ARTIFICIAL INTELLIGENCE IN EDUCATION, GLOBAL PRACTICES, FUNCTIONAL TYPOLOGY, AND QUESTIONING ALGORITHMIC LOGIC

Marina VASILEVA CONNELL
International EdTech and STEM Strategist, External evaluator for the EVIDALI project, European Schoolnet, Scotland
marinaconnell@iamlearner.net

UDC: 004.83.055:37.026

ABSTRACT:

This paper presents an analysis of the development, typology, and application of artificial intelligence (AI), with particular emphasis on its practical implementation within the contemporary educational system. It begins with a brief overview of AI's evolution, which has unfolded in parallel with humanity's pursuit to understand and model its own capacity for thinking. The paper then examines global practices from countries such as China, Finland, the United States, South Korea, and India, highlighting diverse implementation strategies and pedagogical approaches.

The paper offers a typology of AI tools based on their function: generative, productivity-oriented, tutoring, visual, and audio tools, with an assessment of their potential to foster critical thinking. The central message is that teachers must raise students' awareness of the need to re-evaluate the algorithmic logic behind AI-generated responses. AI should not be used merely to retrieve information, but as a means to analyze, compare, and construct arguments. Through the approach of "questioning the answers," educators can promote autonomous, responsible, and ethically grounded learning.

The paper concludes with a selection of tools that Macedonian educators can adopt, emphasizing the role of AI as a didactic mediator rather than an infallible authority.

Keywords: *artificial intelligence, educational system, global practices, AI tool typology, critical thinking, questioning the answers, algorithmic logic*

Introduction

In contemporary society, digital literacy and technological competence have become essential components of primary education. Artificial Intelligence (AI), asnow probably the fastest-evolving technology in human history, is already transforming the way students learn, teachers teach and schools operate. Although AI is most commonly associated with higher education and industrial applications, its integration into primary education opens new possibilities for interdisciplinary learning that is both interactive and personalised.

Primary education is a critical phase in the development of students' cognitive, social and communication skills. Integrating AI at this stage requires a pedagogically thoughtful approach that considers students' age and developmental needs, as well as some reflection on the learning context. Teachers are key actors in this process, as their appropriate use of AI tools can foster

creativity and critical thinking. As Yim and Su (2025) emphasize, successful AI literacy in primary education must be grounded in constructivist methodologies and ethical awareness, while deep cognitive engagement can also be facilitated by the use of project-based learning. Furthermore, Holmes et al. (2022) warn that without pedagogical training, teachers risk using AI merely as technical support rather than as a tool for developing critical thinking. According to Luckin et al. (2016), the role of the teacher in the age of AI is not diminished but transformed—from a transmitter of knowledge to a mediator of meaning and analysis.

However, in an era where answers are instantly accessible through a simple query to an algorithm, a new pedagogical responsibility arises: teaching students not only to ask questions, but also to challenge the responses received. This process - referred to in this paper as *questioning the answers* - represents a vital step toward cultivating autonomous, responsible and critically engaged learners. Rather than treating AI as an infallible source of truth, it should be used as a tool that provokes students to think, compare, analyse and formulate new questions.

The aim of this paper is to provide a systematic overview of the practical application of AI in primary education, through an analysis both of its historical development and its current global usage as well as some scrutiny of many of the concrete recommendations for teachers from across disciplines. Special emphasis is placed on the need for educators to convey the message that AI should not be used for passive answer retrieval, but as a means to encourage critical analysis, argumentation and independent thinking. In this sense, *questioning the answers* is not merely a method - it is a pedagogical imperative for the 21st century.

An Abbreviated Analysis of the Development of Artificial Intelligence

The development of artificial intelligence (AI) has unfolded in parallel with humanity's pursuit to understand and model its own capacity for thinking. As early as 1950, Alan Turing posed the question "Can machines think?" and proposed the Turing Test as a criterion for intelligent behaviour (Turing, 1950). In doing so, he not only initiated a technological debate but also opened an epistemological dilemma: are the answers provided by machines sufficient, or should they be critically examined?

In 1956, during the Dartmouth Conference, researchers formalized the term 'artificial intelligence' and defined it as the science of creating machines capable of human-like reasoning. Over the following decades, AI evolved through symbolic systems, expert programs and problem-solving algorithms. Yet even then, some scientists warned that machine-generated answers should not be treated as final truths, but rather as starting points for critical analysis.

In the 1980s and 1990s, with the emergence of neural networks and machine learning, AI began learning from data instead of relying solely on predefined rules applied to a discrete tranche of information. This led to significant advances in speech, image and text recognition, but also intensified concerns about the verifiability of results amidst issues of bias and transparency.

Educators and researchers working with educational technologies began emphasizing that students should not simply make unquestioning use of AI tools but also to critically evaluate their outputs.

In the past decade, generative models - such as transformers and large language models - have enabled AI to produce text, images, code and other forms of content with impressive precision. However, this has also increased the risk of passively accepting automated responses. Instead of fostering dialogue with knowledge, there is a real danger that students may become accustomed to accepting ready-made solutions. For this reason, educators have increasingly pointed to the need for a new educational paradigm - one that teaches students to question the answers, not just to ask the questions.

As Seymour Papert noted, "The best computer is not the one that gives answers, but the one that provokes questions" (Papert, 1980). Viewed through a pedagogical lens, the history of AI is not merely a technological evolution, but a continuous opportunity to cultivate critical thinking - especially when teachers use AI not as an authority, but as a prompt for dialogue, anal and inquiry.

A Brief Overview of the Current State of AI in Education

Over the past decade, artificial intelligence (AI) has gradually been integrated into educational systems worldwide, spanning all levels - from primary to higher education. Educational institutions have applied AI for automated assessment, adaptive learning, teacher support and content creation. Generative models such as ChatGPT, Claude and Gemini have enabled students to receive fast, structured, linguistically precise responses to open-ended questions (Department for Education, 2025 GOV.UK).

In primary education, AI tools have been used to develop language, mathematical and logical skills. Students received feedback through intelligent tutors, while teachers monitored individual progress. However, without a clear pedagogical framework, there was a risk that students would accept answers as final without questioning their logic or validity (Xu, 2025).

In secondary education, AI has been applied to academic writing, text analysis and exam preparation. Students used generative tools to create essays, presentations and research projects. Teachers who emphasized the process of *questioning the answers* succeeded in fostering discussions, comparisons and argumentation - activities that strengthened students' critical thinking and autonomy (Harouni, 2023).

In higher education, AI has been used for scientific research, data processing, academic writing and professional communication. Students had access to advanced tools for synthesis, citation and the structuring of arguments. At this level, however, the need for epistemological maturity became evident - the ability not only to use AI, but also to critically examine its logic, biases and contextual validity became critical (UNESCO, 2023).

As Harouni (2023) and Xu (2025) have pointed out, teachers must convey the essential message: AI is not an authority but a tool. Students should be encouraged to question the answers,

compare them with other sources, challenge them and develop their own arguments. Only then can AI become a means for fostering autonomous, responsible and critically engaged learning.

The implementation of artificial intelligence in education began as early as the 1970s, through intelligent tutoring systems (ITS) for individualized learning (Carbonell, 1970). In the 1980s and 1990s, AI was used for adaptive testing and diagnostic tools, mainly in specialized institutions (Woolf, 2010). With the development of machine learning and neural networks, the 2000s saw more intensive integration of AI into digital learning platforms, including automated evaluation, content recommendations and progress tracking (Luckin et al., 2016). Today, generative AI enables new forms of interaction, creative expression and critical thinking, with the potential to redefine the educational process (UNESCO, 2023).

According to a systematic review of 25 empirical studies published in the International Journal of Technology and Design Education, AI in primary education has most commonly been applied through intelligent agents, project-based learning, human-agent interaction and mixed evaluation methodologies (Yim & Su, 2025). This review showed that constructivist approaches, critical literacy and ethical awareness were key components of successful AI programs.

Global Experiences

China began integrating AI around 2018 through platforms such as Squirrel AI, which adapted lessons based on student progress. The Ministry of Education set a goal for AI to be present in all schools by 2030 (Zhang et al., 2021). Teachers received training to monitor student engagement and emotional responses, while parents accepted the technology with moderate concerns about privacy.

Finland introduced the Elements of AI course for teachers, developed by the University of Helsinki. AI was used for personalised learning and creative activities, especially in early childhood education (Finnish Ministry of Education, 2022). Teachers embraced the technology as a support tool, and parents viewed it as an opportunity to develop digital ethics.

The United States used platforms such as Khanmigo (Khan Academy), Gradescope, and Duolingo. Implementation was supported by institutions such as MIT and Stanford, with a focus on automated assessment and interactive boards (Holmes et al., 2022). Students showed high motivation, while parents demanded transparency in data usage.

South Korea introduced AI-based teaching programs focused on language learning and 5G-supported virtual classrooms. Teachers were actively involved in pilot programs, and students used AI for interactive learning (Lee & Kim, 2023). Parents supported the technology, especially in urban areas.

India used AI for accessible and scalable education, particularly in rural areas. Platforms such as BYJU'S enabled personalised learning and career guidance (NITI Aayog, 2021). Teachers in urban areas embraced the technology, while rural regions required additional resources and training.

Challenges and Potentials

Despite positive outcomes - such as increased motivation, improved academic performance, and the development of critical thinking - significant challenges remain:

- Lack of pedagogical training for teachers (Holmes et al., 2022)
- Ethical dilemmas related to privacy and automated assessment (UNESCO, 2023)
- Technological inequalities between schools and regions (NITI Aayog, 2021)

At this stage, AI should not be viewed as a replacement for teachers but as a tool that supports the learning process. A key factor is that students develop the ability not only to ask questions, but also to question the answers - to critically analyse, compare and contextualise them. This positions AI as a didactic instrument for cultivating autonomous and responsible learning.

A Succinct Typology of Artificial Intelligence

Artificial intelligence (AI) today is evolving in diverse forms, tailored to specific purposes, users, and educational contexts. AI-based tools are used for process automation, creative support, data analysis and interaction with students and learners. Most commonly, they are built on machine learning, natural language processing, computer vision, and generative models (Luckin et al., 2016; Holmes et al., 2022).

In education, AI tools are categorized according to their **function** and **pedagogical application**. Some are oriented toward productivity and organization, others toward learning and tutoring, and still others toward creative expression. However, their true value does not stem solely from technical capabilities, but from how they are used in teaching practice. Teachers who integrate these tools with activities that require analysis, comparison, and argumentation succeed in transforming learning from reproductive to critical - again the process referred to in this paper as *questioning the answers* (Harouni, 2023).

For example, generative tools such as ChatGPT, Claude and Gemini enable rapid generation of text, ideas and explanations. Yet without pedagogical guidance, students may accept the generated responses as accurate without examining their logic or origin, or even the context in which they are given. Therefore, teachers should encourage students to analyse the outputs, compare them with other sources, and pose additional questions - activities that strengthen critical thinking and learner autonomy (Xu, 2025).

Tutoring and learning tools such as Khanmigo, Squirrel AI, and Duolingo are used for adaptive learning, language practice and interactive exercises. They offer individualised approaches, but their educational value increases when students are prompted to question the explanations they receive, to challenge them and to discuss them with teachers or peers (Yim & Su, 2025).

Table 1. General Categories of AI Tools

Category	Examples of AI Tools	Potential for *questioningtheanswers*
Generative Tools	ChatGPT, Claude, Gemini, Jasper	High – enable analysis and comparison of content
Productivity Tools	Notion AI, Microsoft Copilot, Grammarly	Medium – support organization but require additional critical framing
Learning & Tutoring Tools	Khanmigo, Squirrel AI, Quill, Duolingo	High – enable interaction and independent verification
Visualization Tools	Midjourney, Canva AI, AutoDraw	Medium – foster creativity but require interpretation
Audio & Speech Tools	Murf.ai, Descript, ElevenLabs	Medium – useful for communication but limited in analytical depth

In the category of visual and creative tools, such as Canva AI, AutoDraw, and Midjourney, students can create presentations, graphics and visual representations. These tools encourage creativity but simultaneously require interpretation and argumentation - why a particular visual structure was chosen, what message is being conveyed and whether it is appropriate for the intended audience.

Productivity tools such as Notion AI and Microsoft Copilot are used for organizing ideas, planning, and managing information. Although not directly designed for learning, they can be integrated into instructional activities that require argument structuring, reflection and re-evaluation of generated suggestions.

Table 2. Categories of AI Tools and Their Potential for Re-Evaluation

Category	Examples of AI Tools	Potential for Re-Evaluation
Generative Tools	ChatGPT, Claude, Gemini, Jasper	High – analysis of structure and arguments
Productivity Tools	Notion AI, Microsoft Copilot, Grammarly	Medium – requires critical interpretation
Learning & Tutoring Tools	Khanmigo, Squirrel AI, Duolingo	High – enable interaction and verification
Visualization Tools	Canva AI, AutoDraw, Midjourney	Medium – requires aesthetic and communicative analysis
Audio & Speech Tools	Murf.ai, Descript, ElevenLabs	Medium – useful for communication but limited in analysis

As UNESCO (2023) emphasises, AI tools can enrich learning only when used within a framework that promotes critical thinking, ethical evaluation and learner autonomy. Teachers play

a key role in this process—not as technical operators but as pedagogical mediators who convey the essential message: not every answer is final, and every answer deserves to be questioned.

Domains of AI Tool Application

AI tools have a transformative impact on nearly every domain of contemporary life. In technology, they are used for software development, automation and cybersecurity. In economics and industry, AI supports market analysis, risk forecasting and optimization of production processes. In healthcare, it is applied in diagnostics, medical image processing and personalized therapy amongst other areas.

Categories and Examples:

Table 3. Categories of AI Tools by Domain

Domain	Examples of AI Tools
Technology	GitHub Copilot, Replit, DeepSeek
Economics	BloombergGPT, AlphaSense, FinGPT
Industry	Siemens AI, IBM Watson, Runway
Education	Khan Academy, Coursebox, GrammarlyGo
Healthcare	DeepMind Health, Aidoc, BioGPT
Creativity	Canva AI, Murf.ai, Gamma, Descript
Law & Ethics	Harvey AI, Luminance, Lexica
Tourism & Travel	Hopper AI, Tripnotes, GuideGeek

In education, AI tools enable adaptive learning, automated assessment and teacher support. In the creative industries, they are used to generate music, video, graphics and text. In law, marketing, tourism and public administration, AI is applied to document processing, behaviour prediction and enhancing user experience.

Creative Potentials of AI Tools in Education

In contemporary education, AI tools enable students, learners, and educators to create various forms of content - texts, presentations, videos, music, applications and academic papers. The creation process is interactive: the user submits a prompt and the AI generates content that can be edited, analysed or shared. These tools are accessed through web platforms, mobile applications or integrations within existing educational systems (Holmes et al., 2022).

However, without a clear pedagogical framework, the process of creating with AI can be reduced, as we have noted, to obtaining ready-made results without critical analysis. Students often accept the generated responses as accurate without questioning their source, logic, structure or originality. As already noted, teachers who emphasize the process of *questioning the answers*

succeed in transforming these tools into instruments for critical thinking, argumentation, and independent evaluation (Harouni, 2023).

For example, when students use ChatGPT to write an essay, teachers might encourage them to compare the generated text with other sources, analyse its style, identify potential biases and suggest improvements. When students use Canva AI for presentations, instructors could prompt them to explain why they chose a particular structure, visual style or argumentative flow. In all these cases, AI is not the endpoint but a starting point for dialogue and re-evaluation (UNESCO, 2023).

Categories and Examples:

Table 4. Categories of AI Tools by Type of Creation

Type of Creation	Examples of AI Tools	Potential for Re-Evaluation
Text and Essays	ChatGPT, Claude, Jasper	High – analysis of structure and arguments
Presentations	Gamma.app, Canva AI	Medium – requires visual interpretation
Videos and Podcasts	Pictory, Descript, Murf.ai	Medium – encourages content discussion
Music and Sound	Suno, Beatoven.ai	Medium – requires aesthetic and technical analysis
Applications and Web	Lovable, Replit	High – enables technical re-evaluation
Academic Papers	SciSpace,Consensus, NotebookLM	High – requires source and logic verification

As Xu (2025) emphasizes, AI can enrich learning when used to deepen existing time for reflection, rather than replace it. Teachers who are able to integrate the process of *questioning the answers* into their instructional practice succeed in transforming learning from passive to active, from reproductive to analytical and from technologically dependent to cognitively autonomous.

AI Tools and Career Building for Students

In today's educational environment, AI tools not only transform the way students learn but also open new pathways for professional development. The use of AI in the classroom is already influencing students' career aspirations - especially when teachers encourage them to question the answers they receive, analyze the algorithms behind them and reflect on how they themselves might improve or create such systems.

As Holmes et al. (2022) emphasize, AI should not be treated merely as a productivity tool, but as a platform for developing digital competencies, algorithmic thinking and technological creativity. When students learn how generative models work, how algorithms are trained and what ethical questions are associated with their use, they begin to see AI not only as a user-facing technology but also as a professional opportunity.

Teachers must play a key role in raising students' awareness that the future of work will require not only the ability to use AI tools, but also to understand, modify and create them. Students who develop skills in *questioning the answers* - through analysis, comparison, and argumentation- are preparing for roles such as**Visionary Careers for Students Using AI**

Table 5. Categories of AI Tools and Potential Careers for Students

Category	Example Profession	Role of AI in the Career	Recommended AI Tools for Students
Machine Learning and Algorithms	Machine Learning Engineer, AI Researcher	Designs models, trains algorithms, develops intelligent systems	Replit, Google Colab, Hugging Face, Teachable Machine
Space Technologies	Space Center Designer, Astronaut-Engineer	AI for navigation, data analysis from space missions	NASA Eyes, Orbital AI, SpaceML
Bioinformatics and Genetics	Genomic Analyst, AI Biologist	DNA analysis, disease prediction, personalized medicine	DeepMind AlphaFold, BenchSci, BioRender
Robotics and Autonomous Systems	Robotics Engineer, Autonomous Vehicle Designer	Real-time control, perception, decision-making	VEXcode VR, NVIDIA Jetson, OpenAI Gym
Creative Industries	AI Music Composer, Digital Artist	Generates music, visual art, interactive experiences	Suno AI, Runway ML, DALL·E, Beatoven.ai
Education and Pedagogy	AI Tutor Designer, AI Literacy Educator	Creates adaptive platforms, teaches critical thinking through AI	Khanmigo, Talkpal.ai, LangBuddy.ai, Socratic
Climate Science and Ecology	Climate Data Analyst, AI Ecologist	Climate modeling, risk prediction	ClimateGPT, Earth Engine, ClimAI
Cybersecurity and Ethics	AI Ethicist, Security Analyst	Threat detection, development of ethical frameworks and policies	IBM Watson AI Ethics, SecAI, Lighthouse AI
Neuroscience and Cognitive Tech	Brain Interface Designer, AI Neuroscience Researcher	Brain process simulation, human-machine interface development	Neuralink (simulations), BrainCraft, Cognitivescale
Law and Digital Justice	AI Legal Analyst, Legal Algorithm Designer	Case analysis, automation of legal processes	CaseText, Harvey AI, DoNotPay

UNESCO (2023) stresses that education must prepare students not only to use technology but also to critically evaluate and transform it. This requires a shift in the teaching paradigm—from passive use to active creation, from reproduction to innovation. Harouni (2023) notes that "the teacher is not here to replace the algorithm, but to surpass it"—by encouraging students to imagine what a better algorithm, a more poetic answer or a more efficient and effective piece of code might look like. In this sense, *questioning the answers* becomes not only a pedagogical approach but also a professional calling for teachers.

Overview of AI Tools with Support for the Macedonian Language

AI tools that support the Macedonian language are expanding rapidly, especially in education. Their true value emerges when students are encouraged to analyse, question and improve the outputs - not simply consume them.

Language Learning and Communication Tools

Several AI platforms now support Macedonian for speaking, pronunciation, grammar and comprehension. These are especially useful for students, teachers and foreign language learners:

LangBuddy AI – Offers personalized conversations in Macedonian, tailored to the learner's level. Ideal for practicing dialogue and pronunciation langbuddy.ai.

Talkio AI – An interactive AI tutor that provides feedback on pronunciation, sentence structure and fluency talkio.ai.

Talkpal AI – Gamified learning with challenges and interactive questions. Supports reading, listening and speaking talkpal.ai.

Duolingo – Includes Macedonian as a foreign language with visual and audio exercises.

Teachers should use these tools not only for linguistic support but also to foster *critical thinking*—encouraging students to question explanations, compare sources and challenge assumptions.

Generative Tools with Macedonian Support

These tools can generate text, translations, ideas, and content in Macedonian:

- **ChatGPT** – Supports Macedonian for essays, explanations, and dialogue generation.
- **Gemini (Google)** – Understands and responds in Macedonian, especially for short tasks and translations.
- **Claude** – Handles basic communication and textual analysis in Macedonian.
- **DeepL Translator** – Offers high-precision translation to and from Macedonian.

Their educational value increases when students are prompted to *analyse, revis, and discuss* the accuracy and logic of the generated content (Holmes et al., 2022).

Educational and Productivity Tools

Some tools are not fully localized but can process Macedonian text or be used with Macedonian interfaces:

- **Grammarly** – Does not support Macedonian grammar correction, but is useful for English writing by Macedonian students.
- **Canva AI** – Allows creation of presentations and visual content with Macedonian text.
- **Curipod** – Can generate interactive lessons and debates in Macedonian if content is manually entered.

These tools are valuable for *visual organization*, but teachers should encourage interpretation and argumentation—why a structure was chosen, what message is conveyed, and whether it suits the audience.

Creativity and Visual Expression Tools

- **AutoDraw** – Converts sketches into graphics, independent of language.
- **Pictory** – Can create videos with Macedonian text if manually input.
- **Descript** – Supports audio editing, though Macedonian support is limited.

Application in Primary Education

The strongest Macedonian support is found in language tools (LangBuddy, Talkio, Talkpal) and generative models (ChatGPT, Gemini, Claude). In primary education, these tools can be used for:

- Developing language skills
- Creating texts and projects
- Visual presentation and creativity
- Independent learning and communication

Yet their *true educational value* is unlocked when students are encouraged to *'question the answers'*—to analyse, compare, and contextualise. Only then does AI become a tool for autonomous, responsible and critically engaged learning. Sources: langbuddy.ai talkio.ai talkpal.ai

Questioning Algorithmic Logic - *Questioning the Answers*

Modern generative artificial intelligence (AI) provides access to automated responses, synthesized information, and personalized solutions. While this marks a significant advancement in educational technology, a fundamental question arises: are students learning to think, or merely to accept? In this context, critical thinking becomes not just desirable, but essential (Holmes et al., 2022).

Asking questions to AI is a starting point but should not be the ultimate goal. True educational value emerges when students consider the responses they receive, compare them with other

sources, challenge them and contextualize them. This process - *questioning the answers* - forms the foundation of digital literacy, epistemological maturity and autonomous learning (UNESCO, 2023).

As American philosopher John Dewey emphasized, "If we teach today's children as we taught yesterday's, we rob them of tomorrow" (Dewey, 1938). In the age of AI, this means that educators must prepare students not only to use technologies, but also to critically examine their outputs, logic and implications. This approach requires dialogue, analysis and argumentation - not passive acceptance.

Similarly, Neil Postman warned that "every technology is both a burden and a blessing; every tool is both a solution and a problem" (Postman, 1992). AI can facilitate learning, but it can also lead to passivity if critical interaction is not encouraged. Therefore, teachers must promote the process of re-evaluation - not only of answers, but of the questions, algorithms and assumptions themselves.

In contemporary pedagogy, Paulo Freire highlights dialogue as the foundation of critical education: "To ask questions is an act of freedom" (Freire, 1970). In the context of AI, this means that students should be encouraged to question the authority of the algorithm, analyse its assumptions and develop their own perspectives. Teachers, in this sense, are not merely transmitters of knowledge but facilitators of critical awareness.

Classroom Activities That Foster *Questioning the Answers*

To cultivate critical thinking in the age of AI, educators create environments where answers are not endpoints but starting points for analysis, dialogue and re-evaluation. AI tools, when used with pedagogical guidance, become catalysts for argumentation, comparison and self-reflection (Holmes et al., 2022; Harouni, 2023).

Here are five classroom activities designed to foster the *questioning the answers* process:

1. **AI Response Analysis**
   - **Activity:** Students pose a question to an AI tool (e.g., ChatGPT or Khanmigo) and receive a response. In groups, they analyse: Is it accurate? Complete? Biased?
   - **Goal:** Develop skills in information verification, logical evaluation and reasoned thinking.
   - **Pedagogical Value:** Encourages doubt as a healthy cognitive mechanism, not resistance to technology (UNESCO, 2023).
2. **Comparing Responses from Different AI Tools**
   - **Activity:** Students ask the same question to two different AI tools (e.g., ChatGPT and Gemini) and compare the responses. If responses are the same of similar, ask a third or fourth AI tool.
   - **Goal:** Promote understanding of algorithmic variability, bias and the importance of multiple sources.

- **Pedagogical Value:** Students learn that different models may offer different interpretations, requiring critical assessment.

3. **Reflective Journal: "What Did I Learn, What Did I Re-Evaluate?"**
   - **Activity:** After each AI interaction, students write a short journal entry: What did they learn? What surprised them? What would they double-check?
   - **Goal:** Foster metacognitive awareness, self-reflection and development of personal epistemology.
   - **Pedagogical Value:** Builds a habit of re-evaluation, which is the foundation of autonomous learning (Freire, 1970).
4. **Debate: "Is AI Always Right?"**
   - **Activity:** Students are divided into two groups - one defends the accuracy of AI, the other challenges it. They use real examples from school assignments.
   - **Goal:** Develop communication skills, argumentation and ethical reasoning.
   - **Pedagogical Value:** Students learn that AI is not infallible, and that critical discussion is essential to digital literacy (Postman, 1992).
5. **Project: "I Am AI – Respond and Explain"**
   - **Activity:** Students are tasked with writing a response as if they were an AI, then explaining and re-evaluating it from a student's perspective.
   - **Goal:** Encourage empathy, understanding of algorithmic reasoning and critical analysis.
   - **Pedagogical Value:** Students gain awareness of how knowledge is constructed and how algorithms can shape - but also limit - it.

This approach not only develops students' cognitive and communication skills, but also prepares them for a future in which critical evaluation of digital content will be a core life competency. Recall Harouni's (2023) statement that, "The teacher is not here to replace the algorithm, but to surpass it" - by encouraging students to think, to doubt and to create.

Conclusion

The implementation of artificial intelligence (AI) in education began as early as the 1970s, but today it has acquired a new and immensely powerful dimension through generative tools that enable interactive, personalized and creative learning. The history of AI in education demonstrates that technological advancement must be accompanied by pedagogical maturity and critical awareness.In its current state, AI is used across all levels of education, but its value depends on whether students are encouraged to critically re-evaluate the answers they receive. Teachers who integrate the *questioning the answers* approach are likely to succeed in transforming AI from a tool of automation into a medium for critical thinking (Harouni, 2023; UNESCO, 2023).

Different types of AI tools -generative, visual, linguistic, and productivity-focused - have varying potential to stimulate analysis and argumentation. When used with clear pedagogical

intent, they become catalysts for autonomous learning and ethical evaluation (Xu, 2025; Holmes et al., 2022).

Creating with AI tools should not be reduced to obtaining ready-made results, but should instead foster dialogue, comparison and re-evaluation. Teachers who encourage this process create classrooms where students not only learn, but also reflect on what it means to know (Freire, 1970).

In the context of career development, students should be encouraged not only to use AI tools but also to understand, modify and create them. This prepares them for future professions such as AI engineers, ethicists, educational technology designers and data analysts (UNESCO, 2023; Holmes et al., 2022).

The use of AI varies by educational level, but in all cases, critical re-evaluation of answers is essential. Teachers must convey the message that AI is not an authority but a tool that requires analysis and argumentation (Yim & Su, 2025).

Although support for the Macedonian language in AI tools is limited, there are linguistic and generative platforms that can be integrated into instruction. Their value is amplified when students are encouraged to re-evaluate outputs, compare them and improve them (Talkpal.ai, 2025; LangBuddy.ai, 2025).

Critical thinking in the age of AI is not a luxury - it is a necessity. Students should be encouraged to question the authority of the algorithm, analyse its assumptions and develop their own perspectives (Postman, 1992; Harouni, 2023).

Pedagogical activities such as response analysis, tool comparison, debates and reflective journals foster the process of *questioning the answers*. These not only develop students' cognitive and communication skills, but also prepare them for a digitally mature and responsible life (UNESCO, 2023; Freire, 1970).

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Use of Generative AI

For reasons of transparency, please note that the LLM Copilot was used to check and correct grammar and syntax in the text