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Arbitrary cognitive offloading to GenAI: Does the current policy landscape account for the right to quality education of children and youth in the European Union?

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Abstract

General-purpose generative AI (GenAI) is increasingly used by young learners in the European Union, with 20% of individuals aged 15–29, approximately 15 million people, relying on it for educational tasks such as information retrieval, feedback, or full task delegation. While cognitive offloading is a natural part of human learning, GenAI's ease of use risks disrupting efficient learning processes, potentially depriving children and youth of their right to quality education, including foundational skills like literacy, numeracy, and critical thinking.

This paper argues that the unmediated use of GenAI in educational settings undermines the right to quality education by interfering with cognitive development. It examines the role of cognitive load, metacognition, and cognitive offloading in learning, linking these concepts to GenAI's potential to disrupt memory consolidation, problem-solving, and critical thinking. The analysis evaluates the current European policy landscape, focusing on the *EU AI Act*, *OECD Digital Education Outlook 2026*, and the *European Parliament CULT Committee's 2026 briefing* to assess whether existing hard and soft policies address the cognitive risks of GenAI. While these policies recognize risks, they primarily target AI-enhanced educational technologies rather than general-purpose GenAI, leaving a regulatory gap.

The paper concludes that arbitrary cognitive offloading via GenAI jeopardizes the normative goals of quality education, as defined by frameworks like UNICEF's and Bloom's Revised Taxonomy. It calls for a revision of the EU's normative approach to general-purpose GenAI, emphasizing the need to protect young learners' right to cognitive development and autonomy.

Keywords: cognitive offloading, metacognition, AI in education, right to education, metacognitive laziness, OECD, EU AI Act, CULT

1 Introduction

Generative AI (GenAI) is usually defined based on its ability to create ("generate") new audiovisual and textual content, but it can also be defined by the fact that this ability enables it to serve a broad array of use cases. In other words, GenAI is also general-purpose AI. It is in this latter respect that young learners in the European Union use it. Indeed, they are its heaviest users. In 2025, 20% of them use it in the context of their education. This amounts to a total estimated number of approximately 15 million[1] people between 15 and 29 years that use GenAI to find information, seek feedback for their assignment, or delegate entire tasks.

Given its general-purpose nature, the sheer ease to delegate cognitive tasks has been shown to disrupt the efficiency of learning processes and therefore carries high risks for young people to de deprived of the quality education they are entitled to. At the same time, offloading cognitive tasks is part of every human experience. A young learner usually is cognitively not yet in a position to learn *how* to solve a problem and to solve a problem in the same instance. Learning strategies provide means to reduce occurring cognitive load, and to foster an effective learning process. GenAI seems to interfere with the equation of keeping required cognitive effort to produce deep understanding.

In this paper, I am going to argue that GenAI in educational settings[2] deprives children and youth from their human right to quality education, specifically from their right to acquire basic formative skills, including literacy, numeracy and critical thinking. I am going to lay out this argument in three steps:

In the first part of this paper, the background section, I provide context about the human learning process, the influence of cognitive load, and subsequent strategies such as cognitive offloading and metacognition. I establish links to GenAI's possible interference with learning and human cognitive development. Especially young learners who are building their cognitive architecture are susceptible to irreversible consequences. Such consequences include failed memory consolidation, cognitive atrophy, illiteracy, impaired problem solving, lack of critical thinking, and consequently loss of autonomy and human dignity. I connect these concerns to the human right to education, examining the meaning of quality education and its links to educational goals. In the middle part, I am using a case study to establish a comprehensive understanding of GenAI's intricate impacts on cognitive and metacognitive dimensions of young learners.

In the third part, I analyse the current remedial standings of European hard and soft policies for cognitive impact dimensions of general-purpose AI. The EU AI Act being the baseline, the OECD Education Outlook 2026 report and the CULT Committee's briefing

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[1] According to the newest statistics cited in the report "Young people in Europe 2022", 73 million young people between 15-29 live in the EU in 2021 (European Commission. Statistical Office of the European Union., 2022, p. 5). No later census data is available.
[2] Explicitely refering to two educational spaces: 1) the classroom or the university as on premise-space where teachers and peers are present, and 2) the educational non-formal setting for homework or project work, alone or with peers, parents etc.

2026 are centre pieces of the analysis. These reports recognize the pressing dangers on cognitive development of GenAI in education and propose risk mitigations. Amending a hard regulatory element of a cognitive criterion in the EU AI Act is a deliberative proposal forward but designed with AI-enhanced education technologies in mind.

Finally, the paper takes the occasion to discuss GenAI's normalisation and that the current understandings should lead to revise our normative approach to general-purpose AI.

2 Methodology

This paper originally set out to examine the cognitive influences to which young people are exposed through the use of GenAI during their formative years, and how the European policy landscape is currently addressing this. Following a literature review in February 2026, the initial finding was sobering: no significant policy instruments yet existed. However, when the two documents OECD Digital Education Outlook 2026 and CULT Committee Briefing were published in March 2026, it became necessary to revise both the initial research question and the methodology for addressing it.

Conceived as a policy analysis, this paper now examines whether GenAI influences the human learning process to such an extent that the right to a quality education is at risk, and how the latest policy measures address this issue to significantly reduce this risk.

To answer these questions, a qualitative approach was taken, overlaying existing scientific findings with internationally applicable law and political regulatory procedures. Sources were selected accordingly, including scientific studies, background papers, journalistic sources, and a statistical report.

- Scientific studies: A total of 20 primary scientific studies were selected from the fields of cognitive psychology, cognitive science, computer science, educational science, and neuroscience. These were identified via keyword searches (e.g. cognitive offloading, cognitive overreliance, cognitive atrophy, extended mind, critical thinking, artificial intelligence and the education of children and young people) and through references within the background papers.
- Foundational papers: Nine foundational documents on general-purpose AI and education in the European context (OECD, European Commission, European Parliament) were selected. These were identified via keyword searches (e.g. cognitive dimensions, AI harms, European policy, European Education). Two of these documents, namely the OECD Digital Education Outlook 2026 and the CULT Committee Briefing 2026, for in-depth policy analysis as they were the only ones addressing the issue at a pan-European level at that time.
- Journalistic sources: These serve to enrich the paper qualitatively, but do not contribute to the onus of proof.

- Statistical report: One selected document ("*Young people in Europe: A statistical summary 2022*") provides descriptive evidence of stated user figures, but does not analyse the figures themselves.

Based on this data, a comprehensive picture of the state of scientific knowledge in this area can be formed, enabling valid conclusions to be drawn about the comprehensiveness of policy measures. However, the consequences and effects of the measures cannot be predicted based on the available data. This also means that the conclusions of this study are limited in terms of the possible positive and negative consequences of GenAI use on cognitive development. Consequently, any argument relying on this evidence base is euqally limited.

3 Background

This section of the paper introduces concepts and issues required for an analysis of the paper's leading question on the impact of arbitrary cognitive offloading on the goals of education, and the influence of European policy: cognitive load theory, metacognitive laziness, the goals of education and EU education policy.

Cognitive Load Theory

Learning is a process involving information. When there is more information than the brain's working memory can handle, or too little, the learning process is hindered.

Cognitive Load Theory is based on the assumption that the working memory has a very limited capacity, and that learning places a cognitive load on it. In contrast, the long-term memory has virtually unlimited capacity. Learning involves taking in information and processing it inside the working memory before subsequently storing it in the long-term memory. This storage, in turn, takes the form of schemata: complex knowledge structures containing multiple types of knowledge, e.g. declarative (*knowing-that*), or procedural (*knowing-how*) knowledge. It is important to emphasise that accumulating knowledge alone does not lead to expertise; instead, complex schemata differentiate experts from novice learners.

Managing cognitive load in the working memory influences the efficient construction of a person's cognitive architecture. According to John Sweller, cognitive load originates from intrinsic, extraneous or germane sources. Intrinsic load arises from efforts to process the content of a task or the complexity of a problem, whereas extraneous load originates from the instructional design and accessibility of the task. Germane load contributes to schema construction, a highly desirable learning outcome. Thus learning conditions should reduce extraneous load, while intrinsic and germane load should be increased. This combination improves learners' chances to build the foundations for deep learning and, consequently, deep understanding. For more information on this topic, see Sweller et al. (1998).

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Metacognitive Laziness

Cognitive offloading is a strategy to regulate efforts of learning. Formally, it is defined as "the use of physical action to alter the information processing requirements of a task so as to reduce cognitive demand" (Risko & Gilbert, 2016, p. 676). Counting with one's fingers, taking notes or navigating with a GPS, these are all forms of cognitive offloading.

The kind of load that is offloaded through these tasks depends on the intended learning goal: if someone is trying to get to a location in a city quickly perhaps due to an emergency, it would not be detrimental for them to use a GPS, but it would be detrimental for them if they were trying to learn the city's geography to ease navigation later. In both situations, the intrinsic load (the factual information itself, e.g., the ways around the city) and germane load (the motivation and effort that are required, e.g., to build the schemata of the city) are offloaded. However, in the second scenario, the person would not want to offload these, because they are purposefully trying to build schemata in their long-term memory.

Given that the learning process is an essential part of the cognitive development of children and young people, the function of cognitive offloading should be to make learning objectives achievable, not to effectively *do* the objectives for them. Take for example using a calculator for arithmetic operation versus counting by hand. Children who use their hands show substantive cognitive resources and are more efficient in arithmetic calculations (Thevenot et al., 2025). In fact, germane load has been shown to enhance the learning effect, for example determining which new information aligns with existing knowledge (Gerlich, 2025; Risko & Gilbert, 2016, p. 685).

Taking self-regulated learning decisions, such as deciding over single cognitive tasks to perform, or to offload, is a human intellectual capacity called metacognition. Metacognition is *thinking about thinking,* and supplies an additional form of thinking that supports the learning process. Essentially, the learner can realize what they do not know to perform a task. Through metacognition, thinking has the chance to become *critical thinking*, e.g. when continuing the search for more reliable sources of information, or adjusting ones strategies of fact-checking (Singh et al., 2025; Winne, 2021). The deliberative effort from metacognition and its attached decision-making creates an additional cognitive load, the metacognitive load. Take for example the act of evaluating the perceived difficulty of a task. Usually such evaluation consists of a multi-stage process where the individual assesses if they can retrieve the specific knowledge from their memory, how easy or hard this retrieval might be, or if the expected utility of, e.g., conducting a *Google* search right away, would be higher than actually engaging in a recalling from memory process. A metacognitive belief is formed that forms an argumentative ground for the learners final decision.

These metacognitive actions cause an additional cognitive load in the working memory of the learner. Challenges to sustained metacognitive engagement originate in self-perceived capability to solve a problem, low achievement motivation or complexity of a given task. Unlike offloading cognitive tasks for load reduction as discussed earlier, metacognition does not need offloading in that sense. Instead, the learner metacognitively disengages. This behaviour is called metacognitive laziness.

Pedagogical approaches propose metacognitive scaffolding techniques that enable learners to self-regulate and stay engaged with the task at hand. Scaffolding proposes to solve a task by means of distinct engagement phases: planning ("What is it that I must do? Have I done a task like that before? What can I solve independently? What can I not solve independently?), execution (How well do I understand the material? Can I use this source? Should I seek help for this part, and why?) and reflection (Have I managed to solve the task to my satisfaction? What have I learnt about my approach of such a task? What does that mean for next time?). This approach funnels information in a way that they turn into germane load. In that case, what could have been an extraneous load, is transformed into a learning plan, or tasks that are broken down into subtasks and evolve in difficulty.

By the same token, freeing up mental resources from low-cognitive involvement tasks, e.g. grammar checking, can facilitate critical thinking which is considered an activity of high-cognitive involvement. Again, depending on the goal of the learning task, these activities oscillate between different types of cognitive load.

The Goals of Education

Education is a fundamental human right. Article 26(2) of The Universal Declaration of Human Rights (UDHR) sets forth that "Education shall be directed to the full development of the human personality and to the strengthening of respect for human rights and fundamental freedoms. It shall promote understanding, tolerance and friendship among all nations, racial or religious groups, and shall further the activities of the United Nations for the maintenance of peace" (United Nations, 1948).

In this sense, education is not the direct realisation of human dignity, but a necessary consequence arising from the exercise of the right to education. Therefore it stands to reason that access to any form of education alone is not sufficient to achieve this level of impact; quality standards must also be met. To get to the bottom of the question of whether arbitrary cognitive offloading undermines the impact of education, the first step is to examine whether international quality criteria are in place and examine whether the of GenAI violates these criteria.

The minimum criteria of quality in education aren't prescribed in an international treaty and therefore, quality education cannot benefit from an international standard that

nations can be held accountable for[3].
A paper authored by UNICEF (2000) characterizes quality education through the dimensions of

1. safe and inclusive schooling facilities, well-managed classrooms
2. participants and their mental health
3. child-centred teaching processes and assessment
4. curricula and content that enables the acquisition of basic skills (literacy, numeracy, and skills for life)
5. outcomes that encompass knowledge, skills and attitudes, and are linked to national goals for education and positive participation in society.

Under point 4., the paper states that learning should be student-centred[4] and tailored to individual learning differences, and that "in general, curricula should emphasize deep rather than broad coverage of important areas of knowledge, authentic and contextualized problems of study, and problem-solving that stresses skills development as well as knowledge acquisition". Here, it is also emphasized that content cannot be separated from the process, that is, how children learn to read is a product of what they are reading, and respectively, the literacy they develop. Numeracy being taught in an integrated manner provides foundations to develop logical reasoning and advanced interpretative communication skills. Both literacy, and numeracy, so goes the paper, form foundations to acquire life skills that include topics such as health, hygiene, etiquette, vocational skills. Thus, at the heart of defining the meaning of quality education lies a mediation of life skills imparting from content and process in equal terms. The process should rely on student-centred methods, and practices to elevate skills to competence.

UNICEF's definition builds on Robert Marzano's New Taxonomy. It draws a distinct line between lower-order versus higher-order thinking skills, and the learner's active engagement in deciding how to transform information (Marzano & Kendall, 2007, pp. 17–19). This one, in return, builds on Bloom's Revised Taxonomy. The latter provides a framework that has largely informed our understanding of the role of schools, universities and further education institutions prior to UNICEF's definition project. It assigns a cognitive, procedural and a declarative knowledge dimension to the intrinsic goal of education. Within the boundaries of this framework, education mediates capacities that require the interplay of knowledge acquisition, its immanent updating,

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[3] Thre are good reasons why this is the case, e.g. sovereignty of nations; geographical, social and cultural differences. Appointed by the United Nations, the transnational agency UNESCO is responsible to establish conditions that supports the national provision of quality education.
[4] The term student-centred here is used to expressed the opposite of teacher-centred that illustrates a shift away from a unidimensional transfer of knowledge from the teacher to the student towards a constructivist approach.

and cognitive processes. Therefore, with an increase in complexity, school curricula should entertain ways to foster essential human skills and traits:

1) memory consolidation and remembering
2) understanding concepts
3) applying judgement
4) analysing
5) evaluating
6) creating

On the bottom level of complexity, lower-order thinking skills include storing and remembering facts, as well as understanding concepts. Higher-order thinking skills comprise the analysis, evaluation and application of complex judgement. Critical thinking, problem solving and decision making are compounds of these skills. The process that bears these compounds requires executive functioning[5] and metacognition. UNICEF makes mention of the *thinking about thinking*-activity in its definition of quality education under *student-centredness*. In other words, quality in education should account for mediating metacognitive skills because of its impact on forming cognitive abilities.

However, The metacognitive dimension of learning can be an inconsistently explicit aspect of the lived learning process in schools. Young children in early education years configure their workload by strategies such as counting with their fingers. Progressing towards more complex educational goals, older children begin to coordinate their cognitive skills with the task they have been given and develop an understanding about effective learning strategies. The development of these learning strategies can be actively construed, or accidentally, not knowingly, assimilated.

More traditional teacher-centred approaches to education assume a unidirectional transfer of knowledge from the teacher to the student, whereas constructivist approaches emphasise the active involvement of the student. At the heart of constructivism lies the idea that learner's prior knowledge influences how and what of the new information is assessed and stored. Therefore, learners actively shape their personal learning process through monitoring and planning activities and consequently alter their individual epistemic journey. More importantly, constructivism values the learning process as a source for knowledge in and of itself. This is what Willingham referred to when he wrote that thought processes are intertwined with what is being thought about. According to him, it is impossible to engage in critical thinking when one

[5] Akin to metacognitive skill that enable learners to monitor and plan their task engagement, executive functions, as their name suggests, allow them to reguate their behavior and thinking, e.g. maintaining focus, continuing the work even when motivation declines, to control frustration or impulsive behaviors. For further details about the effect of executive functions and metacognition for cognitive development, please see Roebers (2017).

has nothing to think critically about, e.g. a learner can only think critically about something based on their existing prior knowledge (2019).

In contrast, more traditional approaches operationalise the teacher's cognitive skill and knowledge as the teaching transaction and assume that critical thinking can be facilitated by what is transmitted from the teacher to the learner. This pedagogical approach bears higher chances to encroach higher-order thinking skills, than a constructivist approach does. This insight matters for the critical assessment of the impacts of GenAI in the classroom.

EU Education Policy

What does current EU policy say about the intersection of AI and policy? To answer this question, we will use the EU AI Act as the baseline, as well as the OECD Education Outlook 2026 report and the CULT Committee's 2026 briefing. In brief, the EU AI Act introduces a a trade-off between the acquisition of digital skills versus the acquisition of basic learning skills. The OECD report recommends a more *effective use*-approach to GenAI and thus contains no notable references to regulating cognitive influences. In contrast, the CULT Briefing considers amending the AI Act to include an assessment of precisely this cognitive impact. However, regulatory recommendations seem to be have been designed to address AI-enhanced learning technologies, and not GenAI. Therefore, further analysis is provided to propose additional mitigation strategies.

The EU AI Act

Recital 56, the EU AI act explicitly states that the deployment of AI systems is a realisation to the right for high-quality education, naming the acquisition of digital skills and competences, including critical thinking skills.

It reads "The deployment of AI systems in education is important to promote high-quality digital education and training and to allow all learners and teachers to acquire and share the necessary digital skills and competences, including media literacy, and critical thinking, to take an active part in the economy, society, and in democratic processes. (…)".

At the same time, it classifies the same AI systems as high-risk in cases where they assess, monitor or evaluate individuals, and consequently the trajectory of their lives. This reasoning displays a profound gap regarding the perils of GenAI in the classroom – and outside of it. Fundamentally, the right to quality education encompasses the right to form digital literacy *and* critical thinking skills. In the case of GenAI, this seems deeply conflictual. The general-purpose nature of GenAI provokes arbitrary cognitive offloading when metacognitive capacities are not or only little developed and can imply cognitive risks for millions of young people. In other words, teaching digital skills using GenAI entails the risk of undermining other fundamental learning processes and skills. Given the concept of quality education as outlined here, it is reasonable to conclude that the consequences of such an undermining would cause greater harm than the teaching of digital skills could justify. The scientific groundwork for this hypothesis is presented in the case study of section 4.

This lays the ground for a suspicion that the EU AI Act's specification to account for the right to quality education disables itself. Given the current evidence regarding GenAI in the classroom, it appears contradictory to ensure that digital skills are taught (e.g. prompting, understanding capabilities of an LLM) while also guaranteeing the development of higher-order thinking skills (e.g. discerning truth from falsehood, drawing conclusions from prior analysis). This contradiction is evident in the fact that GenAI allows for arbitrary cognitive offloading, resulting in children and young people receiving a lower standard of education than they would otherwise. Consequently, children and young people are unable to enjoy their full right to education.

The following parts provide an analysis of recent educational policy publication as well as a case study of a learner's behavior when solving a learning task involving GenAI. The case study shall provide context for the analysis at stake: does European education policy recognize and address the cognitive dimensions of GenAI and their problematic impact on children and youth as beneficiaries of the right to education?

OECD Digital Education Outlook 2026

The OECD Digital Education Outlook 2026 (2026) has been chosen for review inside this project for two reasons. First, in 2023 the OECD published a background paper with the title "Generative AI in the classroom: From hype to reality?" which provided first insights of major issues with GenAI in classrooms (2023). The paper's tone reflected on potentials for more dynamic classrooms and individualized learning. Second, it is authored by a long-standing international organisation, combining the represention of economic interests with a transnational analytical rigour. Findings and recommendations of OECD reports are of non-binding nature, collecting scientific evidence for informed public and political discussion.

The analysis focuses on the categories of learners, teachers and educational institutions[6] and sets out recommendations for all these target groups aimed at using GenAI to improve learning, teaching and institutional management. The report is framed around *outcomes* these groups create, are responsible for or are involved with.

The rise in content generated by GenAI constantly challenges the limits of our knowledge in everyday life. Misinformation and deception pose a challenge to society as a whole, the scale of which is already socially and politically evident, for example

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[6] This categorisation reflects active stakeholders in the education sector and was also made, for example, in the report "The Unintended Consequences of Artificial Intelligence and Education" by Education International (Holmes, 2023).

through media attacks on democratic systems or infringements of personal rights. Right at the outset, the report emphasises that the utility of higher-order thinking skills, namely critical thinking, problem-solving and decision-making, as well as metacognitive abilities, will increase.

The report collected statistics from OECD member states to draw a more precise picture on age groups and level of education where GenAI is used and for which purposes. Globally, teenagers (age 12-17) make for the group among all age groups with highest usage, e.g. 90% of Estonian school students report making use of GenAI, followed by higher education students, e.g. 85% of French students reported having used a GenAI tool in 2025 at least once, where numbers were up to 94% for German students, with 65% of them reporting to use it daily or weekly. Looking at the most popular uses of GenAI within these groups, the report refers to a study conducted in seven European Countries by Vodafone Stiftung (Stiftung Vodafone, 2025):

Type of cognitive engagement	Type of learning task	Self-reported use in %
Low-cognitive involvement tasking[7]	finding information	56
	receiving explanatory support for terms and concepts	45
High-cognitive involvement tasking[8]	using complete solutions to given tasks	31
Meta-cognitive tasking	make use of interactive content to guide learning experience	29
	structuring and planning a personalised learning path	20

The report indicates significant variances between countries which may be due to national differences in access, proliferation, dissemination, and cultural perception of GenAI tools, but differences in research methodology and assessment criteria might

[7] Categories of low-, high- and meta-cognitive tasking have been chosen according to Bloom's Revised Taxonomy.
[8] Task with highest arbitrary offloading potential. The more kinds of cognitive involvement are required, the higher the potential for arbitrariness.

explain them equally well. Therefore, interpreting these numbers should be approached with caution.

CULT Briefing "Artificial Intelligence in the Classroom"

In early 2026, the Committee on Culture and Education (CULT) of the European Parliament (EP) received the briefing "Artificial Intelligence in the Classroom", the first one centered around this question. Committees of the EP examine proposals prior to bringing them before the whole assembly. The CULT Committee works on european educational policy that promotes engaged and resilient European citizens through programs such as Erasmus+. Given that education is a matter of national sovereignty, CULT's responsibility consists of vision building, convening, and deliberating educational opportunities, risks and challenges in the European Union. Findings and recommendations of CULT briefings are of non-binding nature that collect scientific evidence for deliberation. Inspite of their soft policy nature, it is said that these committee briefings project a baseline understanding of contemporary issues among stakeholders of European policy making. This marks the reasoning why this briefing has been chosen for review inside this project.

The report differentiates between GenAI and AI-enhanced educational technologies, and clarifies that most of the reported risks are associated with GenAI in an unmediated education context. In comparison, AI-enhanced educational technologies are product optimised for learning purposes. Therefore, there needs to be a bifurcated approach for governance and responsible use.

The CULT Briefing refers to identical usage figures already introduced in the OECD report discussed above. It adds that two thirds (63.8%) of young people aged 16–24 in the EU used GenAI in 2025 which makes for almost twice of the adult population (32.7%). Among this age group, 39.3% stated they were likely to use AI tools for formal education (Chounta, 2026, p. 2).

That means that around 20%[9] of young people in the EU use AI tools for formal education. Despite grounding its argumentation in the distinction between the substantive risks imposed by GenAI versus AI-enhanced educational technologies, the report does not issue usage numbers of the latter.

4 Case Study

To illustrate the challenges brought on by GenAI's introduction into education, let us suppose a learner named "D" in early high school is given the task to compare two historical texts A and B from two authors about the same event and articulate the

[9] 63.8% of all young people use AI Tools and thereof 32.7% use AI tools for formal education, that means approximately 20% of young people in the EU use AI tools for formal education.

authors' divergent viewpoints of the event. For example, do the authors reference different facts, what are their general tones, do they provide valid reasoning for their differing viewpoints, do they employ manipulation strategies and if so, what might be their motivations in doing so?

Learners are free to decide how they approach the task, e.g. reading text A first and taking notes, then text B and taking notes, or skimming both and underlining similarities and differences afterwards, or not making any marks at all. The aim of the task is not to resolve which of the authors is "right", but to train the learner in at least four cognitive skills: working memory (keeping one text in mind while reading a second one), reading comprehension (decoding text, extracting meaning, constructing a representation of the text), sustained attention (identifying different or identical facts, deviations in wording), and critical thinking (analysing line of reasoning and manipulation strategies).

D trains their metacognitive skills when they decide which approach is more promising for them to achieve the task, when they monitor how well they have understood the text, if they need a second pass, and if they have sufficiently engaged with the critical questions. Last, the task imparts knowledge-that (declarative) of the event, and knowledge-how-to (procedural) about the approach of such a task. The latter fosters the development of mental schema, and repeating similar tasks will reinforce their availability, and differentiates unexperienced learners from experts.

Cognitive processes

Since there is evidence of positive learning impacts from usage modes where a chatbot takes on the role of a deliberative interlocuteur, a replication of the *Socratic Method*[10], it is possible to argue in favour of D making use of a *modified* GenAI (Monzon & Hays, 2025; Singh et al., 2025; Xu et al., 2025). However, the initial reading (reading comprehension skill) and note-taking (sustained attention) should not be skipped by D: The problematic use case we are concerned with here is if D uses GenAI to complete the entire task, e.g., prompting it to ingest and compare the two texts, their tone, the presence of manipulative tactics, and so on. In which case D neither works on the information contained in the task, nor gains the skills required to complete it.

Over-reliance

This skipping-through-the-learning-process qua the aid of GenAI has been shown to bring about a few direct and indirect consequences for the learner. For example, studies by Gerlich (2025), Kosmyna et al. (2025) and Zhai (2024) have shown that students who arbitrarily offload whole tasks to GenAI, such as D does, indeed hamper their cognitive

[10] The Socratic Method is an argumentative dialogue informing a structured way to learn and practice critical thinking. Among others, Monzon and Hays (2025) propose using GenAI to create desirable difficulties, instead of bypassing effort.

development: They eperience distorted memory consolidation, aren't able to speak about the topic later on, or cannot make cross connections to other learning contents. Overreliance captures the process of handing more tasks over to AI than the learner *should have* handed over according Cognitive Load theory. For example, D could ask for background information to the two texts D should compare, why they are meaningful, or what their public perception might me. In this case, D would involve GenAI for a lower-engagament portion of the task, and keep the rest of it for himself to process, thus he would rely on GenAI, but not *over*rely.

The suggestion that offloading low-cognitive-involvement-tasks facilitates critical thinking provides an important provocation for the critical assessment of GenAI in an educative setting: can we save critical thinking by enumerating the low-cognitive involvement tasks that children and youth can offload, and the critical thinking (along with other high-cognitive-involvement-tasks such as problem-solving and decision-making) will build and develop naturally?

Several clues should lead to the safe assumption that this is not the case:

In the case of D, the initial reading and taking notes, is typically the low-engagement portion of the task they should not offload if their learning goal is to improve critical thinking abilities through the appropriation of text. Through the act of reading, D's metacognitive capabilities will do their part to assess how well they understand the text, if they possess information about such the problem of comparing two texts and how to solve them, and if they want to seek help.

By retrieving and deciding about the information to retrieve, D is already *with* the problem in a critical way (Willingham, 2019). What is more, the *metacognitive* decision process that underpins the analytical process just described would be massively hampered, or disrupted, if there was a generic answer to the offloading question. Hence, offloading a cognitive task for reasons of ascribed cognitive engagement status does not solve the problem of cognitive development, even if it does solve the problem of arbitrary offloading. This is an important insight to come back to when evaluating possible solutions to the problem.

Atrophy

Cognitive atrophy is a consequence of cognitive offloading of single tasks, and to overreliance, particularly when heavily repeated. A well known example of cognitive atrophy is a form of functional illiteracy: the degration of once acquired reading and writing skills. It occurs when these skills are not regularly used, for example when D consistently watches images or videos instead of reading texts, or prefers digital text-to-speech applications over D's own writing, or simply lets GenAI do the reading. When the cognitive pathways that are involved in reading and writing process are not demanded, they atrophy. In fact, the last OECD's Survey of Adult Skills (2024) revealed that adult functional illiteracy is rising globally while it had been steadily reduced in the past century[11].

Metacognitive processes

Still in the young internet days, Nicholas Carr described how using *intellectual technology*, whereby referring to the internet, had changed his ability to absorb a long read, and to memorize what he had read. He asked if losing the ability for deep reading eroded the ability for deep thinking (Carr, 2008). This question kicked of a series of *Google Effect*-studies that primarily focused on individual memory allocation in tension with an externalised memory (the internet), and others provided the first links between offloading strategies best described as metacognitive laziness and *illusions of competence*, also called *false mastery*. For example, one study showed the augmentation of people's self-esteem, and overrated feeling of *having-knowledge-in-their-head* when they had completed a quiz successfully with Google's help. They would also overestimate how well they would perform in the next test of that kind without an external aid (Fisher et al., 2015). In a similar setting, people should solve a quiz and were divided in two groups that either was allowed to use, or not to use google. Before answering the quiz, they were asked whether they would know the answer. Interestingly, the group that was allowed to google the answer made significantly less effort in *thinking about* whether they would know (retrieve) the answer by themselves (A. F. Ward, 2013; D. M. W. Ward Adrian F., 2013).

Laziness and the illusion of competence

One of the many outcomes teachers have observed, and research evidence confirms, concerns the dissociation between improved performance on assigned tasks and longterm skill or knowledge acquisition: these studies show that writing an essay with GenAI improves essay scores (the outcome) but does not increase knowledge gains. Furthermore, in another study, students were asked to assess their own pen and paper writing for improvement: the setting allowed one student group to seek help from human tutors, and another one from of GenAI. The results indicate that the GenAI-group would skip a pre-assessment all together, and ask GenAI directly for improvement suggestions, whereas the human tutor group followed the model of the "help seeking" theory (Chen et al., 2025; Fan et al., 2025).

The latest studies examining the impact of GenAI on metacognition confirm correlations between metacognitive laziness and illusions of competence. The randomized study by Fan et al. (2025) found that the convenience of AI can undermine learners' engagement

[11] Exact numbers of functional illiteracy are particularly difficult to estimate. An overall estimate of illiteracy worldwide claims that there are around 750 Million people who cannot read and write sufficiently but it is unclear if this metric accounts for functionally illiterate populations.

in the learning processes (planning, monitoring, and revision). The learner hands over their metacognition to the tool.

Another study confirm that students may solve more tasks in less time when they ask for the solution but show lack of genuine understanding. What is more, learners' self-reported confidence of learning gains is systematically overrated (Singh et al., 2025, p. 2). For novice learners who are still building schema and have less knowledge about what they do not know, this often invokes the Dunning-Kruger effect, where people tend to vastly overestimate their level of knowledge, particularly in new, unfamiliar domains (Kruger & Dunning 1999).

Overerstimations of gained competence are not exclusive to GenAI but span across digital learning where ease of use is confused with depth of learning. GenAI's design, its availability and accessibility, or its *generalness*, suggest an ease of use for any given task and provides ground for metacognitive laziness through which arbitrary offloading is catalyzed. The category mistake of users to confuse ease of use with cognitive involvement impacts the development or training of critical thinking abilities, and is, consequentially, detrimental for developing expertise (Lodge & Loble, 2026, p. 23). These findings are evidence for GenAI promoting metacognitive laziness.

How do these findings translate to D's behavior? During the initial reading, D feels a certain cognitive and metacognitive burden synthesizing in their head, e.g. the difficulty of the vocabulary, the length of the text, grasping the overall tone and meaning of the text. Overwhelmed, D decides to prompt GenAI to generate the required output. D sees the output, looks at it briefly with satisfaction, thinking: "That does not look so difficult, looks like I could do that myself", and pastes it into D's homework document. D having formed a belief about a newly gained competence in solving such a task, 2 weeks later, a class exam contains a similar assignment. D reads the instructions, and then both texts. Soon, D metacognitively reflects that the task appears to be at least as difficult as it did two weeks ago, and that D beliefs not being up to the task. Nervous and cognitively overwhelmed, D takes notes while struggling to remember the first text during the lecture of the second. D then then turns to the main part of the task to analyze divergent viewpoints (e.g. by presented facts, general tone etc.). D tries to recall the ouptut the GenAI had produced to guide the process but fails to do so. Even more nervous, D undertakes the analysis nonetheless in an ad-hoc, unsystematic fashion.
If the condition was not the exam setting, but comparable situation from the initial confrontation with such a task, it is legitimate to assume that D would once more rely on GenAI and arbitrarily offload D's cognitive involvement to solve this task, and the vicious cycle between over-reliance, illusion of competence and metacognitive laziness would continue.

Metacognitive laziness and social costs, transaction costs

Learning strategies often involve seeking help when facing challenges. In that case, the learner metacognitively assesses if they involve teachers, peers or GenAI to solve their learning tasks. Studies show that seeking help from GenAI alters the help-seeking process. Students would seek help earlier in their process from GenAI than they would from a human, and skip to evaluate the generated answer they received. The study reasons this finding with the involved costs of help-seeking: if the perceived knowledge-gain is lower than the cost of the social interaction with the teacher, e.g. because of possible reputation loss, then they either avoid seeking help, or involve GenAI instead. This finding confirms the risk for metacognitive laziness in front of GenAI, and it social costs precisely to inhibit this laziness (Chen et al., 2025).

Another study could show that students who ask for explanations, instead of solutions, increase their understanding of the topic, but not the volume of solved tasks. The same study reveals that simply disabling the copy and paste function invokes higher transaction costs, and prevents a decrease in required learning efforts (Lehmann & Cornelius, 2025, p. 24).

Reviewed studies confirm deep disturbances with learning efforts that shape the development of cognitive abilities and skills of novice learners like children and youth. The cognitive consequences include long-term memorization issues, and distorted schema building. Compound higher-order thinking skills depend on the quality of metacognitive strategies, that is, they either do not form or atrophy when *effort* is replaced by *laziness*. There is a critical subsequent dynamic at play that brings about overconfident learners who overestimate their acquired skills while they miss opportunities to develop long-term expertise. To summarize, associated risks of GenAI for learning purposes could outweigh its anticipated benefits (Yan et al., 2024).

Other issues

The impacts of arbitrary (meta-)cognitive offloading span from failing to store and recall information in the long-term memory, making it difficult for learners to refer and discuss what they *thought* they had learned, to cognitive atrophy and metacognitive laziness, which imply the loss of literacy, numeracy, critical thinking, and adaptive problem solving. Beyond these effects, they distort judgements of the self as a knower, the trustworthiness of the source, and the epistemic value of the learning process. In the grand scheme of education, numerous consequences for young people, and society at large, arise.

Among many, the impact on already weakened democratic decision-making will increase. If young people cannot rely on learnt schema for critical thinking, their ability to discern truth from deception will cause even greater luring into epistemic bubbles, and a loss of *common* social concerns related to work, environment, health (Rose, 2026).

Furthermore, If learners use GenAI to request the entire result of what would have only been the last stage of the learning process they would have gone through, what does that mean for the value of the *process* of education, a process that forms a human from a very young age to young adulthood? Does that mean that only the final result matters, the grade, the credential? While workplaces are becoming more and more enshrined with GenAI, for many it seems like schools are the only places where humans can still cultivate thinking. If they are deprived of the right to earn the fruits of the laborious process of education, how can they become the autonomous, self-reliant person entitled to dignity qua their status of being a human (Pollmann, 2026; Rose, 2026)?

By the same token, what does that mean for the value of a genuine human creation, e.g. a piece of writing, versus one that has been entirely simulated to be such? With the ever more sophisticated GenAI models, detecting human-made versus GenAI-made content is more and more difficult discern, and raises the same pressing questions surrounding the status of truth, and human dignity.

5 Potential Remedies

This section surveys some of the potential remedies to the problems discussed above.

OECD Recommendations

One key finding the report highlights is a study showing student's inclination to increase the use of GenAI with an augmented workload, for any given task. Concurrently, higher usage was correlated with procrastination, self-reported memory loss, and finally overall academic performance. Worth mentioning here is that an arbitrary delegation of cognitive work to GenAI increases student's propensity for naïve overreliance on these systems. As a result, students struggle to assess trustworthiness and quality of GenAI's outputs, and submit to this discrepancy, leading to lost opportunities to develop critical thinking, or related skills (Abbas et al., 2024; Zhai et al., 2024). After reviewing 106 experimental studies on human-AI collaboration, a meta-analysis found that task performance was worst in the collaborative setting compared to AI or a human solving a task independently (Vaccaro et al., 2024). This is yet another confirmation towards overreliance and the illusion of cognitive mastery. These findings demonstrate GenAI's negative potential on cognitive development.

The OECD report proposes that learners and teachers adopt an *effective-use* approach to GenAI. Recommendations for effective uses list behavioral and procedural interventions for learners and teachers to prevent large scale negative impacts on societies and economies, such as an increase in illiteracy. While these recommendations align with latest scientific findings, it remains questionable if they provide actionable measures for students and teachers. In the face of it, *learning to learn* with GenAI sounds like a reasonable recommendation. However, which of these findings provides us with evidence to *infer meanings about effective uses* of GenAI for all learners at all stages? What constitutes use cases that respect the learner's right to quality education in a way that encompasses GenAI without compromising on *all* indicated dimensions? In addition, the effective use-recommendation raises concerns regarding the student-centredness: if school curricula shall be designed to adopt to student needs, it seems contradictory to require the learner to adapt to how the tool functions. Shouldn't rather the tool be designed in a way that adapts to the learner by default? Here, the CULT Briefing's recommendations offer a range of approaches to adequately address the complexity and impact of socio-technical systems within education.

However, the OECD's recommendations shift the conversation from a frame of positive potential *by* GenAI on to a frame of adaptation of learning *to* GenAI. By outlining these findings, the report challenges the idea of GenAI's positive *potential* to promote high-quality education and underscores the need for purpuseful adaptation in the classroom but does not provide solid grounds for continued delivery of quality education.

CULT Recommendations

Unlike the OECD report, which puts its entire remedy belief into *effective use* pedagogies, the CULT Briefings' suggestions cover a mix of pedagogical interventions, new regulatory framing, and cognitive impact assessment.

Pedagogical interventions

The educational interventions incorporate the 'effective use' recommendations from the 2026 OECD report[12] which are intended to create the conditions necessary to promote "cognitively safe and productive use of AI" in schools. Interestingly, the term 'cognitively safe' appears here without being further explained, and interestingly the OECD report makes no use of this term at all. [13].

Firstly, the efficient use of AI systems is reiterated in the CULT Briefing as a pedagogy-first recommendation, in line with the evidence-based proposal of the OECD report. AI systems should only be used if they serve clearly defined learning objectives, and not be "deployed as a general-purpose convenience"(Chounta, 2026, p. 6). Secondly, this is

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[12] Furthermore, the European Commission's Ethical Guidelines on the Use of AI and Data in Teaching and Learning for Educators (2022) are cited as the source for the following recommendations.
[13] *AI Safety* includes research, governance and application of AI Systems that prevent harmful use or mitigates harmful effects of AI Systems. However, the phrasing "cognitively safe AI use" has no established meaning at the time of the Briefing's publication date. One study from May 2026 by Zainuddin et al. (2026) tries to introduce the concept of "cognitively safe AI use, but this is only a first attempt.

followed by the recommendation to use AI systems that are specifically designed for teaching purposes; therefore, general-purpose AI should not be used *at all*. Thirdly, metacognitive scaffolding (planning, reflection and evaluation) and a mastery orientation (augmenting knowledge through exploration, questioning and connection) are preferred approaches to effective use in all cases (Xu et al., 2025). However, the third point in particular raises the question of whether this refers to general-purpose AI or an AI system designed specifically for education. Fourthly, age and the associated learning objectives must be taken into account: "The cognitive and developmental differences between a seven-year-old and a sixteen-year-old demand genuinely differentiated governance frameworks, not a single age-neutral approach". (Chounta, 2026, p. 7)

Regulatory frame

Legally binding frameworks such as the *General Data Protection Regulation* and the *Council of Europe Framework Convention on AI and Human Rights, Democracy and the Rule of Law* do not address the risks as they are set in the CULT briefing. The EU AI Act (Annex III) on the other hand classifies applications as *high-risk* which *decide ov*er individuals' learning trajectories through conformity assessments, admissions, evaluation and student progress monitoring, in short the trajectory of someone's biography (European Data Protection Supervisor, 2025). The CULT briefing suggests the revision of some areas that create ambiguity, e.g. the report asks if adaptive learning systems and intelligent tutoring systems (which generate personalised learning pathways and may implicitly steer students' learning process) would constitute high-risk systems, given that they influence learning trajectories (Chounta, 2026, p. 7).

The report critically remarks, that *"none of the existing regulatory instruments requires the systematic assessment of AI systems for their cognitive impact on child users before deployment in school settings. An AI system that increases short-term task performance while undermining long-term skill development would, under current frameworks, likely pass regulatory review"* (Chounta, 2026, p. 8).

Consequently, the report conceptualizes a new *cognitive outcome* criterion for AI systems before their deployment in school settings. This represents a novelty in the European AI-related jurisdiction.

The briefing suggest the following measures for AI Systems:

- mandating a cognitive impact assessment as an education-specific layer, within or alongside the fundamental rights impact assessment (FRIA) of AI Act (Article 27) for high-risk AI systems, to be conducted before any AI system is deployed in compulsory school settings; it could require the assessment of cognitive load, metacognitive development, the learner's developmental stage, and equity impact.

- establishing minimum evidence standards for pedagogical efficacy claims as a condition for AI systems used in education, e.g. providers must provide evidence for their claims, and standardisation labels could lever a signal to deploying institutions.
- introducing a mandatory pedagogical evaluation (including cognitive dimensions of learning) for AI systems acquired by public educational institutions before procurement as a condition of award, analogous to accessibility requirements embedded in public procurement for digital tools.

Cognitive Impact Assessment

The briefings's analysis of the impacts of GenAI on the cognitive dimensions of education, elaborates on the consequences for cognitive development, including fundamental and metacogntive skills, as well as autonomy, over-reliance and dependency. Thus, it elaborates on all aspects of the human right to quality in education, including "curricula and content that enables the acquisition of basic skills (literacy, numeracy, and skills for life)".

Criticisms of the OECD Recommendations have raised concerns about scenarios in which learners' rights to a quality education are violated when young students are required to *learn how to learn* with GenAI. Here is where the CULT Briefing emphasizes the importance to favor AI-enhanced learning technologies that are adapted to student's needs over GenAI that cannot meet this need because of its general-purpose nature.

Interestingly, the report identifies the use of AI systems tailored to the learning context as the most important educational measure. It then recommends, in line with the OECD's recommendations, that procedural and self-learning measures, such as adapting learning content to focus on *learning how to learn*, be given greater emphasis in the curriculum. Ultimately, however, neither this recommendation nor the one to use AI systems in an age-appropriate manner offers any new insight or a convincing solution to the problem of cognitive development in the face of GenAI.

The introduction of a new regulatory layer for cognitive impact assessment in the EU AI Act for high-risk applications is a novel regulatory approach that merits further consideration. The suggested remedies acknowledge the far-reaching consequences for young citizens when both binding and non-binding measures are distributed among several pedagogical stakeholders, caretakers as well as EdTech and GenAI manufacturers. While it is essential to incorporate an assessment of cognitive impacts in educational context in the AI Act, the suggested regulations should, in principle, be straightforward for AI-enhanced learning technology to comply with: these tools are already designed for educational purposes and built in an education-specific way. It will therefore be feasible for most providers to comply with the suggested standards and for deployers to perform the assessment.

Unexpectedly, however, there is no bifurcated approach to regulating GenAI versus AI-enhanced learning technologies. The briefing does not propose any formal or binding remedies to protect the right to a quality education despite GenAI. Instead, it creates the impression that the suggested amendments have been designed through the prism of AI tools already adapted to educational purposes in mind. For example, 'establishing minimum evidence standards for pedagogical efficacy claims as a condition for AI systems used in education' can only apply to producers who advertise their products as being designed for educational use.

Since both educational and regulatory interventions focus more on AI-enhanced learning technologies than on GenAI, the question arises as to whether the measures that have been ‘left out’ suggest that GenAI is too general to be equipped with such guardrails?

This leads to the conclusion that the suggested mitigations do not suffice to protect children’s right to quality in education and that the problem of quality education in light of GenAI persits. The infringement has been partially addressed by the CULT Committee’s interventions.

6 Conclusion

Arbitrary cognitive offloading is detrimental to the human learning process, as much as a surplus of cognitive load is. An efficient learning process favors a balance between beneficial intrinsic and germane load, after the detrimental extrinsic load have been reduced. In the face of a learning problem to be solved, the beneficial load can be composed of low- and high-cognitive engagegement tasks, just as when D reads two literary texts with sustained attention, memorizes the content and then analyses and applies judgement. Beneficial load facilitates learning, and is highly dependent on the goal of the given learning task. When learners prompt GenAI to solve whole tasks for them, they offload cognition in an arbitrary manner. In that case, cognitive overreliance on GenAI reduces or even erases the possibility for a beneficial load, and the hampered learning process results in distorted memory consolidation, difficulties in retrieving facts, refering to and speaking about the supposedly learnt content, not even to speak of crossreferencing it. In the long term, cognitive development is impacted and basic cognitive skills might not form.

Learning is an active process in which learners learn *how* learning works, and that it is beneficial to offload *irrelevant* information to the external environment. However, the ease of use of GenAI can lead learners to reduce their metacognitive involvement. Metacognition constitutes a highly dynamic process that provides the learner with insight about their own thinking. Commonly described as *thinking about thinking*, it constitutes a part of cognitive load itself, and that often causes students to bypass this activity. Metacognitive laziness manifests in this bypassing and results in behaviors such as leaving generated output unverified, illusion of competence, limited capacities to develop expertise, and ultimately crippled critical thinking skills.

Against this backdrop, studies by Fan et al. (2025), Singh (2025) and Xu (2025) recommend that learning curricula should focus on teaching metacognitive skills. This would better equip learners to use GenAI efficiently in their learning process. For example, GenAI could be used to provide explanations rather than complete solutions, or suggest learning strategies and guide learners step by step through the learning process. These studies have shown that this approach improves learners' critical thinking skills, deepens their understanding, and enhances their ability to learn independently.

The right to quality in education enshrines foundational learning objectives. Although the preamble to the Universal Declaration of Human Rights (UDHR) does not provide specific guidance on this matter, a UNICEF report from 2000 offers concrete normative guidance. Accordingly, quality in education is characterised by a focus on the learner and their mental health, an appropriate learning process and a curriculum that covers basic literacy, numeracy and life skills. The outcomes of quality in education contribute significantly to learners' socialisation by shaping the development of knowledge, skills, and values. A closer examination of these qualitative learning objectives reveals their reference to Bloom’s revised taxonomy. Consequently, the normative understanding of the goals of quality education is underpinned by low- and high-order thinking skills, metacognition, and executive function. Preserving and promoting the process of achieving these goals is fundamental to the right to a good education, bridging the gap from cognitive development to human autonomy and dignity.

Recital 56 of the EU AI Act explicitly states that deploying AI systems is an expression of the right to a high-quality education, including digital and critical thinking skills. The OECD’s Digital Education Outlook report and the CULT Briefing largely concur in their analyses of the impact of GenAI on cognitive overreliance and metacognitive laziness. This is why the non-regulatory measures largely coincide and draw on similar evidence-based references. Recommendations include teaching metacognitive learning strategies, using GenAI for metacognitive scaffolding and taking a more differentiated approach according to age group, particularly for younger learners. However, particular emphasis should be placed on the CULT Briefing’s recommendation to use learning-specific AI-enhanced technologies (i.e. not GenAI) in education, as these could yield positive cognitive gains in the long term. Further regulatory recommendations are also based on this premise, including novel cognitive impact assessments, evidence standards for educational AI claims and mandatory pedagogical evaluations prior to school procurement. Unexpectedly, however, there is no bifurcated approach to regulating GenAI versus AI-enhanced learning technologies. The briefing does not propose binding or formal mitigations to protect the right to quality in education in the light of GenAI, and instead creates the impression that the suggested amendments have been designed for education-specific AI. From here it is not implausible to infer that GenAI is too general to be equipped with such guardrails.

Thus, instead of arguing to attain the right to education qua the use and deployment of GenAI, evidence suggests to argue for the opposite: the right to education is not saved, instead it is infringed. This dichotomy should alarm policy makers, teachers, and social institutions to steer the narrative away from *benefits* to *perils*. The *normal* development of (meta-) cognitive skills is perturbated in a way that the goal of high-quality in education can no longer be achieved *with* this tool, but is instead jeopardised *by* it.

The EU AI Act's recommendation to use GenAI in education to develop digital literacy and critical thinking skills is contradictory. Rather than supporting the right to a quality education, it is being undermined. Furthermore, the two mitigation strategies presented do not adequately minimise the risk of arbitrary cognitive offloading when using GenAI.

The CULT Briefing provides crucial insights when it argues that distinguishing between GenAI and AI-enhanced learning technologies is of fundamental importance. It proposes a regulatory approach that introduces a novel criterion to assess the 'positive cognitive impact' of an AI system. AI systems used in the classroom should therefore be restricted to those specifically designed as educational digital tools and marketed and sold as such. GenAI cannot be included in this category. It is precisely the generalness of GenAI that can lead to cognitive and societal harm. In contrast, AI-enhanced learning technologies are specific; for instance, learning management systems provide learners with tailored motivation based on their behaviour and progress.
The briefing highlights the impossibility of reconciling general-purpose AI systems with student-centred values, such as contextualised problem-setting and problem-solving that emphasise cognitive development, and knowledge transmission.

This is merely the tip of the iceberg, and it entails further unconsidered pitfalls. To address the conflictual proposal of the EU AI Act the more directly, means to adjust recital 56. This change should reflect the insight that only an adapted AI system can be in a position to not infringe on the right to quality education.

In other words, an amendment of recital 56 seems necessary.

> *The use of AI Systems is considered fruitful for high-quality digital education and training when all learners and teachers are enabled to acquire and share the necessary digital skills and competences, including media literacy, and critical thinking, to take an active part in the economy, society, and in democratic processes.(…). General purpose AI-systems do not fulfill this objective."*

The shift from the question of how GenAI might be handled within the context of high-quality education to the realisation that general AI is entirely unsuitable for the educational context gives rise to a new normative framework. So if GenAI were not used – and consequently the digital skills that can only be acquired through GenAI were not taught – would this constitute a violation of the right to education, or is a new understanding of digital skills required instead? Does "to prompt engineer" constitute a fundamental digital skills?

Declaring GenAI an AI system with limited use for specific domains where generalness is more beneficial than harmful could cause GenAI to lose its naturalised status. This would pave the way for education to make use of AI-enhanced learning technologies, through which digital skills could be developed, and the problem of arbitrary cognitive offloading could be solved.

It seems that the generalness of GenAI acts as a catalyst for arbitrary cognitive offloading, thereby rendering it unsuitable for educational use. Excluding it from school curricula, in turn, would prevent the teaching of digital skills associated with its use. This raises the question: which digital skills would be considered as such if GenAI was not a generally accessible AI system, but was instead replaced by a multitude of specialised AI-enhanced purpose-built technologies? Would the skills acquired in this way not be particularly valuable precisely if GenAI was no longer the standard AI system? What if a new norm for specialised, specific-purpose- applications was established? Whether it be resilient microservice software architectures, biodiversity approaches or diversified supply chain management: diverse student-centred AI learning systems promise to advance critical thinking and problem-solving whilst significantly reducing the risks of single-system dependency, a cognitive, infrastructural and political terms alike.

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