appropriate level of challenge. The concept of desirable difficulty (Bjork and Bjork, 2011) is operationalised here: the system does not make things easy. It makes things appropriately hard, calibrated to the individual student's current understanding. A student who has mastered the foundational concept receives extension tasks. A student who is still consolidating receives scaffolded support. The teacher does not need to create thirty differentiated worksheets. The AI generates them, and the teacher validates them.

Second, the platform provides real-time formative data. When the teacher finishes the synchronous session with the in-room group and turns attention to the online group, they do not begin from a position of ignorance. They can see, at a glance, which students completed the adaptive tasks, where the common misconceptions are, and who needs immediate intervention. This data does not replace teacher judgement, it informs it. The teacher still decides what to do with the information. But the information is there, in a form that would have required hours of manual marking to produce in the pre-AI model.

Third, in multilingual contexts, and the Gulf, with its extraordinarily diverse student populations, is among the most multilingual educational environments on earth, the AI can generate tasks in multiple languages, provide glossaries and sentence frames for English as an Additional Language learners, and localise content to the cultural context of the classroom. Zawacki-Richter et al. (2019) noted that AI's capacity for real-time language adaptation is among its most promising applications in education, and in a hybrid model serving students from dozens of linguistic backgrounds, this capacity is not a luxury. It is a condition of equity.

The risk, identified earlier, that AI becomes a cognitive bypass rather than a cognitive scaffold, is managed through Tier 4.

Tier 4: Teacher as Curator and Validator

No AI-generated task enters a student's learning pathway without teacher approval. This is a design principle, not a workflow preference. It is the mechanism through which the school ensures that content is culturally appropriate, pedagogically sound, aligned with the curriculum, and calibrated to an appropriate level of productive difficulty.

In practice, this means that the AI generates a menu of possible tasks, and the teacher, drawing on their knowledge of the students, the community, and the learning objectives, selects, modifies, or rejects them. Schön (1983) described this kind of professional judgement as *reflection-in-action*: the capacity to make rapid, contextually informed decisions based on a synthesis of theoretical knowledge and practical wisdom. It is the essence of expert teaching, and in a hybrid model it becomes the teacher's primary function. The teacher is not delivering content. The teacher is designing the learning experience in real time, using AI as a generative assistant and their own professional expertise as the quality filter.

This tier also addresses the intellectual integrity concern that dominates the American discourse around AI in education but that, as Kasneci et al. (2023) have argued, is better addressed through assessment design than through prohibition. If students are generating work with AI assistance, the teacher's role is not to police whether the work is "really theirs" but to design tasks in which AI assistance is a starting point rather than an endpoint, tasks that require personal reflection, oral explanation, local cultural knowledge, or collaborative construction that no algorithm can fabricate. The teacher who asks a student to use AI to generate a first draft and then explain, in a live conversation, why they agree or disagree with the AI's reasoning is not fighting against technology. They are teaching with it, in a way that develops exactly the critical thinking skills that unmediated AI use might erode.

Tier 5: Pastoral Infrastructure

This tier is listed last not because it is least important but because it is the foundation beneath the other four. Without it, nothing else holds.

The pastoral infrastructure consists of three elements. The first is the daily wellbeing micro-check-in, a structured, ritualised moment at the beginning of every synchronous session in which the teacher takes the emotional temperature of the group. This is not a casual "how is everyone?" It is a deliberate practice, brief but consistent, that communicates to every student that their emotional state matters and is noticed. Borup et al. (2020) found that consistent, personalised, non-academic contact was the single strongest predictor of student success in online and blended learning environments. The check-in is that contact, formalised and protected.

The second element is a structured re-entry protocol for students transitioning between modes. A student who has been learning from home for three days and returns to campus on Thursday is not simply resuming normal school. They are re-entering a social environment from which they have been absent, navigating the disorientation of shifting between the private, screen-mediated experience of home learning and the public, embodied experience of the classroom. Wenger (1998), writing about communities of practice, emphasised that belonging is not a passive state but an active process of participation that must be continuously renewed. A school that does not deliberately support re-entry, through peer buddy systems, teacher check-ins, and explicit acknowledgement that the transition is hard, risks leaving returning students feeling like visitors in their own classroom.

The third element is staff emotional resilience. Brackett (2019) is unequivocal: you cannot teach emotional regulation if you are not practising it yourself. Schools operating in disruption-prone

contexts need structured support for teachers, not as a welfare perk but as an operational necessity. Hargreaves and Fullan (2012) call this *professional capital*, and they argue that it is the most underfunded, undervalued resource in education. A ten-minute guided reflection at the start of a staff briefing. A weekly peer support circle in which teachers can name what they are finding difficult without professional consequence. A clear, destigmatised protocol for requesting reduced duties during periods of acute personal stress. These are not soft additions to a hybrid learning model. They are load-bearing elements. A teacher who is emotionally depleted cannot perform the relational work that Tiers 2 and 5 depend on. A system that depletes its teachers in pursuit of continuity is consuming its own foundations.

The five tiers are not a prescription for a specific timetable or a specific technology stack. They are a set of design principles that can be instantiated differently in different contexts. A primary school will implement them differently from a secondary school. A school with world-class broadband will implement them differently from one with intermittent connectivity. A school serving a predominantly Arabic-speaking community will make different content decisions from one serving a multilingual international population. The principles remain constant: asynchronous before synchronous, connection before content, AI as scaffold not substitute, teacher as curator not deliverer, pastoral as foundation not afterthought.

Fullan and Quinn (2016) argue that the greatest barrier to educational improvement is not the absence of good ideas but the absence of *coherence*, the alignment of strategy, practice, resources, and culture around a shared understanding of what matters. The five-tier model is an attempt at coherence: a framework in which the technological infrastructure, the pedagogical design, the emotional architecture, and the professional development strategy all point in the same direction. Whether any given school achieves that coherence will depend, as it always does, on the quality of its leadership, the investment it makes in its teachers, and the depth of its commitment to the proposition that education, even in a crisis, is fundamentally about the relationship between a human being who teaches and a human being who learns.

The Students We Don't See

In the summer of 2020, a photograph went viral in the United States. Two young girls, sisters, were sitting on the concrete kerb outside a Taco Bell restaurant, hunched over school-issued laptops, using the restaurant's free Wi-Fi to attend their online classes. The image was shared as an indictment of the digital divide, and it was, but it was also something more subtle and more damaging. It was evidence that the architecture of remote and hybrid learning, however thoughtfully designed at the institutional level, rests on a set of assumptions about the home environment that are simply untrue for a significant proportion of the student population.

Toyama (2015), in *Geek Heresy*, articulated the principle with uncomfortable clarity: technology amplifies existing social dynamics. It does not neutralise them. If the underlying conditions are equitable, technology can accelerate progress for everyone. If they are not, technology accelerates advantage for those who already have it, while leaving those without further behind. He called this the *amplification principle*, and it applies to hybrid learning with devastating precision. A well-designed five-tier model, built on asynchronous foundations and AI-powered differentiation, will produce excellent outcomes for students who have reliable broadband, a quiet space to work, a functioning device, and an adult in the household who can provide basic logistical support. For students who lack any one of these conditions, the same model becomes a source of exclusion dressed in the language of innovation.

The data from the pandemic era is unambiguous on this point. Engzell, Frey and Verhagen (2021) found that learning loss in the Netherlands, a country with among the highest broadband penetration rates in the world, was up to 55% greater for students from less-educated households. Andrew et al. (2020), studying the English context, found that the gap in daily learning time between the highest- and lowest-income households was substantial and cumulative. Bacher-Hicks, Goodman and Mulhern (2021), using Google search data as a proxy for household engagement with online schooling, found that lower-income zip codes showed dramatically less engagement, even when schools provided identical platforms and resources. The technology was the same. The outcomes were not. Because the technology was never the variable that mattered most. The variable that mattered most was the ecosystem surrounding the child.

In the Gulf context, the equity landscape has its own particular contours. The UAE and broader Middle East host some of the most economically stratified school systems in the world, with international schools serving expatriate communities at fee levels ranging from modest to extraordinary, alongside government schools serving national populations with very different resource profiles. Within a single city, one school may issue every student a MacBook Air while another relies on shared tablets and a computer lab. A hybrid learning model that assumes universal device access, stable home broadband, and a dedicated workspace is designing for the first school and ignoring the second. Arora (2019), writing about digital life beyond the West, warns that the assumptions embedded in educational technology, about connectivity, about interface literacy, about the domestic environment, are overwhelmingly shaped by the lived experience of designers in affluent, digitally saturated societies and are often profoundly mismatched to the conditions in which the majority of the world's learners actually live.

The device question, while the most visible equity concern, is not the most important one. A school can lend a laptop. It cannot lend a home. Kuhfeld et al. (2020), modelling the potential impact of COVID-era school closures on academic achievement, identified the home learning environment as a more powerful predictor of outcomes than any technological variable. A student with a device and broadband but no quiet space, no parental support, and no established routine for independent study is not meaningfully more advantaged than a student without the device. The infrastructure that matters most is human, not digital, and it is the infrastructure that hybrid learning models are least equipped to provide.

Certain student populations face compounded disadvantage. Students with special educational needs and disabilities often depend on physical proximity to a teaching assistant, the sensory environment of a specialist classroom, or the tactile resources that screen-based learning cannot replicate. Jimerson, Burns and VanDerHeyden (2016), reviewing the evidence on multi-tiered support systems, emphasise that the most effective interventions for students with complex needs are characterised by high-frequency, face-to-face, relationally intensive interaction, precisely the conditions that hybrid learning disrupts. A student with autism who relies on a predictable physical routine, a student with dyslexia who needs a specialist to sit beside them and model reading strategies, a student with attention difficulties who requires the structured environment of a classroom to maintain focus, these children do not experience hybrid learning as a flexible alternative. They experience it as the removal of the conditions under which they can learn at all.

English as an Additional Language learners face a related but distinct challenge. Language acquisition, particularly in the early and intermediate stages, is profoundly dependent on immersion, on the ambient exposure to spoken language, the social interactions in which meaning is negotiated in real time, and the non-verbal cues that scaffold comprehension for learners who cannot yet rely on the words alone. Zheng et al. (2016), in a meta-analysis of one-to-one laptop programmes, found that technology-mediated learning produced smaller effect sizes for EAL students than for native speakers, suggesting that the screen is a less effective medium for learners whose language

proficiency depends on social immersion. A hybrid model that moves these students to screen-based learning for even part of the week may slow their linguistic development in ways that are invisible in the short term but consequential over months and years.

And then there are the youngest learners. The five-tier framework described earlier is designed for students who can read, type, navigate a device, manage asynchronous content independently, and participate in a synchronous discussion through a screen. A four-year-old in FS1 can do none of these things. Early childhood education is, by its nature, embodied, sensory, relational, and play-based. The idea that a child in the earliest stages of formal education can meaningfully engage in hybrid learning through a screen is, to put it plainly, developmental nonsense. Colao et al. (2020) and the broader literature on early childhood development are consistent: for children under six or seven, the screen is not a viable substitute for the classroom. The tactile experience of manipulating physical objects, the social experience of negotiating with peers, the regulatory experience of being guided through frustration by a physically present adult, these are not enhancements to early learning. They are the medium through which early learning occurs.

None of this means that hybrid learning should be abandoned because it cannot serve everyone equally. It means that any honest implementation must include an explicit *equity audit*, a systematic assessment of which students the model serves, which it underserves, and what compensatory measures are required to prevent the design from becoming a mechanism of exclusion. Warschauer and Tate (2018), writing about digital divides and social inclusion, argue that equity in educational technology is not achieved by providing equal access to tools but by providing differentiated access to the conditions that make those tools effective. In a hybrid model, this means device lending programmes for families without hardware. It means mobile data subsidies for households without stable broadband. It means designated spaces in the school building, open even during closures, if safety permits, where students who cannot learn effectively at home can come for supervised, supported study. It means prioritising face-to-face provision for the students who need it most: those with SEND, those in the early years, those who are newly arrived and still acquiring the language of instruction, and those whose home environments are unsafe, unstable, or simply not conducive to learning.

Sen (1999) argued that development should be measured not by the resources available to a population but by the capabilities those resources actually enable. A laptop is not a capability. A functioning hybrid learning experience that produces genuine understanding in a child who feels safe, supported, and known, that is a capability. And if the model we build produces that capability for some students while denying it to others, we have not solved the problem of crisis-era education. We have reproduced its inequities in a new format, with better branding and a more sophisticated user interface.

The Decisions That Matter Before the Crisis Hits

In the weeks following the outbreak of COVID-19, a senior official at a Gulf education authority described the challenge his team faced with a metaphor borrowed, somewhat improbably, from motor racing. "We were trying to change the tyres," he said, "while the car was doing two hundred kilometres an hour." The metaphor was apt, but it obscured a deeper truth: the reason the tyres needed changing at all was that nobody had fitted the right ones before the race started.

The most consequential decisions in crisis-era education are not the ones made during the crisis. They are the ones made, or not made, in the months and years beforehand. A school that has invested in a robust learning management system, trained its teachers in hybrid pedagogy,

established device lending protocols, negotiated AI platform agreements, and communicated a clear hybrid learning model to parents is a school that can pivot in forty-eight hours. A school that has done none of these things is a school that will spend the first two weeks of any disruption doing what it did in March 2020: improvising, apologising, and hoping the situation resolves before the damage becomes structural.

Reich (2020), in *Failure to Disrupt*, documents a pattern that should trouble anyone involved in education policy: the persistent gap between the transformative rhetoric surrounding educational technology and the modest, often disappointing reality of its implementation. The gap is not primarily caused by bad technology or bad intentions. It is caused by a failure of institutional preparation, the assumption that technology will work as promised without the systemic investment in training, infrastructure, and pedagogical redesign that makes it work in practice. The lesson applies with particular force to hybrid learning. The five-tier model described earlier is only as strong as the institutional architecture that supports it, and that architecture cannot be built during an emergency. It must exist before the emergency arrives.

The policy implications fall into five domains, each of which requires action at the level of the individual school, the school group or district, and the regulatory authority.

The first domain is *standing readiness*. Military organisations do not wait for a conflict to begin before training their personnel in combat operations. They train continuously, so that when deployment comes, the transition from peacetime to operational tempo is a matter of execution rather than invention. Schools in disruption-prone contexts need an equivalent concept. König, Jäger-Biela and Glutsch (2020), studying teacher adaptation during COVID in Germany, found that the single strongest predictor of effective online teaching was not the teacher's technological proficiency but their prior experience with digitally mediated instruction. Teachers who had experimented with blended approaches before the pandemic adapted faster, experienced less stress, and produced better outcomes than equally qualified colleagues for whom online teaching was entirely novel. The implication is straightforward: hybrid teaching cannot be a capability that exists only in a contingency document. It must be practised, regularly, systematically, and with the same seriousness that schools bring to fire drills and safeguarding protocols. A school that runs a hybrid learning day once per term, with all students learning from home, all teachers delivering through the hybrid model, and the full five-tier architecture operational, is a school that will not need to reinvent its practice when the real disruption arrives.

The second domain is *teacher professional development*. The training deficit exposed by COVID was not a gap in technical skills. Teachers learned to use Zoom and Google Classroom within days. The deficit was in pedagogical design for hybrid environments and in the relational skills required for screen-mediated teaching. Darling-Hammond and Hyler (2020) argue that effective crisis-era professional development must go beyond platform training to encompass the design of asynchronous content, the facilitation of synchronous discussions in split-audience contexts, the interpretation of AI-generated analytics, and the emotional dimensions of teaching through a screen. Trust and Whalen (2020) add that this training must be ongoing rather than one-off, embedded in the professional development cycle rather than delivered as a panicked workshop on the eve of a closure. Schools and school groups that invest in a sustained hybrid pedagogy CPD strand, not as a response to a current threat but as a standing component of teacher development, are building the professional capital (Hargreaves and Fullan, 2012) that makes institutional resilience possible.

The third domain is *infrastructure and procurement*. The AI-powered differentiation described in Tier 3 of the hybrid model depends on platform agreements that take months to negotiate, pilot, and integrate. A school that begins shopping for an adaptive learning platform on the day it closes its campus is a school that will not have one operational for weeks. Williamson (2017), writing about

the growing influence of educational technology companies on school practice, warns that procurement decisions made under crisis pressure are disproportionately likely to favour the vendors with the largest marketing budgets rather than the platforms with the strongest pedagogical foundations. Schools and regulators need standing procurement frameworks for AI-enabled learning platforms, frameworks that evaluate not only functionality and cost but also data governance, cultural appropriateness, algorithmic transparency, and compatibility with the pedagogical model the school intends to implement. Baker and Hawn (2022), reviewing algorithmic bias in education, emphasise that AI platforms are not neutral tools. They embed assumptions about what constitutes progress, what counts as engagement, and what patterns indicate risk, assumptions that may or may not align with the values of the community they serve. A procurement framework that does not interrogate those assumptions is outsourcing its educational judgement to an algorithm.

Device lending libraries, bandwidth audits, and home connectivity assessments fall into the same domain. Every school that serves a population where some families lack reliable broadband or functioning devices needs a standing inventory of lendable hardware, pre-configured and ready for distribution within twenty-four hours of a shift to hybrid delivery. Every school needs a current picture of its students' home connectivity, not as an abstract data point but as an operational variable that shapes which students can access the asynchronous layer and which cannot. The schools that managed device distribution most effectively during COVID were those that had already mapped their communities' digital infrastructure before the crisis, not those that attempted the mapping while the crisis was unfolding (OECD, 2020).

The fourth domain is *communication and trust*. Sahlberg and Walker (2021), analysing the Finnish education system's comparatively strong performance during the pandemic, attribute much of its resilience to a pre-existing culture of trust between schools, families, and the state. Parents trusted teachers to make sound professional decisions. Teachers trusted administrators to support them. The system trusted its educators to adapt without micromanagement. That trust was not built during the crisis. It was the accumulated product of decades of investment in teacher professionalism, transparent communication, and shared governance.

Schools operating in less trust-rich environments, and the international school sector, with its transient populations, diverse cultural expectations, and fee-paying parent bodies, is often one of them, must work harder and more deliberately to build the communicative infrastructure that crisis-era hybrid learning requires. Parents need to understand the hybrid model before it is activated. They need to know what asynchronous learning looks like, why synchronous sessions are shorter than traditional lessons, how AI is being used and how it is being governed, and what their role is in supporting learning at home. A school that communicates these things clearly, in advance, through parent workshops, written guides, and demonstration sessions, is a school that will face fewer complaints, less resistance, and more constructive partnership when the model goes live. A school that springs the model on parents during a crisis, with a hastily drafted email and a link to a platform nobody has seen before, is a school that will spend the first week managing confusion rather than supporting learning. Harris and Jones (2020) are blunt on this point: crisis leadership is not about making good decisions under pressure. It is about having made enough good decisions before the pressure arrives that the crisis becomes manageable rather than catastrophic.

The fifth domain is *regulatory clarity*. Education authorities, KHDA, ADEK, and their equivalents across the region and beyond, have a unique and difficult role in hybrid learning governance. They must define what constitutes adequate provision without being so prescriptive that they prevent schools from adapting to local circumstances. They must hold schools accountable for learning outcomes without penalising them for conditions beyond their control. And they must do all of this in real time, often with incomplete information about how long the disruption will last or how it will evolve.

The KHDA's response during COVID was, by any of the finest international standards, swift and structured. Expectations for distance learning were communicated clearly, inspection frameworks were adapted, and schools received a degree of regulatory support that many counterparts in other jurisdictions did not. But the frameworks were designed for a sustained period of remote delivery, a steady state, however uncomfortable, in which schools could plan and operate within known parameters. A conflict-driven disruption that oscillates unpredictably between modes requires a different regulatory posture: one that defines baseline expectations, minimum synchronous contact hours, minimum pastoral provision, minimum accessibility standards, while granting schools the operational flexibility to determine how those expectations are met. Fullan and Quinn (2016) describe this as the difference between *accountability* and *internal accountability*, the difference between compliance with external mandates and the capacity of an organisation to hold itself to its own standards. The most effective regulatory frameworks create the conditions for internal accountability to flourish, rather than substituting external prescription for professional judgement.

One concrete mechanism that several education systems have begun to explore is the concept of a *hybrid learning readiness certification*, a process through which schools demonstrate, in advance of any crisis, that they have the infrastructure, the training, the communication protocols, and the pedagogical design to deliver effective hybrid learning when required. Schools that hold the certification receive regulatory flexibility during disruptions. Schools that do not are subject to closer oversight and support. The mechanism incentivises preparation rather than penalising failure, and it shifts the regulatory conversation from "are you open?" to "are you ready?", a question that, as the evidence reviewed in this article makes clear, determines almost everything about whether hybrid learning will succeed or collapse under its own contradictions.

This Time, We Know Better

The principal in the Gulf, the one composing the email she had hoped never to write again, did something different this time. She deleted the draft.

Not because the situation had resolved. Not because the campus was safe, or the threat had passed, or the regulator had told her to stand down. She deleted it because the email she was writing was the wrong document. It was the 2020 email, the one that said *we are moving to online learning effective immediately, please find the Zoom links below, we apologise for the inconvenience and will update you as the situation develops*. It was a logistics email. It described a mode of delivery. It said nothing about how learning would actually happen, how relationships would be maintained, how students would be supported emotionally, or what role the teacher would play in a model that no longer assumed everyone was in the same room.

She opened a new document and wrote something different. It began not with platform links and timetable adjustments but with three commitments. First: every student would have daily, live, personal contact with a teacher who knew their name and could read their face. Second: no lesson would attempt to replicate a classroom experience through a screen, the asynchronous content would do what screens do well, and the synchronous time would do what only humans can. Third: the school's AI-enabled adaptive platform, which teachers had been piloting for six months, would be activated fully, not as a replacement for teaching but as the infrastructure that allowed teachers to be present, genuinely present, with each group in turn rather than fractured across both.

She sent the document to her leadership team with a single question: *Are we ready?*

The honest answer, for most schools in most contexts, is: not yet. The model described in this article, asynchronous foundations, synchronous connection, AI-powered differentiation, teacher curation, pastoral infrastructure, is not technically difficult to understand. It is institutionally difficult to build. It requires investment in platforms that take months to integrate, training in pedagogical approaches that most teacher education programmes do not cover, communication with parents that must happen before the crisis rather than during it, and a regulatory environment that rewards readiness rather than merely inspecting compliance. None of these conditions materialise spontaneously. All of them require decisions made in advance by people who understand that the next disruption is not a question of *if* but of *when*.

The evidence reviewed across these pages tells a consistent story. Hybrid learning failed during COVID not because hybrid learning cannot work but because what schools delivered was not hybrid learning, it was emergency remote teaching, improvised under impossible conditions, using a pedagogical architecture designed for physical co-presence and projected, unmodified, through a webcam (Hodges et al., 2020).

The research on blended and hybrid learning design, Garrison, Anderson and Archer (2000), Means et al. (2013), Bower et al. (2015), Laurillard (2012), Horn and Staker (2015), consistently shows that well-designed blended environments can match or exceed the outcomes of purely face-to-face instruction.

The research on AI in education, Bloom (1984), Holmes, Bialik and Fadel (2019), Mollick and Mollick (2023), Luckin et al. (2016), shows that adaptive, AI-powered platforms can provide the personalised, responsive learning support that makes hybrid delivery operationally viable in ways that were simply impossible in 2020.

And the research on learning in crisis contexts, Masten (2014), Masten and Narayan (2012), INEE (2010), Immordino-Yang and Damasio (2007), is unequivocal that the emotional and relational dimensions of education are not supplementary to learning but constitutive of it, and that any model which prioritises content delivery over human connection in a context of fear and uncertainty has misunderstood both the crisis and the children living through it.

We know all of this. We have known most of it for years. The question is not whether the knowledge exists but whether the will exists to act on it, to invest in the infrastructure, redesign the pedagogy, train the teachers, and build the institutional muscle that allows a school to shift between modes without losing the thing that makes it a school rather than a content delivery platform.

There is a passage in Masten's (2014) work on resilience that applies, I think, to institutions as much as to individuals. She argues that resilience is not a rare quality possessed by exceptional people. It is, as she calls it, *ordinary magic*, the product of basic protective systems, consistently maintained, that allow human beings to adapt to adversity. The protective systems she identifies are simple and unsurprising: stable relationships with competent caregivers, cognitive and self-regulation skills, a sense of meaning and purpose, and connections to a functioning community. Remove any of these, and the capacity for resilience degrades. Maintain them, and people, even very young people, even in very difficult circumstances, find ways to learn, to grow, and to recover.

A school is, at its best, a concentrated expression of every one of those protective systems. The teacher is the stable, competent caregiver. The curriculum develops cognitive and self-regulatory capacity. The ethos provides meaning and purpose. The community, of students, families, and staff, sustains connection. Hybrid learning does not change any of this. It only changes the medium through which it must be delivered. And if we design for the medium with the same intentionality we bring to designing for the classroom, if we treat the screen not as a degraded version of the room

but as a different space with its own affordances and its own demands, then there is no reason, in principle, why a child learning from home during a crisis cannot experience the protection, the challenge, and the connection that education is supposed to provide.

But only if we build it before we need it. Only if we invest in the training, the technology, and the human infrastructure that make it possible. And only if we remember, as the pandemic should have taught us, at a cost we are still counting, that the purpose of education in a crisis is not to maintain the appearance of normality. It is to maintain the reality of care.

The real test of hybrid learning is not whether students can access content from home. It is whether, when they return to the classroom, they still feel like they belong there.

About the Author

Dr. Neil Hopkin is a globally recognised thought leader in international K-12 education, and serves as the Director of Education at Fortes Education.

His extensive academic background includes advising UK government bodies and spearheading significant educational initiatives, particularly with the EdTech, Early Years, Higher Education and Teacher Professional Development fields, equipping him with invaluable insights and expertise. As the head of Fortes' Academic Leadership Team, Dr. Hopkin is responsible for overseeing academic performance, operational efficiency, curriculum development, and staff professional development across Fortes Education institutions.



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