YouthProAktiv

Co-funded by the European Union

The next digital divide: Youth in the age of Artificial Intelligence

YouthProAktiv is dedicated to fostering proactive engagement and entrepreneurship among young people, while strengthening their capacity to participate fully in education, employment and democratic life. As artificial intelligence becomes increasingly embedded in how people learn, work, access information and make decisions, young people are among those most directly exposed to both its opportunities and its risks. AI can support personalised learning, skills development, accessibility and innovation, but it can also deepen inequalities, spread misinformation and affect human agency when it is used without adequate knowledge, guidance and critical reflection.

This policy briefing has been developed to examine the emerging divide between young people who are able to use AI critically, ethically and independently, and those who may become increasingly dependent on it for tasks such as writing, research, problem-solving and decision-making. It focuses in particular on the risks associated with **cognitive outsourcing** and on the importance of protecting **critical thinking**, **learner agency** and **cognitive autonomy**. The briefing also considers how AI literacy, education and youth policy can help young people benefit from artificial intelligence without weakening their ability to think, judge and act on their own.

Summary of key messages and policy recommendations:

Artificial intelligence is increasingly shaping how young people learn, work, create, communicate and access information. It can support personalised learning, accessibility, creativity and skills development, but it can also expose young people to **misinformation, bias, privacy risks and forms of overdependence**. The emerging AI divide therefore concerns not only access to technology, but also **whether young people have the knowledge, guidance and critical skills needed to use AI independently and responsibly**.

The briefing highlights that the **impact of AI depends largely on how it is used**. AI can support learning when it helps young people organise information, receive feedback and engage with complex tasks. However, **passive reliance** on AI-generated content may reduce engagement in writing, memory, problem-solving, reflection and critical evaluation. Meaningful AI literacy must therefore include **fact-checking, awareness of bias, ethical judgement and the ability to recognise when AI should not be used**.

The policy recommendations call for embedding critical AI literacy across formal and non-formal education, protecting human-first learning, training teachers and youth workers, reforming assessment methods, addressing unequal access to AI guidance and involving young people meaningfully in AI governance. Together, these measures can help ensure that AI strengthens young people's learning, creativity and participation without replacing independent judgement and human agency.

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or EACEA. Neither the European Union nor the granting authority can be held responsible for them.

1. The emerging AI divide: From digital access to cognitive autonomy

The concept of the digital divide has traditionally been used to describe inequalities in access to and use of computers, the internet and other digital technologies. Early approaches focused primarily on physical access, but later research demonstrated that access alone does not adequately explain people's ability to benefit from technological change. The digital divide also includes **differences in motivation, material resources, digital skills and actual patterns of technology use**. Digital competence therefore involves more than operating a device: it also requires **understanding the advantages and limitations of technologies and selecting the most appropriate tools for a particular task**.[i]

These inequalities have not disappeared with the expansion of artificial intelligence. Approximately 5.5 billion people, around 68% of the global population, were online in 2024, while about 2.6 billion remained without internet access, reflecting persistent disparities linked to geography and income.[ii] Access to advanced AI also depends on infrastructure, high-quality data and computing power, which remain heavily concentrated among a limited number of countries and technology companies. The International Telecommunication Union therefore warns that AI may **deepen existing inequalities across education, employment and governance** unless public investment expands connectivity, skills, infrastructure and inclusive innovation.[iii]

At the individual level, convenient access to AI tools does not guarantee that they will be used effectively, critically or ethically. Research on AI literacy shows that people require **specific knowledge and skills to recognise AI technologies, use them appropriately, evaluate their outputs and understand the ethical responsibilities and risks connected to their use**.[iv] The OECD and the European Union similarly define AI literacy as the technical knowledge, durable skills and future-oriented attitudes needed to engage with, create with, manage and shape AI while critically evaluating its benefits, risks and ethical implications. They also emphasise that simply **interacting with AI tools does not in itself develop AI literacy**.[v]

The growing presence of AI therefore introduces a further dimension of inequality: the difference between those who can use AI as a tool for learning and participation and those who use it without the ability to question its outputs or understand its limitations.[vi] AI literacy requires users to evaluate AI-generated information, identify bias and misinformation, interpret outputs in context and make informed decisions about when and how AI should be used.[vii] Information literacy can help users verify and synthesise AI-generated content, resist automation bias and maintain stronger analytical engagement.[viii]

This emerging divide is especially significant for young people because AI is already embedded in their learning, research, communication and creative activities. A 2025 survey cited by the OECD-EU AI Literacy Framework found that 88% of adolescents aged 13-15 and 96% of those aged 16-18 used AI tools for learning or creative tasks at least several times a week.[ix] The same framework reports that young people aged 16-24 use generative AI at almost twice the rate of the general EU population.[x] This

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or EACEA. Neither the European Union nor the granting authority can be held responsible for them.

widespread use creates opportunities for learning and creativity but also exposes young users to misinformation, bias, stereotypes, privacy risks and the possibility of relying on AI in ways that reduce reflection, persistence and independent reasoning.[xi]

The question is therefore no longer limited to whether young people can access artificial intelligence, but also whether they can maintain control over the cognitive processes involved in learning, judgement and decision-making. Cognitive autonomy encompasses memory, attention, metacognition and the capacity to exercise internal control over one's thinking. It is connected to the ability to reflect on information, evaluate alternatives and decide whether an external technological aid should support or replace a cognitive task.[xii]

To understand this distinction, some researchers differentiate between cognitive offloading and cognitive outsourcing. Cognitive offloading occurs when an external tool stores information or reduces demands on working memory while the individual continues performing the reasoning required by the task. Writing down the intermediate steps of a calculation, for example, reduces the information that must be held in memory but does not transfer the process of solving the problem to the external aid. Cognitive outsourcing occurs when the cognitive function itself -such as composing, summarising, organising, inferring or reasoning- is transferred to an external system.[xiii]

A related framework distinguishes between assistive, substitutive and disruptive forms of cognitive offloading. Assistive offloading supports cognition without replacing it, while substitutive offloading allows technology to perform cognitive work that would otherwise be undertaken by the user. Disruptive offloading goes further by encouraging passive interaction and weakening the individual's control over reflection and thought. Regular dependence on AI for basic cognitive tasks may consequently create an imbalance between external assistance and internal cognitive control, favouring speed and convenience over comprehension.[xiv]

The emerging AI divide can therefore be understood as a divide in cognitive autonomy as well as access and skills.[xv] On one side are users who can employ AI to support learning while continuing to question, verify, reflect and exercise human judgement.[xvi] On the other are users who may increasingly depend on AI-generated answers without developing or maintaining the skills required to evaluate them independently.[xvii] In this context, ensuring equitable access to AI must be accompanied by education that protects human agency, intellectual development and the capacity to think independently.[xviii]

2. Youth and cognitive outsourcing: Opportunities, risks and inequalities

Generative AI is increasingly used by young learners to support academic activities such as searching for information, summarising material, drafting texts and solving problems.[xix] AI systems are also becoming integrated into writing, choice-making and other everyday tasks that previously required greater direct cognitive effort from the user.[xx] Unlike conventional tools that merely store information or support

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or EACEA. Neither the European Union nor the granting authority can be held responsible for them.

intermediate steps, generative AI can produce complete answers, explanations and written outputs with limited ideation or reflection by the user.[xxi]

This capacity creates important opportunities for young people. AI tools can provide rapid access to information, immediate feedback and personalised educational support. Adaptive learning platforms and intelligent tutoring systems can tailor learning experiences to individual needs and may support skill acquisition and knowledge retention.[xxii] By completing repetitive or time-consuming tasks, generative AI may also free young people to dedicate more time to creative or cognitively demanding activities.[xxiii] AI can therefore support learning when it is used as a scaffold that maintains the learner's active engagement rather than replacing it.[xxiv]

The cognitive effects of AI are consequently shaped not only by how frequently it is used, but also by the type of task delegated and the manner in which the user engages with the system. Using AI to support structured debate, question an argument or critique an AI-generated response may encourage deeper engagement and analytical reasoning. In contrast, passive practices such as copying and submitting generated content without evaluation are associated with surface-level learning and limited understanding of complex subjects. AI is therefore not inherently beneficial or detrimental to cognition; its influence depends on the learner, the task, the educational context and the degree of human reflection retained throughout the process. [xxv]

Writing illustrates the difference between assistance and substitution particularly clearly. A tool that helps a learner organise an outline may support the writing process while leaving the formulation and development of ideas to the learner. By contrast, beginning with a complete AI-generated essay may allow the user to bypass cognitive processes involved in producing original work, including the synthesis, organisation and revision of ideas. When AI performs these processes, the learner may obtain a polished result without engaging fully with the intellectual work through which understanding is normally developed.[xxvi]

Similar concerns apply to memory and research. Research on the "Google Effect" found that people who expect information to remain externally available are less likely to remember the information itself and may instead remember where it can be found. Digital technologies can therefore redistribute memory, attention and mental effort rather than simply increasing access to knowledge. When learners rely on AI-generated summaries or explanations instead of retrieving, organising and reconstructing knowledge independently, they may avoid cognitive processes that contribute to durable learning. Excessive dependence on generated answers in education has been linked to surface-level learning, weaker self-evaluation and shallow conceptual understanding.[xxvii]

AI can also influence how young people approach problem-solving and decision-making. Ready-made solutions can reduce the need to analyse evidence, compare alternatives or construct a response independently. Automated decision-support can improve efficiency, but it may also reduce opportunities to practise independent analysis and judgement.[xxviii] The result may be stronger immediate performance

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or EACEA. Neither the European Union nor the granting authority can be held responsible for them.

alongside weaker capacity to respond when the system is inaccurate, unavailable or unable to account for the context of a particular decision.[xxix]

Critical thinking is particularly vulnerable when users accept AI output without verification. Critical thinking requires active engagement in analysing, evaluating and synthesising information in order to reach reasoned conclusions. The speed and convenience of AI-generated responses can discourage the deeper reflective processes on which these abilities depend. A mixed-method study involving 666 participants found a significant negative relationship between frequent AI use and critical-thinking ability, with cognitive offloading acting as a mediating factor. Within the study, participants aged 17-25 displayed higher levels of AI use and cognitive offloading and lower critical-thinking scores than older groups.[xxx]

These findings should nevertheless be interpreted cautiously. Associations between AI use and critical thinking do not by themselves demonstrate that AI directly or permanently causes cognitive decline. The available research remains limited by factors including cross-sectional designs, self-reported data and insufficient measurement of long-term academic and cognitive outcomes. Further longitudinal and experimental research is required to establish causality and determine how effects develop over time and across different learning environments.[xxxi]

Cognitive fatigue may be one mechanism connecting AI dependence with weaker critical engagement. A study of 580 university students found that greater AI dependence was associated with higher cognitive fatigue and lower critical-thinking scores. Cognitive fatigue partially mediated this relationship, meaning that students who reported greater dependence also reported more mental exhaustion, which in turn was associated with weaker critical thinking. Prolonged interaction with AI may therefore create cognitive demands of its own, especially when users must continuously assess, verify and revise generated content.[xxxii]

The effects on concentration are connected to broader changes in expectations about cognitive effort. When instant information and rapid feedback become continuously available, activities requiring sustained attention may begin to feel disproportionately demanding. Frequent exposure to digital multitasking and uninterrupted flows of information has been associated with weaker sustained attention and cognitive flexibility. Individuals who respond rapidly to multiple tasks may nevertheless make more errors and display poorer attentional control. AI systems that consistently reward speed, ease and immediate outcomes may consequently encourage users to favour convenience over depth.[xxxiii]

Dependence on AI may also affect confidence and self-evaluation. AI-generated outputs can create an illusion of competence in which users overestimate how well they understand material that was produced or reviewed by the system. Studies using judgements of learning have found that users may overestimate their knowledge of AI-generated information. This miscalibration can reduce the perceived need to seek feedback, revise an answer or examine gaps in understanding. It may therefore produce confidence in the quality of an output without an equivalent development of the knowledge or reasoning needed to explain and defend it independently.[xxxiv]

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or EACEA. Neither the European Union nor the granting authority can be held responsible for them.

These risks are especially relevant during adolescence and early adulthood, when executive functions and independent cognitive agency are still developing. Heavy reliance on AI for school-related tasks has been associated with weaker self-monitoring and lower metacognitive accuracy. Premature delegation of reasoning and self-regulation may delay the development of independent cognitive agency, which is connected to both autonomy and motivation. Disruptive forms of outsourcing may therefore undermine not only task-specific knowledge but also the learner's capacity to direct, evaluate and take responsibility for their own thinking.[xxxv]

The consequences of cognitive outsourcing are also likely to be unequal. Information literacy can protect learners by helping them evaluate, verify and synthesise AI-generated material and resist automation bias. The study of university students found that the negative association between AI dependence and critical thinking was weaker among participants with stronger information literacy. However, careful verification can itself increase mental workload, meaning that highly engaged users may experience greater fatigue when they rely heavily on AI.[xxxvi]

Young people who receive effective guidance may therefore be better positioned to use AI as a source of feedback, stimulation and support while retaining control over the learning process. Those who lack strong information literacy, educational support or opportunities to practise independent reasoning may be more likely to accept generated outputs passively and become dependent on them.[xxxvii] The emerging inequality is consequently not limited to who can access the most advanced tools, but extends to who can use them without weakening memory, attention, judgement and the ability to learn autonomously.[xxxviii]

3. Rethinking AI literacy, education and human agency

Artificial intelligence can support education by providing personalised learning materials, intelligent tutoring, immediate feedback and adaptive learning experiences. These applications may help learners progress at an appropriate pace and respond to different learning needs and abilities. Customisable interfaces may also improve accessibility for neurodiverse learners and students with different physical abilities. AI-powered tools may therefore contribute to broader and more inclusive access to educational opportunities, particularly where conventional educational resources or personalised tutoring are limited.[xxxix]

AI can also support creativity, problem-solving and the development of skills needed in a changing labour market.[xl] UNESCO argues that education should prepare learners for effective human–machine collaboration while continuing to prioritise distinctly human capacities such as critical thinking, communication, collaboration, creativity, empathy, self-direction and value-based judgement. The integration of AI-related skills into school curricula, vocational education and higher education can help ensure that learning remains relevant to changing economies, professions and societies.[xli]

These opportunities are particularly relevant to young people's employability.[xlii] AI is changing job roles and skill requirements, increasing demand for technological literacy, AI-related knowledge and the ability to work effectively with digital

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or EACEA. Neither the European Union nor the granting authority can be held responsible for them.

systems.[xliii] At the same time, AI is expected to transform or displace some forms of standardised and repetitive work while creating new professional opportunities and increasing the need for continuous reskilling. Education and training systems must therefore prepare young people not only to use current AI tools, but also to adapt to long-term changes in employment and skills demand.[xliv]

The benefits of AI are nevertheless unlikely to be distributed equally. Unequal access to connectivity, computing resources, high-quality data and AI education may reinforce existing disparities between countries, regions and socioeconomic groups.[xlv] Many young people continue to learn about AI informally through peers, online platforms and personal experimentation rather than through structured education. This uneven access to guidance can affect young people's ability to understand AI systems, recognise their limitations and benefit from them safely and effectively.[xlvi]

Meaningful AI literacy must therefore extend beyond the practical ability to operate an AI tool. The OECD and European Union framework presents AI literacy as an interdisciplinary competence drawing on ethics, computer science, media literacy, digital literacy, data science, critical thinking and creative expression. Its purpose is to enable learners to understand how AI works, evaluate its outputs, use it responsibly and participate in shaping how it affects individuals and society. AI literacy should consequently be understood as a foundation for informed decision-making rather than as proficiency in prompting or familiarity with particular platforms.[xlvii]

Understanding how AI systems produce their outputs is an essential part of this literacy. AI models do not learn through human-like understanding, but generate outputs through statistical inference and patterns derived from their training data. Because these data may contain inaccurate, incomplete or biased information, AI systems can reproduce harmful assumptions and existing social inequalities.[xlviii] Learners therefore need to understand that fluent or convincing outputs are not necessarily accurate, complete or neutral.[xlix]

Fact-checking and source evaluation must consequently form central elements of AI literacy. Learners with stronger information-literacy skills are more likely to question the accuracy of AI-generated content, detect bias, verify claims and compare outputs with other sources. These practices help preserve analytical engagement and reduce the risk of accepting generated information without reflection. By contrast, users with weaker literacy skills are more likely to accept AI outputs at face value and are therefore more vulnerable to misinformation and automation bias.[l]

AI literacy must also include awareness of systemic, human and computational bias. Bias can enter AI systems through training data, design decisions, evaluation processes and the wider social context in which a system is developed and deployed. Addressing these risks requires both technical evaluation and human judgement, including participatory design, qualitative review, subgroup testing and continuous monitoring.[li] Learners should therefore be able to question whose perspectives are represented in an AI system, who may be excluded and how an apparently neutral output may affect different groups.[lii]

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or EACEA. Neither the European Union nor the granting authority can be held responsible for them.

Ethical judgement is equally important because AI systems can affect privacy, fairness, transparency, accountability and human agency.[liii] UNESCO's human-centred approach stresses that AI education should enhance human capabilities, social justice, sustainability and human dignity. It also states that AI should support human decision-making and intellectual development rather than undermine or replace them.[liv] Preparing learners to work with AI therefore requires not only technical knowledge, but also the capacity to assess whether a particular use is fair, appropriate and consistent with human rights and social values.[lv]

Meaningful AI literacy should further include the ability to decide when AI should not be used.[lvi] The OECD-EU framework describes learners as active agents who should be able to engage with, manage and shape AI rather than merely consume its outputs.[lvii] Maintaining this agency requires recognising situations in which independent reasoning, human interaction, personal reflection or professional judgement should remain central.[lviii] It also requires understanding that the suitability of AI depends on the task, context, possible consequences and limitations of the system.[lix]

This distinction is especially important in education. Teachers' pedagogical expertise, professional judgement and relationships with learners become more important -not less- as AI tools become integrated into classrooms.[lx] Educators must be able to determine when AI can support a learning objective and when its use may bypass the cognitive effort, human interaction or assessment process needed for meaningful learning.[lxi] However, many educators currently lack sufficient preparation to fulfil this role: the OECD–EU framework reports that only one in three teachers uses AI on average, while three out of four report lacking the knowledge and skills needed to teach with it.[lxii]

The European policy context increasingly recognises the importance of this broader approach.[lxiii] The EU Artificial Intelligence Act promotes a human-centred and risk-based model and identifies AI literacy as necessary for understanding the benefits, risks, safeguards and appropriate use of AI systems. The Act also emphasises human agency and oversight, according to which AI should serve people, respect personal autonomy and remain subject to appropriate human control.[lxiv]

The OECD-European Union AI Literacy Framework connects these principles to the Digital Education Action Plan 2021–2027, the European Education Area, the Council Recommendations on digital education and skills, DigComp 3.0 and the Union of Skills. It also anticipates a European roadmap for mainstreaming AI literacy across education systems. Together, these initiatives recognise that AI literacy is becoming a foundational competence for education, employment and participation in an AI-influenced society.[lxv]

The central educational challenge is therefore not simply to increase the use of AI, but to ensure that its use strengthens rather than weakens human capabilities.[lxvi] AI can widen access, support creativity and help young people prepare for changing labour markets, but these benefits depend on education that combines technical understanding with fact-checking, bias awareness, ethical judgement and independent decision-making.[lxvii] AI literacy must ultimately enable young people to

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or EACEA. Neither the European Union nor the granting authority can be held responsible for them.

collaborate with AI while retaining responsibility for what they believe, create and decide.[lxviii]

4. Policy Recommendations for an AI-Empowered Generation

Artificial intelligence is becoming an increasingly important part of education, employment and young people's everyday lives. The policy objective should therefore not be to prevent young people from using AI, but to ensure that they are able to benefit from it without weakening the skills, judgement and autonomy required to think independently.

The European Union, Member States, educational institutions and youth organisations should adopt a coordinated approach that combines AI literacy, educator preparation, assessment reform, inclusion and meaningful youth participation. The following recommendations aim to support an AI-empowered generation capable of using artificial intelligence critically, responsibly and with confidence.

A. Embed critical AI literacy across formal and non-formal education

We recommend that the European Union and Member States support the systematic integration of critical AI literacy across schools, vocational education, universities and non-formal learning environments.

AI literacy should not be limited to technical knowledge or the ability to operate generative AI tools. It should include fact-checking, source evaluation, awareness of bias, privacy and data protection, ethical judgement, understanding of AI limitations and the ability to identify when the use of AI is inappropriate.

Learning programmes should also help young people distinguish between AI use that supports their thinking and AI use that replaces it. This would allow learners to make informed choices about when to use AI, how to verify its outputs and when to rely on their own reasoning, knowledge and experience.

The EU should encourage the development of adaptable AI-literacy modules that can be used in both formal and non-formal education. These resources should be age-appropriate, accessible and suitable for learners with different educational, linguistic and socioeconomic backgrounds.

B. Protect human-first learning and independent cognitive development

We call on educational institutions to preserve regular opportunities for learners to think, write, research, create and solve problems without AI assistance.

AI should be used as a support for learning rather than as an automatic substitute for the intellectual effort through which knowledge and skills are developed. Learners should, where appropriate, be encouraged to formulate an initial idea, argument or solution independently before consulting an AI system.

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or EACEA. Neither the European Union nor the granting authority can be held responsible for them.

Schools, universities and youth organisations should introduce human-first learning practices that protect reflection, concentration, memory, creativity and independent judgement. These may include AI-free stages within assignments, individual writing exercises, debates, problem-solving activities, oral reflection and tasks requiring learners to explain their reasoning in their own words.

Such approaches should not be designed as a rejection of technology. Their purpose should be to ensure that young people continue to practise the cognitive processes they need in order to evaluate AI outputs, recognise mistakes and act independently when AI is unavailable or unreliable.

C. Equip educators and Youth Workers to guide responsible AI use

We urge the European Union and Member States to invest in continuous professional development for teachers, trainers, educators and youth workers.

Professionals working with young people need practical guidance on how AI can be integrated into learning without encouraging passivity or dependence. Training should help them recognise the difference between AI-supported learning and cognitive substitution, assess the reliability of AI-generated content and design activities that strengthen critical thinking.

Educators and youth workers should also receive clear institutional guidance on privacy, bias, misinformation, academic integrity and the responsible use of AI with minors and vulnerable groups. Professional-development programmes should combine technical understanding with pedagogical and ethical preparation.

The EU should support the creation of shared resource libraries containing lesson plans, workshop formats, case studies and examples of responsible practice. These resources should be suitable for both formal education and non-formal youth work, recognising the important role youth organisations play in reaching young people outside traditional classrooms.

D. Reform assessment to reward reasoning, not only final outputs

We recommend that educational institutions review assessment methods that evaluate only the quality of a final written product.

As AI tools become capable of producing polished essays, presentations and answers, assessments should place greater value on the process through which learners arrive at a conclusion. This may include drafts, research notes, source selection, oral presentations, reflective statements, problem-solving steps and explanations of how AI was used.

Learners should be expected to demonstrate that they understand, can justify and can critically evaluate the work they submit. Where AI use is permitted, students should be able to identify its contribution, verify its outputs and explain the decisions they made independently.

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or EACEA. Neither the European Union nor the granting authority can be held responsible for them.

Assessment reform should also promote tasks that require interpretation, discussion, contextual judgement and the application of knowledge to real-life situations. These forms of evaluation are more likely to reveal whether learners have developed genuine understanding and independent reasoning.

E. Guarantee equitable access to AI education, guidance and support

We call on the European Union and Member States to address the new AI divide as a matter of both technological access and educational inequality.

Providing access to devices or AI platforms is not sufficient. Young people also need high-quality guidance, trained educators, reliable infrastructure and opportunities to develop critical AI literacy. Without this support, those with greater educational and economic resources will be better positioned to use AI effectively, while disadvantaged learners may face a higher risk of passive or dependent use.

Targeted support should be provided to young people in rural and remote areas, young migrants and refugees, young people with disabilities, NEETs, learners from low-income backgrounds and those attending under-resourced institutions.

AI-literacy programmes and educational tools should be available in accessible formats and multiple languages. Public policies should also prevent essential educational opportunities from becoming dependent on access to expensive or privately controlled AI services.

F. Institutionalise meaningful youth participation in AI governance

We urge EU institutions, national governments, educational authorities and technology developers to involve young people meaningfully in decisions concerning AI.

Young people should not be treated solely as users or recipients of AI policy. They should be recognised as stakeholders whose education, employment, rights and social relationships are directly affected by the development and deployment of these technologies.

Youth participation should be integrated into the design, testing, monitoring and evaluation of AI systems and policies. This may include youth advisory councils, participatory policy forums, consultations within schools and universities, and structured dialogue between young people, policymakers, educators and technology developers.

Participation should be continuous, inclusive and transparent rather than limited to symbolic or one-off consultations. Particular efforts should be made to include young people from disadvantaged and underrepresented backgrounds whose experiences may otherwise be absent from AI governance.

By involving young people in shaping the rules and systems that affect them, policymakers can strengthen democratic legitimacy, improve the relevance of AI

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or EACEA. Neither the European Union nor the granting authority can be held responsible for them.

policies and support a generation that understands artificial intelligence not only as a tool to be used, but also as a technology to be questioned, governed and shaped.

Conclusion

Artificial intelligence is increasingly shaping how young people learn, work, communicate, access information and participate in society. Its potential benefits include personalised learning, improved accessibility, support for creativity, skills development and new opportunities for education and employment. At the same time, unequal access to infrastructure, guidance and AI-related skills may deepen existing social and educational inequalities.

The emerging divide is therefore not limited to who can access artificial intelligence, but also concerns who can use it critically, ethically and independently. AI literacy requires more than familiarity with tools: it includes understanding how AI systems work, evaluating their outputs, recognising bias and misinformation, making informed decisions and using AI in ways that preserve human agency.

The evidence reviewed in this briefing also shows that the effects of AI on learning and cognition depend strongly on how it is used. AI can support deeper learning when it is used to stimulate debate, provide feedback or challenge a learner's reasoning. However, passive or habitual reliance on AI may reduce engagement in writing, memory, problem-solving, reflection and critical evaluation. The current research remains relatively recent and does not justify claims of inevitable or permanent cognitive decline, but it does support the need for greater attention to cognitive outsourcing, learner agency and long-term independent thinking.

A human-centred approach to AI should therefore ensure that technology supports intellectual development rather than replacing the cognitive effort through which young people build knowledge, judgement and autonomy. The EU Artificial Intelligence Act, the OECD–European Union AI Literacy Framework and UNESCO's education frameworks all emphasise human agency, critical understanding, ethical use and appropriate human oversight. Their implementation will require coordinated action across education systems, youth work, public policy and civil society to ensure that young people are prepared not only to use AI, but also to question, evaluate and shape it.

The objective should not be to separate young people from artificial intelligence, but to enable them to benefit from it while retaining responsibility for what they learn, create, believe and decide. An AI-empowered generation must remain capable of thinking independently, recognising when technology is supporting its judgement and identifying when it is beginning to replace it.

[i] Celik, I. (2023) Exploring the Determinants of Artificial Intelligence (AI) Literacy: Digital Divide, Computational Thinking, Cognitive Absorption, *Telematics and Informatics 83*. Available at https://doi.org/10.1016/j.tele.2023.102026

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or EACEA. Neither the European Union nor the granting authority can be held responsible for them.

[ii] International Telecommunication Union (2026) *AI for Good Impact Report 2nd edition 2025*. Available at https://s41721.pcdn.co/wp-content/uploads/2022/04/2600081_AI-for-Good-Impact-Report-2025-E-v6.pdf

[iii] *Id.*

[iv] Celik, I. (2023) Exploring the Determinants of Artificial Intelligence (AI) Literacy: Digital Divide, Computational Thinking, Cognitive Absorption, *Telematics and Informatics 83*. Available at https://doi.org/10.1016/j.tele.2023.102026

[v] OECD and European Union (2026) *Empowering learners for the age of AI: An AI literacy framework for primary and secondary education*. OECD Publishing, Paris. Available at https://doi.org/10.1787/65cd27d4-en

[vi] *Id.*

[vii] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence and amending Regulations (EC) No 300/2008, (EU) No 167/2013, (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1139 and (EU) 2019/2144 and Directives 2014/90/EU, (EU) 2016/797 and (EU) 2020/1828 (Artificial Intelligence Act) (Text with EEA relevance). Available at https://eur-lex.europa.eu/eli/reg/2024/1689/oj

[viii] Tian J. and Zhang, R. (2025) Learners' AI dependence and critical thinking: The psychological mechanism of fatigue and the social buffering role of AI literacy. *Acta Psychologica 260*. Available at https://doi.org/10.1016/j.actpsy.2025.105725

[ix] OECD and European Union (2026) *Empowering learners for the age of AI: An AI literacy framework for primary and secondary education*. OECD Publishing, Paris. Available at https://doi.org/10.1787/65cd27d4-en

[x] *Id.*

[xi] *Id.*

[xii] Jose, B., Joseph, D., Mohan, V., Alexander, E., Varghese, S.K. and Roy, A. (2025) Outsourcing cognition: the psychological costs of AI-era convenience. *Frontiers in Psychoogy. 16*. Available at 10.3389/fpsyg.2025.1645237

[xiii] Kirschner, P. (2026) Understanding AI: Offloading or Outsourcing Thinking? Available at https://www.kirschnered.nl/2026/01/13/understanding-ai-offloading-or-outsourcing-thinking/

[xiv] Jose, B., Joseph, D., Mohan, V., Alexander, E., Varghese, S.K. and Roy, A. (2025) Outsourcing cognition: the psychological costs of AI-era convenience. *Frontiers in Psychoogy. 16*. Available at 10.3389/fpsyg.2025.1645237

[xv] *Id.*

[xvi] OECD and European Union (2026) *Empowering learners for the age of AI: An AI literacy framework for primary and secondary education*. OECD Publishing, Paris. Available at https://doi.org/10.1787/65cd27d4-en

[xvii] Gerlich, M. (2025) AI Tools in Society: Impacts on Cognitive Offloading and the Future of Critical Thinking. *Societies 15, 6*. Available at https://doi.org/10.3390/soc15010006

[xviii] UNESCO (2025) *What you need to know about UNESCO's new AI competency frameworks for students and teachers*. Available at https://www.unesco.org/en/articles/what-you-need-know-about-unescos-new-ai-competency-frameworks-students-and-teachers?hub=195885

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or EACEA. Neither the European Union nor the granting authority can be held responsible for them.

[xix] Tian J. and Zhang, R. (2025) Learners' AI dependence and critical thinking: The psychological mechanism of fatigue and the social buffering role of AI literacy. *Acta Psychologica 260*. Available at https://doi.org/10.1016/j.actpsy.2025.105725

[xx] Jose, B., Joseph, D., Mohan, V., Alexander, E., Varghese, S.K. and Roy, A. (2025) Outsourcing cognition: the psychological costs of AI-era convenience. *Frontiers in Psychoogy*. *16*. Available at 10.3389/fpsyg.2025.1645237

[xxi] *Id.*

[xxii] Gerlich, M. (2025) AI Tools in Society: Impacts on Cognitive Offloading and the Future of Critical Thinking. *Societies 15, 6*. Available at https://doi.org/10.3390/soc15010006

[xxiii] Nagata, J. M. Memon, Z., Huang, O. and Moreno, M. A. (2026) Adolescent Health and Generative AI—Risks and Benefits, *JAMA Pediatr 180*. Available at doi:10.1001/jamapediatrics.2025.4502

[xxiv] Tian J. and Zhang, R. (2025) Learners' AI dependence and critical thinking: The psychological mechanism of fatigue and the social buffering role of AI literacy. *Acta Psychologica 260*. Available at https://doi.org/10.1016/j.actpsy.2025.105725

[xxv] *Id.*

[xxvi] Jose, B., Joseph, D., Mohan, V., Alexander, E., Varghese, S.K. and Roy, A. (2025) Outsourcing cognition: the psychological costs of AI-era convenience. *Frontiers in Psychoogy*. *16*. Available at 10.3389/fpsyg.2025.1645237

[xxvii] *Id.*

[xxviii] Gerlich, M. (2025) AI Tools in Society: Impacts on Cognitive Offloading and the Future of Critical Thinking. *Societies 15, 6*. Available at https://doi.org/10.3390/soc15010006

[xxix] Stackpole, B. (2026) *'AI gravity' is pulling you toward dependency. Here's how to push back*. MIT Management Sloan School. Available at https://mitsloan.mit.edu/ideas-made-to-matter/ai-gravity-pulling-you-toward-dependency-heres-how-to-push-back

[xxx] Gerlich, M. (2025) AI Tools in Society: Impacts on Cognitive Offloading and the Future of Critical Thinking. *Societies 15, 6*. Available at https://doi.org/10.3390/soc15010006

[xxxi] Tian J. and Zhang, R. (2025) Learners' AI dependence and critical thinking: The psychological mechanism of fatigue and the social buffering role of AI literacy. *Acta Psychologica 260*. Available at https://doi.org/10.1016/j.actpsy.2025.105725

[xxxii] *Id.*

[xxxiii] Jose, B., Joseph, D., Mohan, V., Alexander, E., Varghese, S.K. and Roy, A. (2025) Outsourcing cognition: the psychological costs of AI-era convenience. *Frontiers in Psychoogy*. *16*. Available at 10.3389/fpsyg.2025.1645237

[xxxiv] *Id.*

[xxxv] *Id.*

[xxxvi] Tian J. and Zhang, R. (2025) Learners' AI dependence and critical thinking: The psychological mechanism of fatigue and the social buffering role of AI literacy. *Acta Psychologica 260*. Available at https://doi.org/10.1016/j.actpsy.2025.105725

[xxxvii] *Id.*

[xxxviii] Jose, B., Joseph, D., Mohan, V., Alexander, E., Varghese, S.K. and Roy, A. (2025) Outsourcing

cognition: the psychological costs of AI-era convenience. *Frontiers in Psychoogy*. *16*. Available at 10.3389/fpsyg.2025.1645237

[xxxix] International Telecommunication Union (2026) *AI for Good Impact Report 2nd edition 2025*. Available at https://s41721.pcdn.co/wp-content/uploads/2022/04/2600081_AI-for-Good-Impact-Report-2025-E-v6.pdf

[xl] *Id.*

[xli] Miao, F., Holmes, W., Huang, R. and Zhang, H. (2021). *AI and Education: Guidance for policy-makers*. United Nations Educational, Scientific and Cultural Organization. Available at https://doi.org/10.54675/PCSP7350

[xlii] UNRIC (2025) *The AI Generation: Youth in the Artificial Intelligence Era*. Regional Information Centre for Western Europe. Available at https://unric.org/en/the-ai-generation-youth-in-the-artificial-intelligence-era/

[xliii] International Telecommunication Union (2026) *AI for Good Impact Report 2nd edition 2025*. Available at https://s41721.pcdn.co/wp-content/uploads/2022/04/2600081_AI-for-Good-Impact-Report-2025-E-v6.pdf

[xliv] Miao, F., Holmes, W., Huang, R. and Zhang, H. (2021). *AI and Education: Guidance for policy-makers*. United Nations Educational, Scientific and Cultural Organization. Available at https://doi.org/10.54675/PCSP7350

[xlv] International Telecommunication Union (2026) *AI for Good Impact Report 2nd edition 2025*. Available at https://s41721.pcdn.co/wp-content/uploads/2022/04/2600081_AI-for-Good-Impact-Report-2025-E-v6.pdf

[xlvi] UNRIC (2025) *The AI Generation: Youth in the Artificial Intelligence Era*. Regional Information Centre for Western Europe. Available at https://unric.org/en/the-ai-generation-youth-in-the-artificial-intelligence-era/

[xlvii] OECD and European Union (2026) *Empowering learners for the age of AI: An AI literacy framework for primary and secondary education*. OECD Publishing, Paris. Available at https://doi.org/10.1787/65cd27d4-en

[xlviii] *Id.*

[xlix] Tian J. and Zhang, R. (2025) Learners' AI dependence and critical thinking: The psychological mechanism of fatigue and the social buffering role of AI literacy. *Acta Psychologica 260*. Available at https://doi.org/10.1016/j.actpsy.2025.105725

[l] *Id.*

[li] International Telecommunication Union (2026) *AI for Good Impact Report 2nd edition 2025*. Available at https://s41721.pcdn.co/wp-content/uploads/2022/04/2600081_AI-for-Good-Impact-Report-2025-E-v6.pdf

[lii] OECD and European Union (2026) *Empowering learners for the age of AI: An AI literacy framework for primary and secondary education*. OECD Publishing, Paris. Available at https://doi.org/10.1787/65cd27d4-en

[liii] Celik, I. (2023) Exploring the Determinants of Artificial Intelligence (AI) Literacy: Digital Divide, Computational Thinking, Cognitive Absorption, *Telematics and Informatics 83*. Available at https://doi.org/10.1016/j.tele.2023.102026

[liv] UNESCO (2025) *What you need to know about UNESCO's new AI competency frameworks for students and teachers*. Available at https://www.unesco.org/en/articles/what-you-need-know-about-unescos-new-ai-competency-frameworks-students-and-teachers?hub=195885

[lv] Miao, F., Holmes, W., Huang, R. and Zhang, H. (2021). *AI and Education: Guidance for policy-makers*. United Nations Educational, Scientific and Cultural Organization. Available at https://doi.org/10.54675/PCSP7350

[lvi] UNESCO (2025) *What you need to know about UNESCO's new AI competency frameworks for students and teachers*. Available at https://www.unesco.org/en/articles/what-you-need-know-about-unescos-new-ai-competency-frameworks-students-and-teachers?hub=195885

[lvii] OECD and European Union (2026) *Empowering learners for the age of AI: An AI literacy framework for primary and secondary education*. OECD Publishing, Paris. Available at https://doi.org/10.1787/65cd27d4-en

[lviii] Miao, F., Holmes, W., Huang, R. and Zhang, H. (2021). *AI and Education: Guidance for policy-makers*. United Nations Educational, Scientific and Cultural Organization. Available at https://doi.org/10.54675/PCSP7350

[lix] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence and amending Regulations (EC) No 300/2008, (EU) No 167/2013, (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1139 and (EU) 2019/2144 and Directives 2014/90/EU, (EU) 2016/797 and (EU) 2020/1828 (Artificial Intelligence Act) (Text with EEA relevance). Available at https://eur-lex.europa.eu/eli/reg/2024/1689/oj

[lx] OECD and European Union (2026) *Empowering learners for the age of AI: An AI literacy framework for primary and secondary education*. OECD Publishing, Paris. Available at https://doi.org/10.1787/65cd27d4-en

[lxi] International Telecommunication Union (2026) *AI for Good Impact Report 2nd edition 2025*. Available at https://s41721.pcdn.co/wp-content/uploads/2022/04/2600081_AI-for-Good-Impact-Report-2025-E-v6.pdf

[lxii] OECD and European Union (2026) *Empowering learners for the age of AI: An AI literacy framework for primary and secondary education*. OECD Publishing, Paris. Available at https://doi.org/10.1787/65cd27d4-en

[lxiii] *Id.*

[lxiv] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence and amending Regulations (EC) No 300/2008, (EU) No 167/2013, (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1139 and (EU) 2019/2144 and Directives 2014/90/EU, (EU) 2016/797 and (EU) 2020/1828 (Artificial Intelligence Act) (Text with EEA relevance). Available at https://eur-lex.europa.eu/eli/reg/2024/1689/oj

[lxv] OECD and European Union (2026) *Empowering learners for the age of AI: An AI literacy framework for primary and secondary education*. OECD Publishing, Paris. Available at https://doi.org/10.1787/65cd27d4-en

[lxvi] UNESCO (2025) *What you need to know about UNESCO's new AI competency frameworks for students and teachers*. Available at https://www.unesco.org/en/articles/what-you-need-know-about-unescos-new-ai-competency-frameworks-students-and-teachers?hub=195885

[lxvii] International Telecommunication Union (2026) *AI for Good Impact Report 2nd edition 2025*. Available at https://s41721.pcdn.co/wp-content/uploads/2022/04/2600081_AI-for-Good-Impact-Report-2025-E-v6.pdf

[lxviii] Miao, F., Holmes, W., Huang, R. and Zhang, H. (2021). *AI and Education: Guidance for policy-makers*. United Nations Educational, Scientific and Cultural Organization. Available at https://doi.org/10.54675/PCSP7350