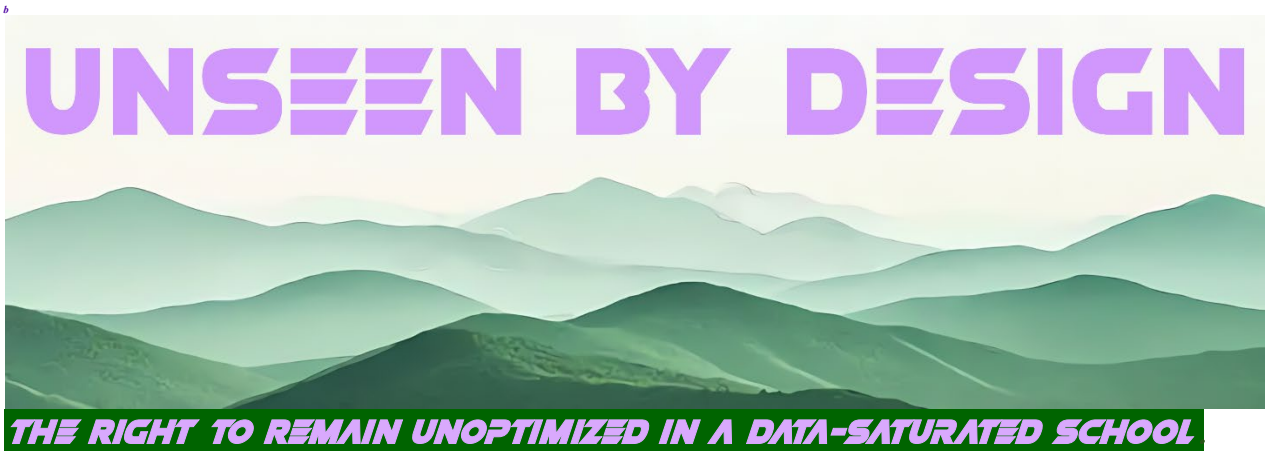


THE FULLY LEGIBLE CHILD

Imagine a school capable of knowing almost everything about a learner. It knows when her attention begins to deteriorate, how long she hesitates before answering, which explanations generate confusion, which classmates alter her participation, what time of day her concentration is strongest, how frequently she revises her work, how quickly she abandons difficult tasks, which subjects provoke anxiety, when her confidence begins to decline, and which academic pathway she is statistically most likely to complete. Over time, these fragments can be combined with attendance records, assessment histories, behavioural logs, platform activity, teacher commentary, biometric signals and predictive analytics until the institution possesses something approaching a continuously updated portrait of the learner.

From the standpoint of educational optimization, the attraction is obvious. Greater visibility appears to promise earlier intervention, more precise support, improved accessibility, better allocation of resources and increasingly individualized learning. Schools have always collected information about students in order to teach them more effectively; contemporary technologies simply extend the granularity, velocity and predictive power of that knowledge. What was once episodic observation can become continuous monitoring. What was once professional impression can become quantified pattern. What was once a teacher's tentative concern can become a system-generated probability.

Yet there is an important difference between knowing enough about a learner to support her well and knowing so much that the institution begins to construct an increasingly totalizing account of who she is. A child is not a stable educational object waiting to be rendered fully legible. She is provisional, contradictory, impressionable, unfinished and capable of becoming someone her previous behaviour did not anticipate. Education itself depends upon this possibility. It assumes that yesterday's difficulty need not become tomorrow's identity, that confidence can be rebuilt, that capacities can emerge late, that interests can change, that students can outgrow labels, and that the future should not be treated merely as an extension of the past.

The deeper danger of the data-saturated school, therefore, is not simply excessive collection. It is **interpretive accumulation**. Attendance becomes a proxy for commitment. Hesitation becomes evidence of low confidence. Digital activity becomes engagement. Behaviour becomes risk. Preference becomes identity. Prediction becomes pathway. Each inference may appear reasonable in isolation, yet when these interpretations are aggregated, institutionalized and retained, they begin to produce something more consequential than a record of learning: they produce an increasingly durable narrative about the learner herself.

That narrative can quietly become self-reinforcing. Once a student is categorized as disengaged, vulnerable, high-risk, low-confidence, academically fragile or unlikely to progress, subsequent evidence may be read through the category already assigned to her. Support may become more targeted, but so may scrutiny. Opportunity may become more personalized, but also more conditional. A system designed to respond to the learner can begin, almost imperceptibly, to pre-empt the learner by narrowing the range of futures considered plausible on her behalf.

This is where the contemporary language of personalization requires greater philosophical scrutiny. Education has become increasingly comfortable with the idea that better data will produce better decisions, but the relationship is neither automatic nor morally neutral. Greater legibility can improve support, but it can also intensify surveillance. Prediction can help institutions recognize patterns, but it can also harden provisional tendencies into institutional expectations. Personalization can remove unnecessary barriers, but it can also produce a subtler form of enclosure in which students encounter increasingly curated pathways based on who systems already believe them to be.

The future-ready school, then, faces a problem more difficult than data protection alone. It must learn to distinguish between **educational visibility and institutional overreach**. It must decide not only what information can be collected, but what information deserves to be collected; not only what can be inferred, but what should remain uninterpreted; not only how long data can technically be stored, but how long it should retain authority over a learner's future. The ethical challenge is not to make students invisible to institutions that have legitimate responsibilities for their learning and safety. It is to prevent educational care from becoming a form of perpetual legibility.

A mature educational institution should therefore be capable of two apparently contradictory acts at once: knowing learners well enough to support them and resisting the temptation to convert that knowledge into a definitive account of who they are. The distinction matters because the most consequential freedom education can preserve may be the freedom to become someone whom yesterday's data could not foresee.

FROM EVIDENCE TO LEGIBILITY

Schools have always generated information about learners. Teachers remember who reads fluently but struggles to infer, who understands a mathematical procedure without grasping its underlying concept, who participates confidently in small groups but withdraws during whole-class discussion, and who appears academically capable while carrying difficulties that formal assessment does not reveal. Registers, report cards, examination scripts, portfolios, pastoral records and teacher observations have long constituted an evidentiary infrastructure around schooling. Such evidence is not inherently intrusive. On the contrary, teaching without information about learners would be pedagogically negligent. The difficulty begins when evidence collected for particular educational purposes becomes part of a wider architecture of **institutional legibility** in which increasingly diverse traces of a student's life can be captured, aggregated, interpreted and made available for decisions far beyond the context in which they originated.

Digitization has altered this relationship not simply by increasing the quantity of information available, but by changing its character. A handwritten exercise reveals what a learner produced in response to a task. A digital learning environment may additionally record when the task was opened, how long the learner remained on a page, how frequently resources were accessed,

whether a video was replayed, when an assignment was submitted, patterns of interaction with peers, and how these behaviours compare with those of other students. Learning-management systems increasingly transform such routine activity into what researchers describe as *engagement data*: metrics and visualizations that are subsequently interpreted as indicators of participation, attention or academic involvement. A 2026 analysis of major learning-management systems found that ordinary platform use can create conditions for surveillance, aggregation, secondary use, predictive classification, distortion and what the authors term possible "decisional interference"—circumstances in which data-derived interpretations begin influencing consequential decisions about students.

This process is often described as the **datafication of education**, but the term deserves more attention than its technical sound suggests. Datafication does not merely mean that schools possess more data. It means that dimensions of educational life are progressively translated into forms that can be counted, compared, visualized and acted upon. Participation becomes frequency. Persistence becomes time-on-task. Engagement becomes a dashboard. Risk becomes a probability. Once translated, these representations acquire an aura of precision that can obscure the interpretive choices involved in producing them. A learner who spends little time on a platform may indeed be disengaged, but she may also have understood the material quickly, worked offline, shared a device, encountered connectivity difficulties, preferred printed resources or used an alternative route through the task. The metric is real; the meaning attributed to it remains an inference.

That distinction is crucial because **visibility is never identical to understanding**. What digital systems make visible is determined partly by what the system is capable of recording. Observable behaviours consequently become easier to privilege than qualities that resist straightforward quantification: intellectual curiosity, moral seriousness, imagination, private perseverance, changing motivation, the quality of a student's questions, or the significance of an idea that continues developing long after a platform session has ended. The danger is not merely measurement error. It is a subtler epistemic distortion in which institutions begin treating what is most measurable as though it were what is most meaningful.

Helen Nissenbaum's theory of **contextual integrity** offers a particularly useful way of understanding why this matters. Privacy, in her account, should not be reduced to secrecy or to an individual's attempt to keep information hidden. Information routinely needs to move between people and institutions. What matters is whether that movement remains appropriate to the context in which the information was produced: who supplied it, who receives it, what kind of information it is, why it is being transferred, and under what conditions. A piece of information can therefore be perfectly legitimate in one relationship yet become problematic when transported into another.

The educational implications are considerable. A teacher may record a student's misconception because it is necessary for planning the next lesson. That does not automatically justify retaining the misconception indefinitely, integrating it into a longitudinal learner profile, sharing it across unrelated systems or using it years later as one variable in a predictive model. A pastoral concern disclosed to a trusted adult may be essential for safeguarding while remaining wholly inappropriate as an input into academic profiling. A pattern of late submission may justify a supportive conversation without warranting an enduring characterization of the learner as unreliable. The original collection of information can be legitimate while subsequent aggregation, transfer or reinterpretation becomes disproportionate.

This is why conventional privacy language is increasingly insufficient for schools. Asking whether information was collected lawfully or whether a student clicked an agreement box tells

us relatively little about the educational legitimacy of what happens afterwards. Contemporary research on learning analytics shows that students themselves often have limited awareness of what educational systems collect and how those data are subsequently used, while greater transparency can improve that awareness without resolving the larger question of whether particular forms of collection and inference should occur at all. The asymmetry is obvious: the institution possesses the infrastructure to aggregate, compare and infer; the learner generally experiences only the visible educational interface.

Future-ready schools therefore need a more exacting distinction between **evidence and legibility**. Evidence is gathered because a defined educational purpose requires us to understand something sufficiently well to act responsibly. Legibility begins when the institution's ambition expands from understanding a particular learning need toward constructing an increasingly comprehensive representation of the learner. The former can deepen educational responsiveness. The latter carries the danger of epistemic overreach: the assumption that because a person has become more extensively represented in data, the institution consequently knows that person more completely.

That assumption becomes particularly consequential in childhood and adolescence, because the subject being rendered legible is not finished. The student recorded by today's systems is still revising her beliefs, capacities, affiliations, ambitions and understanding of herself. The next challenge, therefore, is not simply to determine whether the institution's portrait is accurate. It is to ask what happens when a portrait created from the past begins acquiring authority over a future that has not yet been lived.

A CHILD IS NOT A STABLE PROFILE

The most serious limitation of educational profiling is not that profiles are always inaccurate. Some may be remarkably accurate within the conditions from which they were derived. A student may genuinely have struggled with mathematical reasoning across several years, withdrawn consistently from collaborative work, required repeated scaffolding in writing, or shown a persistent pattern of absenteeism. The ethical problem emerges when accuracy about the past begins acquiring disproportionate authority over interpretation of the future. A profile can describe what has happened without possessing any privileged knowledge of what must happen next.

This distinction is particularly important in education because schools encounter human beings during periods of profound developmental plasticity. Children and adolescents are not merely accumulating knowledge; they are revising identities, discovering capacities, testing affiliations, abandoning assumptions, developing language for experiences they previously could not articulate, and frequently becoming discontinuous with earlier versions of themselves. Development does not proceed with the orderly linearity that predictive systems prefer. A learner can appear indifferent before encountering the subject, teacher or experience that awakens an intellectual commitment. A student regarded as academically ordinary can develop extraordinary disciplinary expertise. Someone who avoids public participation at thirteen may become an exceptionally persuasive communicator at twenty. The inconvenient truth for prediction is also one of education's most important premises: **people change**.

Hannah Arendt offers a powerful philosophical language for understanding why this matters. Her concept of *natality* describes the human capacity for beginning—for introducing something into the world that cannot be fully deduced from what preceded it. Freedom, in this account, is bound to the possibility of acting in ways that are genuinely new rather than merely reproducing existing

patterns. Arendt's argument was political rather than a theory of educational analytics, but its implication for schooling is striking. Education works with beings whose futures remain fundamentally open, and any system that treats previous behaviour as exhaustive evidence of future possibility misunderstands something elemental about human development.

This does not mean educational professionals should ignore patterns. Patterns matter precisely because they can reveal where support, challenge or investigation is needed. The difficulty lies in confusing a pattern with an ontology—moving from *this student has repeatedly experienced difficulty* to *this is the kind of student she is*. That shift may occur almost imperceptibly through ordinary institutional language. A child becomes "low ability," "disengaged," "anxious," "high risk," "not academic," "poor at languages," "a behaviour concern," or "unlikely to cope." Such descriptions may originate in genuine evidence, yet their grammatical neatness can conceal developmental uncertainty. They convert provisional observations into seemingly settled identities.

Once institutional categories harden, they can accumulate what might be called **interpretive inertia**. New information is no longer encountered neutrally; it is read through what the institution already believes it knows. A quiet student who contributes little may be understood as lacking confidence even when she is exercising intellectual restraint. A learner identified as highly able may have genuine difficulty overlooked because competence has become part of the expected narrative. A student with a history of behavioural incidents may find ambiguous conduct interpreted more negatively than identical behaviour from a peer with no such record. The profile does not merely store information. It can become a lens through which subsequent information acquires meaning.

Digital systems intensify this problem because categories can outlive the human relationships in which they were originally formed. Teachers change. Students move between year groups and campuses. Circumstances alter. A label, risk flag or historical note, however, may travel forward with an authority that its original author never intended. Data acquire durability while the human context that made them intelligible disappears. What began as a tentative judgment made during one difficult semester can quietly become part of the student's institutional biography.

There is consequently a difference between **memory that supports continuity** and **memory that produces developmental foreclosure**. Schools need institutional memory. Safeguarding depends upon it; continuity of support often depends upon it; effective teaching can depend upon understanding previous learning. But educational memory becomes problematic when it closes possibilities prematurely, allowing accumulated evidence to narrow which futures adults regard as credible for a learner. Developmental foreclosure occurs when the institution ceases merely to recognize patterns and begins organizing opportunity around the expectation that those patterns will persist.

The language of probability can make this especially difficult to detect. A prediction does not need to claim certainty to influence behaviour. If a system identifies a learner as having an elevated likelihood of failure, withdrawal or disengagement, teachers and leaders may reasonably decide to intervene. Yet repeated exposure to probabilistic classifications can change expectations even when no explicit decision rule exists. The learner becomes associated with a forecast. Resources, conversations, opportunities and interpretations may gradually reorganize around that forecast, until a statistical possibility begins functioning as an institutional presumption.

Future-ready education therefore requires something more demanding than accurate profiling: it requires **hermeneutic humility**. Schools must be willing to interpret evidence while remaining conscious of the incompleteness of every interpretation. A learner profile should be treated as a

provisional representation assembled for particular purposes, not as a compressed version of the person herself. Educational knowledge should remain revisable because the learner remains revisable.

This is why one of the most important freedoms a school can preserve is the learner's capacity to become improbable. Education should certainly help students overcome difficulties visible in their past, but it should also protect their ability to exceed that past—to surprise teachers, contradict data, abandon identities, develop late, change direction and become someone for whom the previous prediction no longer makes sense. A system genuinely committed to human development cannot merely become more accurate at forecasting who students are likely to become. It must remain capable of making room for who they have not yet had the opportunity to be.



WHEN PREDICTION BECOMES PRESCRIPTION

Prediction occupies an increasingly seductive place in contemporary education because it promises to convert uncertainty into foresight. If schools can identify the learner likely to disengage, fail an examination, withdraw from a course, require additional support or struggle during a transition, intervention can ostensibly begin before difficulty becomes crisis. Used judiciously, predictive information can undoubtedly be valuable. The ethical difficulty begins when a forecast ceases to function as a provisional signal and starts reorganizing the educational environment around the future it anticipates.

A prediction is never encountered in a vacuum. Once a student is described as being at elevated risk, unlikely to succeed in a particular pathway, insufficiently engaged or statistically similar to learners who previously struggled, that information enters an ecosystem of human judgment. Teachers may adjust the complexity of tasks, counsellors may redirect aspirations, leaders may prioritize interventions, parents may be advised differently, and students themselves may absorb messages about what appears realistic for them. None of these decisions requires an explicit instruction from an algorithm. The prediction acquires influence simply because it becomes part of what the institution believes it knows.

Education already possesses a substantial research tradition demonstrating that expectations are not inert. Decades of work on teacher expectations have shown that beliefs about students can influence classroom interactions, opportunities and outcomes. A recent narrative review by Christine Rubie-Davies and John Hattie synthesizes evidence showing substantial differences in the learning environments and outcomes associated with teachers who hold consistently high versus low expectations for students. The point is not that every expectation becomes a self-fulfilling prophecy, nor that teachers are incapable of revising their judgments. Research also shows that teachers can and do recalibrate expectations as new evidence becomes available. The more important lesson is that expectations can alter the conditions under which students subsequently learn.

Predictive analytics introduces a new layer into this already consequential process. Traditional expectations are usually constructed from direct interaction, prior attainment, professional knowledge and institutional narratives. Computational prediction can add another form of epistemic authority: statistical probability. A teacher may remain uncertain about a student, while a dashboard presents a risk category with apparently greater precision. A percentage, colour-coded warning or predictive label can appear more objective than the messy interpretive judgments through which educational professionals ordinarily understand learners. Yet the numerical form does not eliminate interpretation; it merely relocates it into data selection, model design, classification thresholds and institutional response.

This is where prediction can become **performative**. The forecast does not simply describe a possible future; it begins participating in the production of that future. A learner classified as unlikely to cope with advanced mathematics may receive less demanding work. A student identified as vulnerable to disengagement may encounter increasingly intensive monitoring. Someone predicted to struggle in an academic pathway may be encouraged toward a supposedly safer alternative before having the opportunity to demonstrate otherwise. Each decision may be defensible as an act of support, yet their cumulative effect can produce what might be called **opportunity contraction**: the gradual narrowing of experiences through which the original prediction could have been disproved.

This does not require malicious intent. Indeed, the most consequential forms of developmental foreclosure may emerge precisely through benevolent intervention. A school seeking to protect a learner from failure may inadvertently protect her from difficulty, risk, intellectual stretch or the experience of discovering that she was capable of more than her previous record suggested. Personalization can then become strangely conservative. Instead of expanding possibility, it calibrates the future ever more closely to the past.

The problem becomes more acute where prediction draws upon historical data shaped by existing inequalities. Models learn from patterns that institutions and societies have already produced. If particular groups have historically had lower participation, reduced access to advanced opportunities, higher disciplinary referral rates or weaker outcomes, predictive systems may reproduce those patterns as apparently neutral probabilities. Recent systems-level analysis of AI

and education warns that algorithmic tools trained on skewed or historically unequal data can reinforce educational disparities rather than ameliorate them, particularly where governance, transparency and local contextualization are weak. The ethical danger is therefore not only that an individual learner may be misclassified. It is that historical inequity can be converted into predictive plausibility and then quietly returned to the institution as guidance about what is likely to happen next.

A future-ready school needs to resist the epistemic seduction of probability. Statistical likelihood is not educational destiny, and predictive accuracy does not automatically confer moral authority over opportunity. There is an important difference between using a forecast to ask where support may be needed and using it to decide which futures remain available. The former treats prediction as an invitation to investigate. The latter allows probability to become prescription.

This distinction also demands a different approach to intervention. A responsible predictive system should create **reversible, expansive and contestable responses**. If a student is identified as potentially at risk, the intervention should increase access to support without diminishing access to challenge. If a learner is predicted to struggle, the institution should intensify the conditions for success rather than quietly lowering the ceiling. Predictions should be time-bound, open to revision and structurally prevented from becoming permanent identity markers. The learner must remain capable of producing evidence that changes the institutional interpretation.

Such restraint is not anti-data. It is a more sophisticated form of data literacy. It recognizes that the most important educational use of a prediction may sometimes be to make the prediction less likely to come true. A school that identifies a probable difficulty and then changes the conditions surrounding the learner has not invalidated the model; it may have fulfilled the educational purpose of noticing risk in the first place. The success of prediction, in other words, should not be measured by how accurately the institution anticipated failure, but by whether foresight enlarged the learner's possibilities.

That principle should become foundational in data-rich schooling. Educational predictions ought to function as **hypotheses about conditions, not verdicts about persons**. Their legitimacy depends not merely on statistical accuracy but on what institutions subsequently do with them. When prediction expands support while preserving possibility, it can serve education. When it begins allocating aspiration, challenge, opportunity or identity in advance, the school has crossed a more consequential boundary: it has moved from anticipating a future to helping determine which futures a learner is permitted to inhabit.

THE RIGHT TO OPACITY

There is a point at which the language of educational visibility reaches its philosophical limit. Schools need evidence, professionals need judgment, and institutions need enough knowledge to fulfil their responsibilities. Yet the assumption that every relevant dimension of a learner should become increasingly transparent is not self-evidently benign. It contains a deeper proposition about personhood: that better education requires progressively greater intelligibility, and that whatever remains difficult to interpret is a problem awaiting clarification. This is precisely where Édouard Glissant's idea of the **right to opacity** becomes important.

Glissant developed opacity within a much broader anti-colonial philosophy of relation. His argument was not about educational technology, student databases or contemporary privacy law. It emerged from a critique of forms of knowledge that presume another person must first become comprehensible according to the observer's categories before they can be recognized, accepted or

valued. In *Poetics of Relation*, Glissant challenged this reduction of difference into forms that are easily measured and compared, insisting instead upon the irreducibility of persons and cultures within relation. The University of Michigan Press describes his wider philosophy as one in which identity emerges through complex relationships rather than through isolated, fixed categories.

That distinction matters enormously for education. Schools are institutions of interpretation. They continuously interpret achievement, behaviour, participation, readiness, potential, language, confidence, aspiration and need. Much of this interpretive work is necessary. But Glissant's challenge introduces a form of **hermeneutic restraint**: understanding another person should not require reducing that person to the categories through which the institution already knows how to see. The student who remains difficult to classify is not necessarily a failure of the system's knowledge. Some ambiguity may belong to the complexity of the person rather than to an informational deficit waiting to be corrected.

Recent educational scholarship has begun to explore precisely this implication. David Ben Shannon and Abigail Hackett apply Glissant's right to opacity to early childhood communication, arguing against the assumption that children's expression must always become increasingly clear, efficient, rational and developmentally transparent to adults. Their work does not reject assessment, communication support or professional understanding. Instead, it questions what may be flattened when educators insist that every gesture, silence, movement or form of expression must be translated into a recognizable developmental meaning. They describe opacity not as indifference or withdrawal, but as a refusal to assume that another person can ever be completely reduced to the interpretive scale of the observer.

The relevance to data-saturated schooling is striking. Digital systems intensify an old educational impulse: the desire to transform uncertainty into legibility. A student who does not participate becomes a pattern of engagement. A hesitation becomes latency. A change in mood becomes an emotional signal. Irregular performance becomes risk. A cluster of behaviours becomes a profile. The architecture of the system encourages movement from observation toward explanation, because information acquires institutional value when it can be categorized, compared and acted upon. Yet every act of clarification also selects what counts as meaningful and what can be disregarded.

This is where opacity should not be misunderstood as secrecy. It is not an argument that learners should be unknowable, that teachers should refrain from noticing, or that safeguarding, assessment and intervention are somehow oppressive by definition. Nor does it suggest that schools should abandon attempts to understand students whose communication, behaviour or learning needs require sustained professional attention. Opacity is more demanding than that. It asks institutions to recognize the difference between **understanding enough to respond responsibly** and claiming interpretive possession over the whole person.

That distinction protects something essential in education: **human irreducibility**. A student may be anxious without anxiety constituting the total meaning of her behaviour. A multilingual learner may speak less in one context without silence representing intellectual limitation. A young person may resist participation for reasons the school cannot fully access and should not immediately pathologize. A student's private reflection may be pedagogically significant without becoming data the institution needs to retain. Not every ambiguity is a defect in measurement. Not every unexpressed thought requires extraction. Not every dimension of learner identity becomes educationally improved by becoming institutionally visible.

There is also a power question embedded here. Transparency is rarely symmetrical. The school knows far more about the student than the student knows about the systems interpreting her.

Institutions can combine records, generate categories, commission assessments and retain histories across years. Learners ordinarily possess far less capacity to inspect the assumptions through which those records are read. Complete transparency, therefore, cannot be treated merely as an informational virtue. It can produce an **epistemic asymmetry** in which one party acquires increasing interpretive authority over another while presenting that authority as neutral knowledge.

Glissant's work complicates this asymmetry because opacity is not a temporary inconvenience on the road to total understanding. It recognizes that some remainder always escapes the explanatory system. Applied carefully to education, this means a school should not regard complete legibility as its endpoint. There should remain aspects of a learner's identity, interiority and development that the institution approaches with humility rather than acquisitiveness. A learner can be supported without becoming completely knowable; indeed, respect may sometimes require precisely this refusal of total comprehension.

This creates an important distinction between **educational personalization and educational possession**. Personalization responds to a learner's needs, circumstances and aspirations in order to enlarge educational possibility. Possession begins when the institution assumes that greater knowledge gives it increasing authority to define the learner's likely preferences, capacities and future. The first remains responsive. The second becomes quietly deterministic. A genuinely future-ready school must become capable of recognizing when it is crossing from one into the other.

The right to opacity therefore offers more than a privacy safeguard. It provides a philosophical counterweight to the contemporary fantasy of the fully knowable learner. It reminds us that education is not improved simply by reducing uncertainty. Some uncertainty is intrinsic to development because people are not finished objects. Some ambiguity protects dignity because human beings exceed the categories used to describe them. Some invisibility preserves freedom because not every emerging identity should be captured at the moment of its formation.

This principle will become increasingly consequential as schools gain access to systems capable of inferring not only what learners do, but what they may be feeling, attending to or thinking. The most advanced institution will not necessarily be the one that renders every dimension of learning visible. It may be the one disciplined enough to establish an **Educational Visibility Boundary**: a principled distinction between what schools need to know, what they may know under carefully constrained conditions, and what should remain protected from routine institutional capture.

That boundary is not a retreat from innovation. It is an assertion that technological capability does not automatically create educational entitlement. A future-ready school should certainly become more intelligent about learners, but intelligence without restraint can become another form of reduction. The more powerful our systems become at interpreting children, the more deliberately education will need to preserve the possibility that a child remains, in part, beyond our categories.

THE EDUCATIONAL VISIBILITY BOUNDARY FRAMEWORK

If future-ready schools are to resist the assumption that greater visibility is automatically better, they require more than ethical caution. Leaders need a practical way to decide where legitimate educational knowledge ends and institutional overreach begins. The **Educational Visibility Boundary Framework** offers one such architecture. It distinguishes among three zones of learner

visibility: **Necessary Visibility, Conditional Visibility and Protected Opacity**. The purpose is not to create rigid categories, but to force institutions to justify why particular forms of learner information are being collected, interpreted, retained or acted upon.

1. Necessary Visibility

Necessary Visibility includes information a school has a clear educational, safeguarding or accessibility responsibility to know. This may include evidence of learning, attendance patterns, demonstrated misconceptions, documented accommodations, legitimate safeguarding concerns and information required to provide appropriate support. The defining principle is **educational necessity**. The institution should be able to explain precisely why the information is needed and how knowing it improves the learner's educational experience or safety.

Necessary Visibility should still be proportionate. A legitimate purpose does not create unlimited entitlement to adjacent information. Knowing that a learner requires reading support does not automatically justify constructing a broad psychological profile. Knowing that attendance has declined does not necessarily justify inferring disengagement, family dysfunction or lack of aspiration. Even within this zone, institutions need to distinguish evidence from interpretation.

2. Conditional Visibility

Conditional Visibility includes information that may have educational value but carries substantial interpretive, ethical or equity risks. Engagement analytics, behavioural patterns, predictive risk classifications, inferred preferences, platform histories, attention indicators and some forms of emotional analytics belong here.

The governing principle is **justified restraint**.

The mere availability of information does not establish an educational right to use it. Before information enters this zone, leaders should demonstrate that its potential educational value outweighs the possibility of misinterpretation, stigmatization, surveillance or unintended restriction of opportunity. Data should remain contestable, time-bound and subject to regular review. The burden of justification should sit with the institution collecting or interpreting the information, not with the learner required to object to it.

Conditional Visibility is particularly important because this is where apparently benign innovation can become **inferential overreach**. A system may accurately detect a pattern while remaining incapable of explaining its meaning. Schools should therefore be cautious about converting behavioural traces into psychological claims, temporary patterns into durable identities, or probabilities into institutional expectations.

3. Protected Opacity

Protected Opacity identifies dimensions of human development that should ordinarily remain outside routine institutional capture, prediction or optimization. This may include private reflection, exploratory beliefs, provisional identities, intimate emotional states, unexpressed thoughts, speculative psychological interpretations, neural data and past errors whose educational relevance has expired.

The governing principle is **human irreducibility**.

Protected Opacity does not imply that schools should ignore safeguarding responsibilities or refuse necessary professional intervention. It recognizes instead that educational institutions do not possess an unlimited epistemic claim over the children and young people entrusted to them. Some dimensions of development require space precisely because they are unfinished. Not every internal state should become an intervention trigger; not every personal tendency should become a profile; not every period of uncertainty should generate a permanent institutional record.

The boundary therefore protects the learner's capacity to change without having every previous version of the self continuously reintroduced as evidence.



THE VISIBILITY BOUNDARY TEST

Before a school collects, combines, infers, retains or acts upon learner information, leaders should subject the practice to seven tests:

Dimension	Leadership Test
Educational Purpose	What specific educational, safeguarding or accessibility purpose requires us to know this?
Necessity	Do we genuinely need this information, or are we collecting it primarily because the technology makes it available?
Proportionality	Is the degree of visibility proportionate to the educational benefit we expect to gain?
Interpretive Humility	Are we treating the information as provisional evidence requiring interpretation, or as an authoritative description of the learner?
Contestability	Can the learner understand, contextualize, correct or challenge the inference being made?
Equity Consequence	Which learners are most likely to be disproportionately monitored, misclassified or constrained by this practice?
Expiry	When should this information, label or inference cease to retain authority over the learner?

The framework deliberately changes the default question. Instead of beginning with *What can this technology tell us?*, leaders begin with the educational warrant for knowing. Capability becomes secondary to legitimacy.

This is where the framework also intersects with a broader architecture of future-ready leadership. **Equity Infrastructure** requires schools to examine whether visibility is distributed unevenly and whether particular groups are more frequently monitored, categorized or corrected. **Student Voice Governance** requires learners to possess meaningful ways of understanding and challenging institutional interpretations of them. **Ethical Anchoring**, within the AQ Leadership Compass, becomes the leadership capacity to establish principled limits even when a technology is efficient, attractive or technically possible.

The Educational Visibility Boundary therefore does not position innovation and privacy as opposing forces. It introduces a more demanding standard: innovation should remain educationally purposeful, proportionate, contestable and reversible. A future-ready school should

become increasingly sophisticated not only in what it is capable of seeing, but also in deciding what it should deliberately refuse to see.

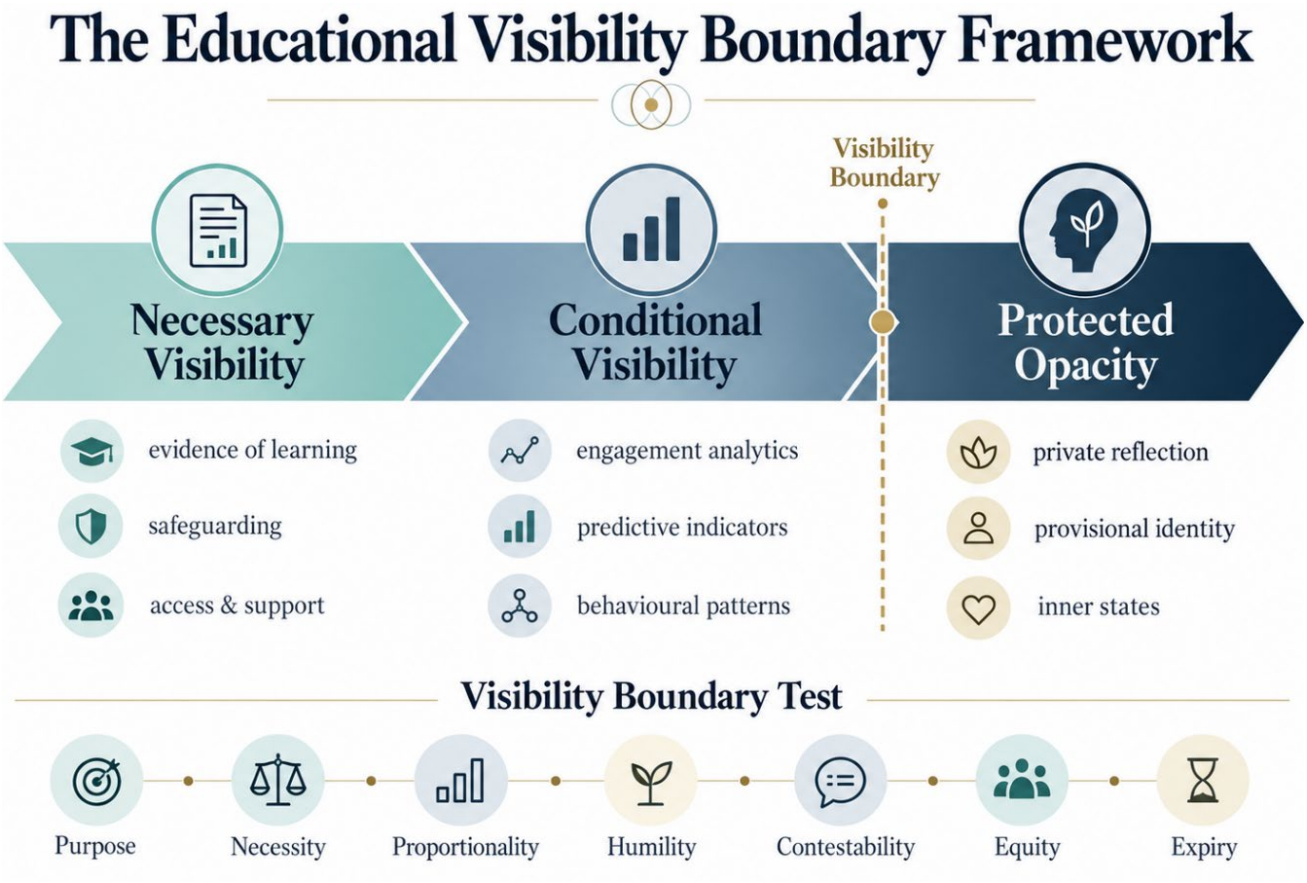


Figure I. The Educational Visibility Boundary Framework.
Conceptualized by Javeria Rana. The framework distinguishes Necessary Visibility, Conditional Visibility and Protected Opacity as three zones for governing learner information in data-rich educational environments. The accompanying Visibility Boundary Test evaluates educational purpose, necessity, proportionality, interpretive humility, contestability, equity consequence and expiry.

MENTAL PRIVACY AND THE LAST PRIVATE SPACE

The argument for educational restraint becomes even more urgent when visibility moves from observable behaviour toward inferred interior states. Schools have always interpreted conduct: a teacher may notice that a student appears distracted, anxious, fatigued or unusually withdrawn. Such judgments are imperfect and relational. They are formed within context, can be challenged by subsequent interaction, and ordinarily remain provisional. Emerging neurotechnologies and AI-enabled sensing systems, however, promise something qualitatively different: the capacity to monitor physiological or neural signals and infer states such as attention, stress, cognitive load, emotion or intention with increasing granularity. The ethical issue is no longer simply whether schools should collect more data. It is whether the interior life of a learner should become an object of institutional measurement at all.

This is no longer a purely speculative concern. UNESCO adopted the first global normative framework on the ethics of neurotechnology in November 2025, explicitly identifying mental privacy, cognitive liberty, human dignity, personal identity and freedom of thought as areas requiring protection. In 2026, UNESCO convened experts around a hypothetical secondary-school scenario in which students wore AI-enabled brain-sensing headsets while systems analysed

neural activity, attention levels, stress indicators and learning patterns in real time. The discussion surfaced concerns about child assent, future surveillance, re-identification, discrimination, commercial access to neuro-behavioural profiles and the inadequacy of parental consent alone where children themselves cannot meaningfully withdraw.

The importance of this shift is difficult to overstate. Traditional educational data are usually traces of what a learner has done: attended, submitted, answered, clicked, achieved, spoken or failed to complete. Neurodata and related biometric signals move closer to what a learner may be experiencing internally. The OECD now defines neurotechnology broadly enough to include systems that access, monitor, assess or influence the brain and nervous system, while its current governance work warns that AI-assisted decoding of neural signals may enable inferences about emotions, intentions and cognitive states. The same work notes that consumer neurotechnologies are becoming increasingly accessible beyond clinical environments, including in education and wellness, raising particular concerns for children whose capacity to understand or meaningfully consent to such processing may be limited.

This emerging frontier forces education to distinguish between **behavioural observability and mental access**. A school may have legitimate reasons to know that a learner has stopped completing work or is repeatedly absent. It does not follow that the institution acquires an equivalent right to infer emotional states, concentration patterns or inner cognitive activity because a device is capable of doing so. The difference is not merely technical. It concerns the boundary between the public responsibilities of education and the private interiority of the person.

Mental privacy matters precisely because thought is not yet action. Young people need space in which ideas can be tentative, contradictory, immature and privately revised before they become expressions for which they are socially or institutionally accountable. A fleeting emotional response is not a settled disposition. A moment of inattention is not proof of disengagement. Stress during a lesson may reflect intellectual challenge, social anxiety, physical discomfort, fatigue, excitement or something entirely unrelated to the curriculum. Translating such signals into institutional categories risks **epistemic compression**: complex internal states are reduced to a format that appears actionable precisely because much of their ambiguity has been removed.

There is also a developmental reason to preserve this interior space. Childhood and adolescence involve rehearsing identities internally before deciding which ones to inhabit publicly. Students experiment with beliefs, loyalties, ambitions, fears and interpretations that may never become durable commitments. If education becomes increasingly capable of inferring those states before learners themselves have chosen to disclose them, the distinction between support and intrusion becomes dangerously thin. The right to privacy must therefore include more than control over personal records. It must encompass what UNESCO and OECD increasingly describe as **mental privacy** and **cognitive liberty**: protections around the integrity of thought, inner experience and cognitive self-determination.

The commercial dimension makes this even more consequential. Neural and neuro-behavioural data can potentially become valuable not only to educators but to technology providers, insurers, employers, researchers and other actors outside the original educational relationship. Once such data exist, questions of storage, ownership, secondary use, re-identification and future interpretation become increasingly difficult to contain. OECD guidance on neurodata governance therefore emphasizes data minimization, purpose limitation, strong consent mechanisms, encryption and restrictions on secondary use, while acknowledging that some high-risk applications may warrant prohibition rather than mere risk management.

For schools, however, the first safeguard should be more fundamental than technical compliance. Before asking how neural, biometric or emotional data might be governed responsibly, educational leaders should establish whether particular forms of collection are educationally legitimate in the first place. This is where the **Educational Visibility Boundary** becomes most consequential. Behavioural evidence that directly supports learning may fall within Necessary Visibility. Engagement analytics or predictive indicators may belong within Conditional Visibility because they require strong justification and contestability. Intimate emotional inference, neural data or routine attempts to measure internal cognitive states should begin from the presumption of **Protected Opacity**, with the burden of proof resting firmly on the institution seeking access.

The principle is not technological conservatism. It is recognition that the capacity to infer more about a learner does not automatically enlarge the institution's moral jurisdiction over that learner. Future-ready schools will undoubtedly become more sophisticated in sensing, prediction and personalization, but sophistication should not be confused with permissiveness. The most important frontier in educational technology may ultimately be one that schools choose not to cross: the preservation of a mental domain in which young people remain free to think, hesitate, imagine, contradict themselves and change without every internal movement becoming educational data.

WHO GETS TO BE UNSEEN?

The right to opacity becomes an equity question the moment visibility is distributed unevenly. Schools do not observe every learner with the same intensity, nor do they interpret identical behaviours through identical expectations. Some students move through institutions with a presumption of competence and benign intent; others accumulate annotations, alerts, interventions and risk classifications because they have already entered institutional categories associated with vulnerability, difficulty or disruption. The ethical problem is therefore not simply whether surveillance exists, but **whose behaviour becomes most available for scrutiny and whose ambiguity is granted the benefit of interpretation**.

This asymmetry is increasingly visible in educational technology. UNICEF's global review of data governance in EdTech warns that children's data can be used for profiling, shared beyond educational purposes and incorporated into algorithmic systems whose biases may reproduce existing disadvantage. It specifically notes that machine-learning systems can inherit stereotypes and structural inequalities embedded in training data, creating unfair outcomes for children who are already marginalized. In the United States, recent research on school surveillance similarly finds that surveillance technologies are more prevalent in large urban schools serving greater proportions of low-income and racially minoritized students. The consequence is not merely differential exposure to technology; it is differential exposure to the institutional consequences that technology can trigger.

The same pattern appears in digital monitoring. Students who rely more heavily on school-issued devices inevitably generate more institutionally visible activity than peers who can shift between personal devices, private networks and alternative resources. Monitoring systems may therefore intensify scrutiny precisely among learners whose economic circumstances make them more dependent on institutional infrastructure. Recent analysis has also raised concerns about disproportionate effects on students with disabilities and other groups whose online activity, communication or behavioural patterns may be more readily flagged by automated systems. Visibility, in other words, can become a function not only of behaviour but of **proximity to institutional systems**.

This matters because observation changes institutional relationships. The student who is repeatedly flagged is no longer encountered only through the immediate situation; she arrives accompanied by a history. Her behaviour becomes easier to interpret as confirmation of an existing pattern. The learner who has rarely been classified may receive contextual generosity—an unusual incident is treated as unusual. The learner already surrounded by alerts may experience the same incident as additional evidence. Over time, the accumulation of visibility can generate an **interpretive burden**: some students must repeatedly demonstrate that they are more complex than the profile preceding them.

Algorithmic systems can intensify this burden while appearing impartial. Research on predictive models in higher education, for example, has shown that algorithmic bias can affect which students receive additional support, including situations in which Black students near important decision thresholds would be less likely to receive resources because of the way predictive models classify success. The broader lesson is not that every predictive tool will reproduce inequity. It is that technical neutrality cannot be assumed simply because decisions are mediated by mathematics. Historical disparities can become computational inputs, and computational outputs can subsequently acquire the authority of objectivity.

For future-ready schools, this should change the meaning of **Equity Infrastructure**. Equity cannot concern only whether students have access to devices, courses, teachers or support. It must also ask whether students have equitable access to **interpretive freedom**: the freedom to make a mistake without becoming a category, to change without being continually recalled to an earlier version of themselves, and to encounter adults who remain capable of revising what they believe they know.

This is why the Educational Visibility Boundary must include an explicit equity test. Before introducing a new monitoring, prediction or profiling practice, leaders should examine not merely whether the system functions, but whose lives will become more legible because of it. They should know which groups will generate the most data, who is most likely to be flagged, what consequences follow an alert, how errors are corrected, whether scrutiny eventually expires, and whether equivalent behaviour receives equivalent interpretation across different learners.

The deeper principle is uncomfortable but necessary. **Visibility can itself become an educational privilege or an educational burden.** Some students benefit from being known well enough to receive support; others risk becoming known so extensively that institutional interpretation begins crowding out the possibility of being encountered afresh. A just school must protect both needs. It should make learners visible enough to prevent neglect, exclusion and unmet need, while ensuring that no child becomes so over-documented that the institution can no longer see the person standing in front of the record.

Equity therefore requires more than fair access to being seen. It also requires a fair distribution of the right to remain partially unseen.

THE EQUITABLE VISIBILITY AUDIT

If educational visibility is unevenly distributed, schools need a way to examine not only what data they collect, but **who becomes most visible, how that visibility is interpreted, and what consequences follow from it**. The **Equitable Visibility Audit** is an author-developed leadership tool designed to surface disparities in monitoring, profiling and institutional attention before those disparities become normalized as neutral practice.

The audit is not intended to produce a simple compliance score. Its purpose is diagnostic: to help leaders identify where ostensibly universal systems may create unequal exposure, unequal interpretation or unequal consequences.

Audit Dimension	Leadership Question	What to Examine
Exposure	Which learners generate the most institutional data?	Device dependence, platform use, attendance systems, behavioural logs, intervention records, monitoring technologies
Flagging	Which groups are most frequently identified as high risk, disengaged, vulnerable or non-compliant?	Alert rates, referral patterns, risk categories, disciplinary records, predictive classifications
Interpretation	Are similar behaviours interpreted differently across different learners?	Teacher comments, referral language, intervention decisions, assumptions about motivation, ability or intent
Consequence	What happens after a learner is flagged?	Additional monitoring, lowered challenge, restricted pathways, referrals, intervention intensity, removal of opportunities
Contestability	Can students understand and challenge how they have been interpreted?	Access to records, explanation processes, appeal routes, opportunities to provide context or correct inaccuracies
Persistence	How long do labels, flags and interpretations continue to shape future decisions?	Data-retention periods, transfer of records, historical notes, expired interventions, longitudinal learner profiles
Recovery	Can a learner genuinely leave an earlier classification behind?	Removal of outdated labels, review cycles, fresh-start practices, evidence thresholds for revising or closing a profile



The audit should be conducted with **disaggregated evidence wherever possible**. Aggregate data may show that a monitoring system functions consistently while concealing the fact that particular groups are substantially more likely to be flagged, referred or subjected to additional scrutiny. Leaders should therefore examine patterns across disability, language status, socioeconomic circumstance, gender, location, academic pathway and other locally relevant dimensions, while avoiding the assumption that disparity itself automatically proves discrimination.

The deeper issue is **interpretive asymmetry**. Two learners may display the same behaviour but encounter very different institutional responses because one already carries a history of concern while the other does not. The audit should therefore compare not only who is monitored, but how similar evidence travels through the system. A late assignment may be treated as an isolated lapse for one student and as confirmation of unreliability for another. A period of silence may be interpreted as thoughtful restraint in one learner and disengagement in another. Equity requires attention to the meanings institutions attach to the same visible act.

A particularly important diagnostic is the relationship between **support and surveillance**. Schools should examine whether learners receiving additional support also become subject to disproportionately intensive observation. Intervention should not automatically expand the institution's entitlement to know more about the student than the educational purpose requires. Where support generates additional data, leaders should ask whether those data remain necessary, whether they are being repurposed, and whether they create consequences beyond the original intervention.

The final dimension—**recovery**—is critical. A fair system should not merely provide learners with the possibility of correcting inaccurate data; it should allow them to outgrow accurate data that is no longer educationally relevant. A student who once required behavioural intervention, academic support or intensive monitoring should not remain permanently interpreted through that history. Equity includes the possibility of being encountered without the full weight of one's institutional past.

EQUITY RED FLAGS

The audit should trigger closer review when a school finds that particular groups are disproportionately monitored, repeatedly flagged without corresponding increases in support, exposed to more persistent records, given fewer opportunities to contest interpretations, or more likely to experience reduced access to challenge and opportunity after being classified.

The central equity question is therefore not simply whether every learner is subject to the same system. It is whether the system produces **equivalent dignity, opportunity and interpretive freedom** across different learners.



Figure 2. The Equitable Visibility Audit.
Conceptualized by Javeria Rana. The audit examines seven dimensions of institutional visibility—Exposure, Flagging, Interpretation, Consequence, Contestability, Persistence and Recovery—to identify whether monitoring and profiling practices create unequal burdens or constrain learners' ability to be reinterpreted over time.

CONSENT IS TOO WEAK

Consent is often treated as the ethical hinge of digital participation. A learner, parent or guardian is informed that information will be collected, a box is checked, a policy is accepted, and the institution proceeds as though legitimacy has been secured. In commercial settings this model is already strained; in schools it is even more precarious. Students rarely encounter educational technologies as genuinely optional environments. The learning-management system, attendance platform, assessment portal, communication application or school-issued device may be woven

into participation itself. Refusal can therefore carry an educational cost. Under such conditions, formal consent may exist while meaningful choice does not.

This is why the ethical architecture of a data-saturated school cannot rest primarily on permission. Children and adolescents also occupy a structurally unequal relationship with the institutions and technologies that collect information about them. They frequently know less about what is being collected, possess less power to negotiate the terms of collection, and have fewer practical alternatives to participation. UNICEF's current guidance on AI and children consequently moves beyond a narrow consent model and emphasizes children's ability to access their data, understand how those data are used, exercise age-appropriate control, and have information deleted where appropriate. It also links privacy to broader rights of expression, development, protection from profiling and freedom from exploitative uses of personal information.

The problem is compounded by what might be called **procedural opacity**. A learner may know that a platform stores information without knowing which behaviours are logged, which variables are combined, which inferences are subsequently generated, which third parties can access them, or how long those interpretations remain active. A 2026 systematic review of research on students' personal-data literacy found persistent limitations in children's and adolescents' understanding of contemporary data practices and the purposes for which their information is used. The review argues that personal-data literacy must include not only protective knowledge but also empowering competencies: the capacity to understand, interrogate and exercise agency within datafied environments.

For schools, this suggests that a more demanding principle should sit alongside consent: **contestability**. Contestability means that learners are not merely informed that an institutional interpretation exists; they have meaningful ways to understand, contextualize, correct and challenge it. A student classified as disengaged should not have to accept that classification as an administrative fact if the underlying data omit relevant context. A behavioural flag should not acquire permanence simply because no mechanism exists for the learner to contest its interpretation. A risk score should not silently influence educational decisions while remaining unintelligible to the person whose opportunities may be altered by it.

Contestability also changes the status of student voice. In many schools, student voice is still understood principally as consultation: surveys, councils, focus groups or opportunities to comment on school life. Those practices remain valuable, but the data-saturated institution requires a more consequential form of **Student Voice Governance**. Learners increasingly need a voice not only in what the school does to them, but in **how the school knows them**. That includes the ability, appropriate to age and maturity, to understand which data are being used, what conclusions have been drawn, where automated or human inference has occurred, and how an interpretation can be amended when it becomes inaccurate, disproportionate or obsolete.

Such governance would require schools to become more transparent about the distinction between a record and an inference. An assessment score is a record of performance under specified conditions. "Low academic resilience" is an interpretation. A late submission is a recorded event. "Poor self-management" is a judgment. Time spent on a platform is observable data. "Low engagement" is an inference. The ethical significance of this distinction lies in the authority attached to each layer. Learners should be able to see when institutions have moved from recording what happened to asserting what it means.

This also has implications for data literacy itself. Students should not be taught privacy merely as a repertoire of defensive behaviours—use strong passwords, avoid oversharing, read settings carefully—while the institutional systems around them remain inscrutable. Personal-data literacy

should include an understanding of categorization, profiling, algorithmic inference, retention and the possibility that data can be technically accurate while the interpretation drawn from them remains contestable. In that sense, data literacy becomes partly civic: it equips young people to participate in environments where information about them increasingly mediates access, opportunity and institutional judgment.

A future-ready school should therefore treat consent as a threshold rather than a destination. Ethical legitimacy requires continuing agency after information has been collected. Learners need routes for explanation, correction, appeal and eventual release from outdated interpretations. They also need institutions willing to acknowledge that transparency is not fulfilled by publishing a lengthy privacy notice that few students can meaningfully decipher.

The stronger standard is **participatory legibility**: if institutions are going to render learners visible through data, learners should have some corresponding power over the meanings attached to that visibility. This does not eliminate professional judgment or institutional responsibility. It makes those forms of authority more accountable. In a school increasingly capable of producing sophisticated representations of its students, the right to be heard must include the right to challenge the representation itself.

Drawing the Visibility Boundary

A framework becomes educationally useful only when it changes decisions. The **Educational Visibility Boundary** is intended to do precisely that: move schools away from an indiscriminate appetite for data and toward a more discriminating form of institutional judgment. The central question is not whether a technology is sophisticated, efficient or even accurate. It is whether the information it produces belongs within the school's legitimate sphere of educational knowledge, and whether the consequences of using that information remain proportionate to the purpose for which it was collected.

This distinction is particularly important because data practices that appear similar on the surface can occupy very different ethical positions depending on context. The same category of information may be defensible in one situation and intrusive in another. A teacher examining assignment completion to identify who may need additional support is not equivalent to a system constructing a durable engagement profile across months of platform activity. A short-term attendance risk alert designed to prompt a conversation is not equivalent to a predictive score that quietly influences course placement. The boundary is therefore not determined by technology alone. It is shaped by **purpose, scope, inference, consequence and duration**.

Engagement Analytics: Useful Evidence or Manufactured Meaning?

Engagement analytics provide a useful illustration because they often appear pedagogically innocuous. Dashboards can show frequency of logins, resource access, submission patterns, video completion, discussion participation and time spent within learning environments. Used carefully, such information can help teachers identify students who may be experiencing difficulty or reveal whether particular resources are being used as intended.

The ethical risk arises when behavioural traces are treated as direct measures of psychological engagement. Time on a platform does not reveal the quality of attention. Frequent clicks do not

establish intellectual investment. A learner may spend comparatively little time online because she works efficiently, uses printed materials or studies elsewhere. Another may remain logged in for extended periods while engaging minimally with the task. The observable data may be accurate while the inferred meaning remains tenuous.

Under the Educational Visibility Boundary, basic task evidence may fall within **Necessary Visibility** where it directly supports teaching. Aggregated engagement profiles belong more appropriately within **Conditional Visibility**, because the interpretive distance between behaviour and meaning has increased. Schools using such systems should therefore apply stronger safeguards: no permanent engagement identity, no automated consequences based solely on platform behaviour, transparent explanation of what the metric can and cannot indicate, and periodic review of whether the data continue to serve an educational purpose.

The critical discipline is **interpretive modesty**. Engagement analytics should generate professional curiosity, not institutional certainty.

PREDICTIVE RISK SYSTEMS: SUPPORT WITHOUT FORECLOSURE

Predictive systems create a different challenge because their explicit purpose is to anticipate what has not yet happened. They may identify learners considered at elevated risk of academic failure, absenteeism, disengagement or withdrawal. The potential educational value is significant. Earlier support can prevent avoidable difficulty, and institutions have a legitimate responsibility to notice patterns that individual teachers may not easily see.

Yet predictive systems also sit close to the boundary between support and prescription. A risk score can rapidly acquire authority because it appears quantitative, comparative and forward-looking. When combined with historical records, demographic variables or behavioural indicators, the model may produce classifications that shape how adults interpret subsequent evidence.

This places predictive analytics firmly within **Conditional Visibility**. The information may be useful, but its legitimacy depends upon what follows from the prediction. A responsible system should trigger additional opportunity rather than reduced opportunity. It should direct support toward the learner without lowering intellectual expectations, closing pathways or allowing probabilistic classification to become an enduring feature of identity.

The Visibility Boundary Test becomes particularly important here. Predictions should be explainable at a level appropriate to the decision being made, open to contextual correction, reviewed against equity patterns and subject to expiry. A learner identified as high risk in one semester should not continue to carry that designation indefinitely once circumstances change. The institution must preserve the possibility of **interpretive recovery**.

The Equitable Visibility Audit also becomes indispensable. Leaders should examine whether particular groups are disproportionately classified as high risk and whether flagging results in comparable support across different students. A system that identifies vulnerability accurately but distributes opportunity unequally remains educationally indefensible.

Emotion and Attention Detection: When Visibility Becomes Intrusion

Emotion and attention technologies present the clearest test of institutional restraint. Systems that claim to infer concentration, confusion, stress, fatigue or emotional state from facial expression, biometric signals or behavioural patterns move far beyond documenting educational performance. They attempt to make internal states institutionally legible.

This is where the presumption should change. Unlike ordinary assessment evidence, these forms of inference should not begin from the assumption that collection is legitimate unless harm can be demonstrated. They should begin from **Protected Opacity**, with an exceptionally high burden of justification on the institution seeking access.

The problem is partly technical. Emotion and attention are context-dependent and difficult to infer reliably from isolated signals. But the deeper objection is normative. Even if detection becomes increasingly accurate, accuracy does not automatically establish educational entitlement. A student may have a right to experience boredom, anxiety, distraction or emotional ambiguity without those states becoming persistent data. Educational support should remain available when learners disclose difficulty or when observable evidence justifies professional concern, but routine extraction of interiority changes the relationship between learner and institution in a more profound way.

This is where the principle of **minimum necessary visibility** becomes crucial. Schools should distinguish between what they need to know in order to discharge an educational responsibility and what they might find useful to know if no boundary existed. Future-facing leadership will increasingly depend on the capacity to resist the latter.

A Governance Architecture for Data-Rich Schools

Applied across these examples, the Educational Visibility Boundary suggests a more mature governance model. **Necessary Visibility** should be purposeful, proportionate and limited to information clearly connected to learning, accessibility or safeguarding. **Conditional Visibility** should require additional justification, transparency, contestability, equity review and expiry. **Protected Opacity** should establish presumptive limits around intimate internal states, speculative psychological inference and other forms of data whose educational value cannot justify their intrusion into personal development.

The framework also shifts institutional accountability. Schools should not require students to prove why a particular form of visibility is uncomfortable or excessive after it has already been introduced. The evidentiary burden should run in the opposite direction. Institutions seeking to collect or infer increasingly intimate information should be able to demonstrate necessity, educational value and proportionality before the practice becomes normalized.

This approach connects directly to **Ethical Anchoring** within the AQ Leadership Compass. Future-ready leadership cannot be measured solely through technological adoption or institutional agility. In some circumstances, the more advanced leadership decision will be to decline a capability because its educational warrant is weak, its inferential reach is disproportionate or its

consequences are insufficiently reversible. Innovation without boundaries is not sophistication; it is merely capability without governance.

The same principle strengthens **Student Voice Governance**. Learners should understand not only that data are collected but which zone of visibility a practice occupies, what consequences may follow and how the interpretation can be challenged. In this sense, the Educational Visibility Boundary becomes not merely a leadership tool but an institutional compact: a way of making explicit what the school believes it has a legitimate right to know.

The future of educational data should therefore not be organized around maximum visibility. It should be organized around **disciplined visibility**—enough knowledge to support learning, enough restraint to preserve dignity, and enough humility to recognize that no institution, however sophisticated its systems become, is entitled to convert the whole child into information.

CONCLUSION: A FUTURE-READY SCHOOL KNOWS WHERE NOT TO LOOK

The future-ready school will almost certainly know more about its learners than any previous generation of schools could have imagined. Its systems will detect patterns earlier, connect information across contexts, anticipate difficulties, personalize support and make aspects of learning newly visible. Some of these capabilities will be profoundly useful. They can help institutions identify unmet needs, reduce avoidable barriers, allocate support more intelligently and recognize patterns that human observation alone may miss. The argument of this article is not that schools should retreat from evidence, analytics or technological sophistication. It is that sophistication without restraint can become a form of institutional overreach.

Educational maturity therefore requires a distinction that future-facing discourse too often neglects: the distinction between **what an institution can know and what it is entitled to know**. Technical capability answers the first question. Educational purpose, equity, proportionality, human dignity and developmental freedom must answer the second. The two cannot be treated as interchangeable. A system capable of inferring attention does not thereby acquire a right to monitor attention continuously. A model capable of predicting disengagement does not acquire authority to narrow a learner's opportunity. A platform capable of accumulating a detailed behavioural history does not establish that such a history should remain permanently attached to the student.



This is why the **Educational Visibility Boundary** matters. Necessary Visibility recognizes that schools cannot fulfil their responsibilities through ignorance. Conditional Visibility acknowledges that some forms of analytics and prediction may provide genuine value while requiring stronger justification, contestability and expiry. Protected Opacity establishes a more demanding proposition: some dimensions of human development should remain outside routine institutional capture not because they are educationally irrelevant, but because their very significance requires that they remain partly the learner's own.

The **Equitable Visibility Audit** adds an equally important corrective. The ethical question is never simply whether a system applies to everyone. Schools must examine whose lives become most heavily documented, who is most frequently flagged, whose behaviour receives suspicious rather than generous interpretation, which labels endure longest and who is given a genuine opportunity to leave an earlier classification behind. Equity in a data-rich school must include access not only to support and opportunity, but to **interpretive freedom**.

That freedom is especially consequential because education works with unfinished people. Children and adolescents must remain capable of contradicting their records, outgrowing their categories and becoming intellectually, socially or morally discontinuous with earlier versions of themselves. A school that cannot revise its understanding of a learner has ceased to educate that learner fully. It has begun managing an institutional representation instead.

Future-ready leadership will therefore require an unusual form of courage: the willingness to establish limits precisely when greater visibility becomes possible. Innovation culture often rewards adoption, expansion and optimization; restraint can appear technologically conservative. Yet there will be circumstances in which refusing to collect, refusing to infer, refusing to retain or refusing to automate represents the more sophisticated decision. Ethical Anchoring is not the rejection of technological capability. It is the ability to subordinate capability to educational purpose.

The strongest schools of the future will consequently be neither data-blind nor data-hungry. They will become **data-discerning**. They will know where evidence improves learning, where inference becomes precarious, where prediction threatens possibility and where human interiority should remain protected from institutional appetite. They will build systems capable of seeing learners clearly without mistaking visibility for comprehension.

Ultimately, the measure of a humane educational institution will not be how completely it can render a child legible. It will be whether, amid unprecedented capacities to observe, classify and predict, the school preserves enough uncertainty for the learner to remain surprising. Future-ready education will need increasingly intelligent ways of knowing children, but it will also need the wisdom to leave part of every child unwritten.



FURTHER READING

Édouard Glissant — *Poetics of Relation*
Glissant provides the philosophical foundation for the article's use of the **right to opacity**. His argument resists the assumption that people must become fully comprehensible through another person's categories in order to be recognized or respected. For education, the significance lies in the possibility that learners can be known relationally without being exhaustively translated into institutional classifications.

Helen Nissenbaum — *Privacy in Context: Technology, Policy, and the Integrity of Social Life*
Nissenbaum's theory of **contextual integrity** offers a more sophisticated understanding of privacy than secrecy or individual consent. Information may be appropriately shared in one context and inappropriate when transferred, combined or repurposed elsewhere. Her work is particularly useful for schools attempting to distinguish legitimate educational evidence from disproportionate data circulation.

Daniel J. Solove — *Understanding Privacy*
Solove challenges the search for a single definition of privacy and demonstrates how privacy harms can arise through aggregation, secondary use, exclusion, distortion and institutional processing. His work helps explain why apparently innocuous pieces of educational information can become consequential when combined into persistent learner profiles.

Hannah Arendt — *The Human Condition*
Arendt's concept of **natality**—the human capacity to begin something genuinely new—provides an important philosophical counterpoint to predictive education. Her work reminds us that human beings cannot be understood only through continuity with their past. For schools, this strengthens the argument that learners must retain the possibility of becoming someone their existing records could not have predicted.

Ben Williamson — *Big Data in Education: The Digital Future of Learning, Policy and Practice*
Williamson examines how data infrastructures, algorithms and digital platforms are reshaping educational governance and the ways learners become represented within institutions. The book is especially valuable for understanding datafication not merely as a technical development but as a change in how educational systems see, categorize and act upon students.

Sonia Livingstone and Alicia Blum-Ross — *Parenting for a Digital Future: How Hopes and Fears about Technology Shape Children's Lives*
Livingstone and Blum-Ross locate children's digital lives within broader questions of agency, inequality, opportunity and adult responsibility. Although focused substantially on families, the book offers an important corrective to deterministic narratives about technology and reinforces the need to treat children as developing persons with rights and agency rather than merely as users to be managed.

Taken together, these works move the discussion beyond conventional data-protection discourse. They connect privacy with **human irreducibility, contextual judgment, developmental freedom, institutional power and the ethical limits of legibility**—the deeper concerns at the heart of *Unseen by Design*.



***Future-Ready Schools** is an exclusive feature by Javeria Rana on The Worthy Educator. Check back regularly for new insights on education transformed!*