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Infantilising education through risk-averse educational technologies of calculability: a critical essay

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ABSTRACT

This paper describes a paradox in education where AI-driven technologies foster risk-averse learning while contributing to heightened global uncertainties. We highlight how the promises of AI promote risk-aversion at the individual level through personalised learning while inducing unpredictable 'superrisks' at the societal level, affecting areas like the labour market, environment, societal relations. This paradox exposes gaps in educational policies that focus on integrating AI, ultimately legitimating AI-defined risks and needs (e.g. data literacy, coding) over broader societal risks (e.g. gender inequality, climate). We contend that AI's reductive nature infantilises learners by reducing them to objects within calculable frameworks stripping away opportunities to engage with and learn to manage real-world complexities. We argue for policy and educational paradigm shift that aims to reconnect education with the world, where students learn to navigate and embrace real-world risks directly aligning with Hannah Arendt's vision of taking responsibility for the world we inhabit.

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1. Introduction

Our paper is a conceptual analysis that draws on two constructs to critically examine the growing disconnect between the individually risk-averse environment AI-infused educational technologies propose in (West-European, Anglo-American) education (with its influence globally) and the large-scale societal risks that AI is simultaneously posing to the world.

First, we reflect on this risk-aversion at the societal level by examining risk through Ulrich Beck's concept of *risk society* (2010/1992) to depict the ruinous gap that emerges for societies as a result of this contradiction. Second, we use Philippe Meirieu's polemical characterisation of education as *infantile* (2010/1992) to describe how predictable, AI systems induce risk-aversion through their exclusive reliance on *calculable* capacities. We then critically review today's practices for adopting AI *via* these concepts of risk and infantilising education, addressing how pedagogic risk definitions are currently being

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re-articulated and re-negotiated through advanced technological solutions and the resulting kind of education they enable.

A certain level of infantilisation is maintained and reinforced by AI systems' reductive nature. In edtech contexts, AI predicts, prescribes, and adapts learning. AI systems create a Goldilocks-type of education – not too hard, not too easy, just right. In it, children become targets within a specific context of calculation. This context maintains their infantilisation by removing the unpredictable – risky – environment of everyday socialisation, indeed, any connection to real-world risks. The risk of relating to and learning to 'coexist with the world external to [learners]'(Biesta 2022: 327), so essential to educational encounters, is thereby removed. Yet, we argue, education should be the place where children learn to live with risk, move beyond egocentrism (the infantile), and be the point, as Hannah Arendt puts it, 'at which we decide whether we love the world enough to take responsibility for it' (1961: 196).

To 'reclaim' education, as the journal's special issue calls for, we need to re-evaluate the wider social risks posed by AI-driven education, the kinds of learning milieus AI systems propose, and the types of risks which they prioritise over others. Although the topic of AI in education is vast (see Holmes, Bialik & Fadel 2018), concerns are urgent, so we focus particularly on critique here, to contribute to more balanced public debate, which overall is dominated by optimistic commercially-driven views. However, first we should ask: How are risks articulated by today's AI- and data-driven educational systems and do these built-in definitions carry pedagogical and historical significance for education?

1.1. Old risks, new risks

Threats to 'people, animals and plants' (that is, living beings of all sorts) are 'risks of *modernisation*' (Beck 2010/1992: 21), writes Ulrich Beck in his sociological analysis of contemporary *risk society*. While risks characteristic of pre-industrial societies can be understood as involving a certain bravery and adventure (e.g. the discovery of new land), the risks of the industrial (e.g. nuclear threat) and the contemporary, digital world differ somewhat (cyberthreats, obesity, pollution, superintelligence wiping out humanity). The concept of industrial risks – late 19th or early twentieth century – changed the world of work through unions and schooling (banning child labour). But other 'old' risks – the risks of poverty, antisemitism, gender inequality – persist. Injury was created as a legal, social, economic, structural, organisational condition to be prevented. Today, injury is further re-defined in a datafied society in terms of the risks of data privacy loss, data theft, and data manipulation.

Unlike some old dangers, many new risks are 'politically reflexive' (Beck 2010/1992: 21). That is, they are subject to political decisions and responses. For example, the push to adopt AI and digitise education is driven by the need to address concerns that new generations might lag behind in digital skills and that countries need to stay competitive globally in AI development (UK Government 2022a, 2025; UK Parliament 2024; European Commission [EC] 2021; EC 2024; EC 2023a,b). But that inherent reflexivity requires us to be alert to how 'risks' are themselves already being constructed when introducing AI in education.

1.2. New risks shaping education

Sociology of education as a discipline has often examined differences in access to education and how educational inequalities are socially sustained (Gewirtz & Cribb 2009). AI and

data-driven digitisation of education are increasingly accepted and promoted through policy as the way to address these differences and risks. However, what is often referred to as digit*al*isation – the broader use of digital tools and platforms – might more precisely be understood as part of a deeper process of *mediatisation* (Couldry & Hepp 2016). Mediatisation refers to how media logic increasingly structures institutional operations and shapes not only how education is delivered but also what counts as knowledge, risk, and success. In this way, the *inherent* normative structures and rules involved in education are revised and replaced through datafication and digitisation, which re-shape the socialisation process through which children live and learn.

Societies' most basic normative certainties – and indeed institutional structures for managing risk such as family, childhood, and school – are being sidelined, even undermined by the dramatic reconfiguration of education through AI. Already anticipating this, Beck writes that – a new 'negotiated provisional family emerges' (Beck 2010/1992: 129), the consequence of individualisation in a contemporary, digitised society; the consequence of both parents working, tending to their own digital lives, spending less time with their children, pursuing individual interests that overshadow community needs, and so on. The resulting societal risks (erosion of family time and commitment to community; overemphasis on external data extraction; students' misuse of school-issued computers, etc.) become a form and function of the technological systems that seem to define contemporary society.

We are told that AI will eradicate risk and lead to 'deep utopia', meaning we needn't worry about risks in utopia except boredom (Bostrom 2024), because artificial (super)intelligence will do it all. AI will 'offer extraordinary new medical advances and clean energy breakthroughs, creating not just new businesses but new industries and quality of life improvements in almost every imaginable area' (Suleyman 2024: 10). Intensified digital education and the boosting of science, technology, education, and mathematics (STEM) enrolment are viewed as key strategies for moving towards utopia and addressing new risks (UK Department for Science, Innovation and Technology [DSIT] 2023). Supranational organisations are advocating the integration of STEM education with digital tools and personalised learning to combat poverty and discrimination (UNICEF 2024). In effect, today, the science of AI becomes 'part of the logic of hazard prevention' (Beck 2010/1992: 79) through a *redefinition* of the logic of hazard.

This attempt to take control of how risks are socially defined is explained through the authoritative nature and exactitude AI promises in education. Risk is, according to Beck, defined as 'the probabilities of physical harm due to [any] given technology or other process'(Beck 2010/1992: 4). It is why, he argues, technical experts are given pole position' (4) in defining the parameters, magnitude, urgency and solutions thereof around these risks. AI experts inevitably therefore play a key role today in relation to managing the very risks that they also claim the authority to define.

Here, we want to highlight the extent to which policies authorise AI's increasing control in education not only of what pedagogically is required but also what counts as 'risks' (e.g. problematic behaviours, distracted learners etc.). In the process, as Beck anticipated, even credibility is revalued. The risks posed by deep problems are reduced to parseable data for treatment, reconfigured to serve new AI-driven instruments of problem-solving, leading institutions and their representatives to adapt to these new translations of risk and credibility 'without fundamentally questioning the forms of power or social control involved' (Beck

2010/1992: 4). For example, GoGuardian, an educational software for monitoring student activity online, 'support[s] student well-being with near real-time insights into their online activity' (GoGuardian 1992 n.d.[1]). It detects and flags content that indicates inappropriate digital use and students at risk of harm to self or others. Its algorithms filter, monitor and block content it deems inappropriate; it claims to pre-empt future risks. While the program has been found to create more problems than it solves – including concerns about student privacy, the opacity of its decision-making algorithms and the risk of false positives leading to unwarranted interventions (Maass, Barnett & Kelley 2023) – yet, over ten thousand schools seem to accept its logics (GoGuardian 2023 n.d.).

AI can easily take on the social role of law and authority due to its mathematical nature; not through the actual force of mathematical reasoning, but through the long-standing 'systematic assumption of realism in science' (Beck 2010/1992: 4). AI systems are computer systems that scoop data, and detect patterns in it; compute sums, means, and probabilities; make predictions. These outputs are treated as scientific evidence that is concrete and believable. In the face of this new authority and new science, we must recall that 'so long as risks are not recognised scientifically, they *do not* exist – at least not legally, medically, technologically, or socially, and they are thus not prevented, treated or compensated for' (Beck 2010/1992: 71). Hence, as a sort of 'scientific monopoly', AI gains a practical *monopoly on truth* (Bourdieu, 2000) – on what is now considered existent. It becomes ever harder to demystify this new science and challenge the risks it identifies, while it introduces new risks and tackles old ones *anew*. As such, AI leads to a 'general obfuscation of risks' (Beck 2010/1992: 72). Old risks are overshadowed by new risks and never fully tackled. That is the general context for AI's insertion into education today.

1.3. The AI risk paradox

Our main thesis springs from this paradox drawn in Figure 1. If AI is envisaged to surpass the human genius (in some ways it already has) – i.e. some kind of *superintelligence* is in the making – we can similarly assume associated societal risks may become *superrisks*. At one end, suppose we treat average human intelligence as somewhere just above the 'village idiot' (Bostrom 2015, 06:08) with AI expected to surpass any known human genius to reach super levels of unknown intelligence. A similar linear assumption prevails in policy, public, and even academic discourse about risks relating to one's future wellbeing. The assumption is that absence of education is more likely to lead to higher risks, while the promise of digitising education is to overcome learning and poverty gaps, promise equitable, and quality futures.

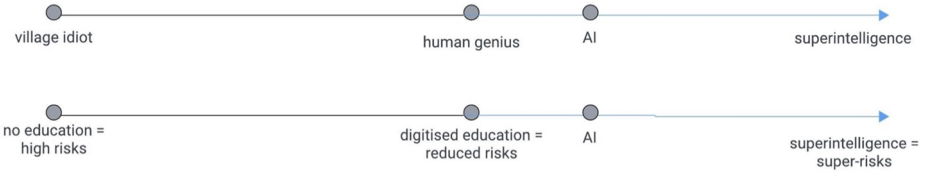

Figure 1. The result is that AI systems promise the reduction of certain risk (defined by them), yet the future promises unprecedented risk predominantly triggered by the very same systems. [Source: V Hillman].

However, the promises of AI in education create a paradox: While aiming to reduce risks of insufficient education, AI introduces new, possibly, superrisks and uncertainties, such as disrupting job sectors and rendering current education and training inadequate. Integrating AI (and any kind of future superintelligence) into education and societies not only reshapes how we understand risks and solutions but also transforms our concepts of knowledge and expertise. This shift can likely affect what skills are deemed valuable for children to learn through education.

In this picture, neither super-artificial intelligence nor super-risk (or any other new risk) can be fully known, nor can children, teachers, parents, or society be prepared for them.

Consequently, what we observe in education is something almost deceitful: Existing risks, some chronic (e.g. gender inequality, poverty, antisemitism, islamophobia etc.), some contemporary (e.g. the breakdown of family bonds, sedentary life), are overridden by risks defined by AI systems (e.g. lack of 'data literate' societies and experts in science and technology). Policymakers and politicians thus misleadingly focus on these new risks without much regard for what is actually desirable and needed in education (Biesta 2019) and the social risks that follow when we ignore those long-term needs that education has historically addressed.

2. Methodology

Our essay is a philosophically-informed exploration of contemporary social problems linked to education. Empirically, it is based on critical analysis of education policies, national and intergovernmental digital education strategies, white papers and select international reports of three geographic regions: the UK (UK Government 2022a, 2022b, 2023, 2025; DSIT 2022), the European Union (EC 2023, 2023a, 2023b) and the United States (US Department of Education 2023; The White House 2023, 2025).

We review how AI, that is commercial AI, is articulated in policy discourse and implementation strategies nationally and transnationally as a way towards mitigating risks in education, listening to AI's 'voice' on risks in education and its proposals for solutions. We call for critical reflection on these strategies by exposing the risk paradoxes that the very same AI systems integrating in education can impinge upon societies as a result.

Figure 1 positions our thinking in relation to the over-linear assumptions, which characterise AI hype. Neither human nor AI advance linearly. In fact, progress through AI in education is likely to be neither universal nor even necessary, unlike the progress that can be imagined in relation to certain universally agreed global risks (planetary, health, military). The uses of AI in education need, therefore, to be considered in the context of some agreed definition of what the *real* risks in education and in societies are. Otherwise, we risk letting education as a knowledge domain be re-articulated by AI systems, while the different real risks from applying AI are overlooked in policy development.

Within this description we interweave our critical analysis of the policies we have examined and how they give AI systems leeway to re-define the risks that education is supposedly designed to minimise and propose its own solutions. We briefly describe some ways in which AI is today being integrated in education. We argue that infantilising education through AI systems could harm future societies by introducing what, echoing the language of Nick Bostrom, one of AI's celebrators, we call social superrisks.

3. AI's proposal for a risk-averse education

AI has demonstrated potential benefits in education, particularly in enhancing accessibility for students with disabilities through adaptive learning technologies and personalised support systems (Harkins-Brown, Carling, and Peloff 2025; Hadinezhad, Garg, and Lindgren 2024). Research also highlights AI's role in mitigating teacher workload and fostering inclusion (Tan, Cheng & Ling 2025), though evidence of the true benefits of AI remains contentious (Holmes, Bialik & Fadel 2018). Despite some of the promises, AI also encourages learning environments that are, from the perspective of both AI and individual students, risk-averse.

Thus, our first argument is that AI encourages learning environments that are, from the perspective of both AI and individual students, risk-averse. Risk-aversion promised by AI systems is expressed in many ways: Diagnosing students and tracking their attention, performance and engagement to provide instant tailored interventions. For example, IXL Analytics provides 'real-time diagnostic which pinpoints students' overall working grade levels' (IXL 2018 n.d.). Its Diagnostic Strand Analysis function simplifies differentiation by grouping students with similar levels and highlights 'the most common skill recommendations for each group' (IXL 2018 n.d.). How the software arrives at such diagnostics and recommendations remains unclear to either teachers or students. EquityMaps, another AI tool, captures visual and audio data to show 'who's talking' in class (CommonSense Media 2022). These platforms and many others employ closed feedback loops whereby student input (responses to questions, attempts made etc.) directly influences the software's output (type of assessments or learning trajectories drawing for students). A set of algorithms analyses students continuously, identifies knowledge gaps, offers adapted content and adjusted difficulty levels of the instruction or assessment. The result is to systematically simplify the actual challenges which, in a face-to-face pedagogic environment, students would normally face.

All these products are based on machine learning that first 'learns' about its users and then the AI responds in real time, personalising what pupils should see, do, learn, or be tested on next. This 'learning' about the student is where pedagogical risk is re-defined. The system 'learns' what *it* thinks is problematic or a 'risk' that needs to be addressed (say, a gap between required competence and current performance) with tailored content or learning pathway. The environments AI creates therefore are controlled, predictable, and closed, unlike human-led teaching and interaction. The sequences of activities, questions, feedback, progression – the student's future – are determined by programmed rules and data-driven decisions. The content and pedagogic delivery are standardised and programmed to meet expected overall benchmarks without any deviations.

Adaptive learning environments lack the unpredictable emotional and social dynamics of the traditional classroom, including peer-to-peer and student-teacher relationships and the physical space itself (e.g. the classroom during a power outage, an unexpected guest speaker during a lesson, a surprise field trip). User interactions are constrained to a device and software: a struggling student is indicated by an orange or a red emoji based on system-inferred test results (disregarding if, say, a child came to school hungry or abused); digital badges represent achieved performance. AI offer *data-clad* environments that can thus be discouraging. Instead, they encourage risk-averse behaviour by students and teachers, with the wider risk of, over time, infantilising education.

3.1. Systems of infantilisation

In *Education and Technology: Issues and Debates*, Neil Selwyn defines AI as computer systems that use data and past experiences to make human-like decisions and predictions, while also automating tasks without direct human input. Terms like 'algorithmic data processing' and 'automated decision-making' (2022: 146) are often used to describe AI due to its ability to process vast amounts of data quickly, highlighting its computerised decision-making based on extensive data analysis (their calculative power).

But this approach fails to take account of how, from a social or pedagogic perspective, AI may work in ways that (whatever their calculative power) are 'risk-averse' and result in wider social *systems of infantilisation*. This emerges when we think of [i] the usual socialisation between teachers and pupils and peer-to-peer, and [ii] the environment of this socialisation. AI systems tend to define what risks and problems educational relationships and environments have or are likely to have in the future, and are designed to manage these risks, *as if* they were problems. These AI systems not only mediate these two conditions – relationships and environment – but they also seek to control them, as risks, when it is far from clear that, from a pedagogic point of view, they actually are risks.

Here are some examples. AI systems promise to solve problems such as teacher shortage or one-size-fits-all education which doesn't cater for an individual's learning pace, style, needs. Instead, AI claims that all children will learn things adaptively and individually. DreamBox Learning promotes itself as an interactive maths platform, which adjusts in real time to a student's behaviour. The product asserts it meets each pupil at their level and accelerates the learning journey by engaging in games-like lessons. It claims to 'get[students] the right amount of challenge' (DreamBox 2018n.d., 0:17) and solve the problem of relationships by making itself the main interaction tool. Any unintended relational or environmental risks can be predicted, controlled, and even prevented. But such systems don't challenge the implied infantile egocentricity of this environment nor do they acknowledge it. On the contrary, they reinforce it. When a child feels bored, the system detects it and pushes a game that sooths or entertains. ClassDojo motivates pupils by awarding them badges for 'good behaviour'. Knewton's Alta detects distracted pupils and pulls them to reengage. In this way, the student is *not* learning to deal with and overcome their frustrations or discomfort, as they would in a face-to-face pedagogic environment, or indeed – in the real world.

Other AIs automate tasks with the purpose to solve teacher workload. Teachers are promised ample time with their pupils instead of spending it on mundane tasks. Gradescope assures teacher workload reduction of up to 30% by automating grading (Singh et al. 2017). Children, instead, will, it is claimed, have the 'right amount' of attention from calm teachers whose overwhelming administrative and grading load is handed to machines. A friction-free environment is promised once AI takes over stressful grading. Yet, a different crisis is created from a social perspective as automating teacher workload devalues teachers' very labour. Gradescope also pledges to provide detailed analytics for teachers to 'get to know their students better', say, by highlighting their learning gaps, at least as AI defines them. There are many more like these products. They all promise a variety of risk aversion, that is, to avoid the risks that are inherent in any *social* context of learning not by addressing them, but by overriding that social context entirely.

This friction-free world where pedagogic risks (as defined by AI) are predicted and prevented epitomises infantilism (Meirieu 2007), but before we explain why, let's define another important trait of AI systems.

3.1.1. The transnationality of AI products

AI systems are transnational in nature. As Beck argues, transnationalism detaches individuals and communities (2000/1997). AI risk-averse systems may create a sense of attachment and meaning (to the real and physical) through their functionalities of simulating familiar content and processes, but this is superficial: even worse, their own environments have a colonising tendency (Couldry & Mejias 2019) because of their subliminal capacity to calculate and exert control, commercialisation, and manipulation. When individuals are fully detached (they are in a personalised bubble for instruction, learning, and assessment), there is no community, no common shared problems, shared resistance, and a shared work towards fixing the common world.

For example, CenturyTech, an adaptive learning platform, is used by Egyptian, Italian, and English pupils (n.d). This makes it a *transnational* digital tool. Many AI systems in education are like it. The abiding principle of transnational digital technologies is the logic, ontologies, and procedural processing of and functioning through data; computing new logics, inferences etc., that nudge and steer a child's learning – whether he or she is a Cairene, Cagliartano, or from Coventry.

What makes this diagnostic software transnational? Beck states that 'transnational social spaces cancel the local associations of community that are contained in the national concept of society' (Beck 2000/1997: 28). The transnational nature of AI instruments cancels the local associations of community as they inject their own dominant logics and essence. Moreover, transnational AI instruments give rise to 'forms of life and action' (Beck 2000/1997: 28) with their own inner logics, semantic representations, and governance.

Thus, we should expect that AI systems create their own versions of societies from and for the next generations. As such, important sociological questions emerge (which prompt further paradoxes): How are transnational AI instruments bypassing cultural norms and values, and (local/national) societal priorities? Do these instruments help cultivate collective action and even resistance against their very own impositions and biases or do they influence with novel authoritative powers, undisputed, and unquestioned?

There is a tendency for human beings to blindly follow technologically influenced decisions even if people clearly know that these decisions are wrong (Schellmann, 2024). Like Beck, we can ask: Are transnational AI instruments 'stateless, or perhaps even institutionless, early forms of transnational world societies?'(2000/1997: 32). Beck believed that transnational corporations and globalism were driving the creation of such stateless global society. AI tools, as products of these forces, are deeply impacting local societies, especially through educating the young. Which factors support or obstruct such transnationalization? And what political outcomes – disintegration of national governments or, alternatively, a global unity – might they bring about?

3.2. Infantilising education through AI

Building on this understanding of AI's transnational quality, we now turn to the ways in which AI can infantilise not just individual pupils, but education itself. As already argued,

AI educational technologies are transnational and generate rather *sterile* environments that can sidestep the otherwise messy, unpredictable, and social nature of mainstream education, and ultimately diminish its richness and authenticity. But our next argument is that AI *infantilises* education itself. We frame this argument within the Western neoliberal market economy for two reasons. First, it helps to contextualise how digital technology, a growing commercial sector, is being today prioritised in defining risks across various domains – from politics and agriculture to medicine and education. Second, it provides a sharper context for observing the societal expectations and demands that AI confronts.

In his essay (2007), French writer Philippe Meirieu explores how the neoliberal market's emphasis on constant consumption – driven by globalisation, media influence, and celebrity politics – contributes to the infantilisation of education. He positions the developing child in this kind of education made available to them. As children often experience a stage of perceived omnipotence, driven by primal egocentricity (Meirieu 2007), they act on unrecognised and unmet desires without understanding the need for delayed gratification. Children are driven by desires they cannot yet identify with or integrate meaningfully into their interactions with the world. Even later in life adults do not necessarily grow out of the infantile – the desire to pursue their own desires. But it is in this crucial moment in childhood where the important role of educators comes (Biesta 2019). They must guide children patiently, teaching them self-regulation, reflection, self-control. Addressing disposition and attitudes, Meirieu argues, become an important part of the pedagogical process (2007). It is education that takes children through a journey that is 'slow' (Biesta 2019: 665); prepares them and guides them through a gradual process to understand and evaluate their desires; helps them discern what will help or stand in the way of a life well-lived in cohabitation with others (Meirieu 2007). Meirieu highlights:

> The educator must thus accompany [the child] patiently along the path of delay and teach him not to react immediately with either violence or resignation, but take the time to question, to anticipate, to reflect, to govern his impulses and to build his willpower (Meirieu 2007: 1).

Put simply, education must help children manage their own desires rather than be controlled by them; develop and maintain a balanced relationship with their own impulses. As such, Meirieu speaks of *resistance*: Education teaches the child how to resist their own urges (or at least be expected to do so). By contrast, AI systems propose in education a radically different pedagogical approach. Instead of education being 'the base on which the child can rely to emerge from the infantile state', AI positions itself as the system from which the child is unable to detach himself.

Although writing about an earlier 'tidal-wave of infantilism' associated with broader consumerism, Meirieu's diagnosis remains strikingly relevant: 'magic formulae are making a killing' (2007:2), with neoliberal market solutions prompted as the route to economic prosperity and fewer future risks. Similarly, AI today is presented as a magic formula for achieving 'just right', 'equitable', 'good quality' education (see marketing slogans like MagicSchool's: 'the magic of AI to help schools save time' https://www.magicschool.ai).

3.3. Risks in contemporary societies: risks as a knowledge domain

However, this emphasis on AI as a magic formula contrasts sharply with the social reality in which AI-driven educational models are being inserted. In stark contrast, we have a

world outside of these AI designs that is transforming in increasingly unpredictable and risky ways, again, due in part to AI itself (e.g. repleting natural resources, autonomous weapons, automated discrimination). This shift highlights a crucial transformation: risk is no longer just a matter of predefined issues, but is being redefined through new systems and technologies.

Risk society (Beck 2010/1992) is one that is aware of the risks in which it lives. Such awareness begins with knowledge and norms, which 'can thus be enlarged or reduced…or simply displaced from the screen of consciousness of risks' (Beck 2010/1992: 75). As societies evolve, Beck notes, old risks might seem exaggerated or amusing to the next generation. Perspectives change from the sense of something posing a significant threat to something that is normalised, even trivialised as new risks and technologies emerge. For example, screentime, long feared since mass media and the television, has now normalised not only in children's homes but in their pockets, bedrooms, and classrooms. The dystopian scenarios of a sentient AI destroying the world seems already, in education, to have been replaced with funding and policy initiatives to integrate AI and create teacherless, AI-only classrooms (Carroll 2024). Some risks, therefore, are not merely trivialised or interpreted away; they are interpreted *anew*, with tech industry's control of these re-definitions.

Similarly, inadequate education has historically been linked to heightened risks of societal, economic, and even political failure, prompting governments to invest in educational reforms and new technologies, with AI offered as the magical solution. Policymakers proclaim that new technologies will achieve levelling up, break down barriers in income, literacy and skills, and produce educated individuals proficient in STEM fields because these subjects promise bright futures (Council of the European Union, 2018; EC, 2023, 2023b[2]). Recent UK government initiatives promised digital skills and computer knowledge to meet the 'needs' for children to 'participate in a digital society' (Department for Digital, Culture, Media & Sport 2022). A new risk narrative is created: lacking AI-driven education, particularly digital and STEM skills, equates to high future insecurity. Yet, digital disruption has created its own forms of social, political, and economic precarity, mainly favouring those driving the digitisation (Gray and Suri 2019). Social risks are being interpreted *away* but not necessarily prevented.

4. Three theses of the AI risk paradox in education

While AI promises equitable education, as we described, it also can reinforce self-centeredness by delivering individualised learning rather than helping students integrate into a wider community of risk-taking (Meirieu 2007). Our central claim is that adopting AI in education creates paradoxes and mismatches between its promises for children's education and its potential to cause superrisks in society. In this section, we expand on this claim about superrisks with three theses about broader risks deriving from AI's role in education that policymakers and society should carefully consider.

4.1. The profit of risks and the marketisation of education

In the previous sections, we examined how AI systems can infantilise both children and the education process itself, and suggested how these systems reflect and exacerbate a broader neoliberal market logic. The rather sterile environments fostered by AI can detract

from the richness and authenticity of human-led educational experiences, because of inherent misconceptions about the capabilities of AI in education and misunderstandings of the resulting societal and educational risks – whether now or in a future marked by superrisks from potential superintelligences.

Summoning AI as a solution for the risks education is designed to solve has in effect extended society's current fixation on measurement and datafication (van Dijck 2014). In the process, social risks are reinterpreted at a distance from what is actually *desirable* for a child's education (Biesta 2007) and might be an indication of good quality.

In this context, philosopher Gert Biesta's essay *What Kind of Society Does the School Need?* (2019) offers important insights. He argues that the relentless pursuit for educational improvement through measurement and accountability has led to 'ever narrower definitions of what counts *as* education and what counts *in* education' (Biesta 2019: 657, original emphasis). This has created a widespread perception of schools as failing and problematic, with stakeholders – including schools, teachers, media, politicians and the public – demanding better outcomes from schools (Biesta 2019). The response to these perceived failures has been a growing reliance on privatised data- and AI-driven solutions from tech giants like Google and Microsoft and the burgeoning edtech industry.

But something else should be questioned simultaneously. Biesta challenges us to consider not just whether societies demand quality education for all children (see the UN Sustainable Development Goals, UN, n.d.) but also to examine the very societies that are making these demands. He introduces Paul Roberts's notion of 'impulse societies' (Roberts 2014: in Biesta 2019), which, similar to Meirieu's emphasis on constant consumption that is instilling egocentrism and impulsive behaviour, are driven by *desires* rather than *needs*. In these societies, the line between manufactured desires – such as those promoted by media, marketing, and standardised testing – and genuine needs becomes increasingly blurred. This blurring serves the interests of a neoliberal market that thrives on consumption, instant gratification, and commercial definitions of success.

The full implications of Meirieu's insight emerge more fully within Wendy Brown's brilliant exploration of neoliberalism as a social philosophy that evacuates the social in favour of the economic (Brown 2015). For Brown neoliberalism subsumes many domains (including 'justice, individual…sovereignty and the law' to 'the project of capital enhancement' (2015: 22). Although Brown doesn't discuss education, neoliberalism necessarily also undermines education seen as the project of fairly enabling individuals to develop as free subjects able to operate within the law, displacing it with a sort of 'sophisticated common sense [or] reality principle that remake[s] institutions and human beings everywhere it settles' (2015: 35). Neoliberalism, by encouraging the embedding of *commercial* AI within education institutions, operates like a 'reality principle' that is reshaping education values with particular force and thoroughness.

These conditions have paved the way for big tech firms like Cisco, Microsoft, Google, and others to play a dominant role in shaping the global education landscape, creating conditions for their investments in the profitable education sector 'without the impediments of existing institutional arrangements' (Robertson 2002: 2). During the Covid-19 pandemic, the involvement of tech giants and supranational organisations such as the OECD and UNESCO highlighted this trend. Rather than focusing solely on immediate responses to the health crisis, these entities advocated for a long-term digital makeover of education (Klein 2020).

The juxtaposition of these developments – the promise of AI in education and the dominant reality of market-driven priorities in consumer societies – reveals a critical paradox: while AI is heralded as the key to achieving equitable, high-quality education, it also contributes to a more commercialised and fragmented (detached from the real world) education. All this requires that we examine not only how the market-driven infantilisation through AI in education ignores the risks of replacing socially-based pedagogic processes with machine-driven models (undermining social learning, nurturing skills of trust, respect etc.) but also the resulting risks to personal liberty for teachers, parents, and the citizens children will become.

4.2. Stability vs liberty

In the past decade, the top five tech giants – Google, Apple, Facebook, Amazon, and Microsoft – expanded their reach into public education globally. These companies and a growing number of others provide integrated education ecosystems through software, hardware, data analytics, and AI. This integration makes it increasingly hard for education institutions to switch providers, thereby giving these companies substantial influence over educational processes (Decuypere, Grimaldi & Landri 2021).

These ecosystems pose yet another paradox between personal liberty and stability. As Hannah Arendt suggested long time ago (1961), the pursuit of stability through technologies promising equitable access to quality education (a common slogan of edtech products today) can conflict with basic democratic principles. For example, while digital tools aim to eliminate illiteracy, ensure ubiquitous quality education, and are ambitiously portrayed by policy as the path to thriving societies (see EC 2023; UK Government 2022b), true educational quality cannot be measured by high test scores and green emojis alone.

Arendt, when making this argument, had critiqued the UK educational system's reliance on standardised exams, which aim to 'weed out' all but a small number of academically-inclined pupils (1961: 180). This same standardised testing plagues American education, too. Moreover, it has intensified since the introduction of Standard Assessment Tests (SATs) and performance league tables in the UK in the 1990s and thriving today, which have had significant negative social consequences. For instance, the introduction of league tables has contributed to increased spatial inequality, as advantaged families have been more likely to move into areas with higher-performing schools, thereby deepening the geographical concentration of privilege and entrenching educational disparities (McArthur & Reeves 2022). Subsequent decades of embedding a culture of standardised testing have increased the risk of what Cunningham (2019: 112) terms 'epistemological erasure' – the systematic exclusion, devaluation, or suppression of non-dominant ways of knowing, learning, and being. Or, as Heimans et al. (2021) argue, standardisation governs what becomes 'seeable' and 'sayable' (363) in education – narrowing pedagogical sense to what can be measured and rendering other educational values and practices 'unhearable, unseeable or "other"' (368).

Whatever the merits of Arendt's earlier debate, today's AI systems massively deepen the problem by depending exclusively on continuous standardised *and individualised* assessments and student performance-tracking enhanced by algorithmic sorting of students.

All the while promising greater educational fairness and quality education, AI can, in fact, erode personal autonomy. Besides standardised testing, tailored learning affects individuals at a subliminal level: neither students nor teachers truly know how AI systems arrive

at their results (Holmes, Bialik & Fadel 2018). Data-driven nudging, operating behind the scenes, can restrict students' freedoms to pursue unconventional interests, and limit them to predefined educational tracks (see Amazon's Future Engineer childhood-to-career programs [Amazon 2018 n.d.]).

AI systems promise artificial stability through their 'just right' tailored learning. This tailored approach can come at the expense of students' freedom to challenge standardised expectations (AI models, diagnostics, predictions). Such systems can diminish students' right to self-determination as they learn the chilling effects (Centre for Democracy & Technology 2022) of Class Dojo's or Bloomz's tracking and rating of their behaviour. Teachers' autonomy is also undermined as their performance is monitored – ranging from the platforms they use (often pressured by superiors evaluating the value of tech investments), to how their classroom behaves and achieves. Students can equally miss out on non-conventional subjects because, say, YouScience's (n.d.) AI is directing them elsewhere.

To define one's own success beyond digital badges, to fail and learn from failure, and to write and think unconventionally, and not be penalised by software that scans words (Chin 2020), is liberating but also risky and destabilising, as it runs counter to AI models' standardised conventions and their embedded rules. For, liberty in a traditional classroom can emerge at any moment – a question sparking a heated debate, a flash of insight, a lasting memory, or a burst of inspiration. These spontaneous moments give school life meaning and pave the way to adulthood – something that AI, reliant on historical data, fails to recognise.

4.3. Disembodying education from society

Like the child, education is born into the world and out of society. Child, education, and society are deeply connected. AI risks disembodying and detaching education and child from the world and society. This disembodiment, through a series of detachments, is gradual but also potentially profound.

First, a detachment is reinforced through discourse – by the continual narrative of education being 'in crisis' as though it exists separately from societies. This narrative not only characterises *old* and *new* societies, risks, systems of governance, curriculum, etc; it also deflects from wider forms of political, economic, and societal failure. When political turmoil or a slow economy plagues a country, the blame is often placed on poor education. Societies thus put responsibility on children to have better education as a primary way to fix the long-term problems of the world, as Arendt long ago noted (1961: 177).

However, this view is misguided and shows the first detachment of education from society as a whole, by presuming that adults from an earlier generation already know better how to fix the world's problems through educating children based on the assumptions *they* (the adults) have inherited from the past. Applying narrowly based solutions on inherited market-driven models risks intensifying this long-standing problem.

A second detachment happens on a more intimate level, as the physical and the social detaches from the real world and human experience when AI systems take on the role of translating, reimagining and concretising people, relationships, and their environment for the purposes of education. Students and teachers risk being reduced to digital icons like trophies, warning signs, and bar charts, resulting in a detachment of self from self and others. AI gradually reduces rich human experiences (say, the teacher who dares his students

to stand tall on their desks to break free from conformity [Weir 1989]) down to data, icons, and metrics. AI-mediated relationships in education become more transactional (teachers and students follow data-led benchmarks, complete nudged tasks, meet efficiency goals). Teachers' and students' own emotional investments and sense of belonging to the process weakens as, for example, when teachers (with students' knowledge) use AI to prepare lesson plans, automate students' reports, and communications.

AI can disconnect students from their environment and identities by reducing them to data points. The digital classroom labels students as engaged/disengaged, high/low performer, or at risk/on track, compromising privacy, and their right to exist beyond rigid categories. This new environment not only risks alienating students from their learning and connection with others; it removes their right to be recognised beyond reductive categories. Teachers, too, risk becoming physically and emotionally distanced from their students as they increasingly engage with pie charts and emojis.

A third detachment occurs at a structural level regarding authority in education. In public education, it is teachers and the institutions that represent them that introduce children to the adult social world, into which, once they grow up, they are expected to enter. To achieve this well, teachers and institutions assume great responsibility. This fundamental responsibility – to make children's transition into the real world possible – is the basis of the *authority* that teachers and institutions are given (Arendt 1961). However, as AI systems increasingly influence vital decisions about the content and goals of education, they begin to usurp this authority (Hillman 2022), a transformation with potentially drastic impacts. Not only teachers, but society as a whole, must recognise this as real crisis when teachers' and educational institutions' responsibilities for children's education and their associated authority are being relinquished to AI without challenge or resistance.

5. Education for living with risks: conclusions

Our essay has offered a conceptual analysis of the contradictions gripping education systems in contemporary (Western-European, Anglo-American) societies. We sought to unpack how important social risks are being re-articulated in light of how AI is changing education, even as AI promises to diminish, prevent, and pre-empt pedagogic risks that they themselves claim to define.

We aimed to trace how the public understanding of educational crisis is today being re-articulated through AI, and sought to ground some of the contradictions in these articulations. We began from the neoliberal market imperative that has driven the strong commercial incentives to digitise education and thus interpret away its risks in ways that it matches these incentives.

AI increasingly intervenes in education through policy support and powerful marketing rhetoric. But this has allowed AI systems and the corporations that develop them to interfere with the creation of knowledge and consciousness about risks, which in turn determines the long and short-term goals on which education ends up focusing. We described AI in education as systems of infantilisation – they create artificial environments that don't reflect the world (and its risks) as *they are*, only as AI systems see them. In doing so, they narrow the diversity of pedagogic experience and limit students' exposure that comes close to the out-of-school real world of uncertainty and complexity.

Reclaiming education from the grips of such systems involves questioning the assumptions behind these technological interventions and considering whether they align with broader educational goals that aim to prepare children to one day stand independently on their own. It also requires the production of consciousness around the risks that AI systems pose. Producing risk consciousness shouldn't be reserved for the classroom, but it *is* the classroom that can negotiate between the risk-averse space of the home of a child and the real world of risks 'to make the transition from the family to the world possible at all' (Arendt 1961: 188–189).

Inspired by Arendt, we argued that AI-driven classrooms risk distorting reality and failing to prepare children for the real world. Since children are still unfamiliar with the world, they must be gradually introduced to it, and through education, ensure their development aligns with the world as it is.

There are always going to be risks in the effort to deliver education that is not infantile, that truly focusses attention, connects with the past, taps into children's inner strengths, and engages their natural curiosity without resorting to artificial tasks; indeed, that integrates nature, sport, and spirit to teach concentration and connectedness with the world. The alternative to addressing these risks is to ignore an even greater risk: the risk that education becomes an artificial setting that makes critical consciousness irrelevant, and instals algorithmic systems, as a new pedagogic authority, prioritising efficiency and standardisation in a system-shaped version of personalised learning, rather than awareness of the lifeworld's actual messiness for which education was meant to be the preparation.

Notes

1. All corporations mentioned in this article have their websites listed alphabetically in the reference section.
2. The European Union is spending €250 million to boost digitisation, achieve 80% of EU population's basic digital skills and another €43 billions of policy-driven investment to support the Chips Act for Europe's competitiveness and resilience in semiconductor technologies and applications (EC 2023b).

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