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From Copy-Paste to Critical Thinking: Generative AI Use in K-12 Students

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Abstract*– Generative Artificial Intelligence (GenAI) has transformed multiple sectors, with education being one of the most impacted. This research analyzes the use of GenAI in upper secondary students (K-12), a vulnerable and understudied sector where the central problem identifies risky practices such as uncritical use, overestimation of AI capabilities, and absence of critical thinking that generates cognitive dependence and validation of false information. This study aims to promote the development of critical thinking about GenAI use through a didactic intervention with fourteen students of 15-16 years old from the Instituto Politécnico Nacional in Mexico. Using a qualitative approach with a pretest-posttest design, the methodology employed semi-structured interviews organized in five dimensions: perception of GenAI, representation and reasoning, mediated learning, critical interaction, and ethical considerations. The results reveal significant post-intervention transformations: paradigm change from instrumental to critical-reflective use, development of verification protocols, construction of complex and structured prompts, understanding of contextual limitations, and establishment of ethical frameworks. Furthermore, this research concludes that teacher intervention can modify forms of thinking, demonstrating that with adequate pedagogical guidance, students develop competencies for responsible GenAI use, minimizing risks and maximizing benefits. These findings underscore the need for further research on teacher education, who directly influences students' perspectives and practices regarding GenAI use.

***Keywords*-- Generative Artificial Intelligence; Critical Thinking; AI Artifacts; AI Use in Education; K-12 Education**

I. Introduction

Everything began with a question posed by Alan Turing, known as the father of computer science, around 1950: can machines think? [1]. This opened the possibility to "intelligent" machines capable of performing tasks as a human being, introducing into the conversation that Artificial Intelligence (AI) is not a new concept. However, due to technological limitations, its development had been somewhat halted.

Conceptually, the term Artificial Intelligence appeared in 1956, proposed by John McCarthy, who took up Turing's ideas about what a machine can do in relation to human tasks, including thinking. This was within the work of a research team at Dartmouth College [2]. The discussion from that moment to the present has centered on what machines can or cannot do, and the constant task of making them imitate human intelligence, leaving far behind calculations and storage (basic tasks that a computer does), approaching even tasks more similar to neural networks and forms of learning, among other complex concepts of the human mind.

Within this AI classification, there are those that can identify faces which appear in a photo, for example, or the well-known Generative AI, which appeared in 2022. Both, as many other ways of AI, use existing data to perform a requested task. In the case of Generative AI, or GenAI as we will call it in this article for practical purposes, it uses existing data and experience to generate original content such as text, images, videos, code, and even music, through patterns and interaction with a human being via chat, hence the name Chatbot [3].

A. The effects of GenAI in education

The growth of GenAI, through the innovative ChatGPT application in 2022, led it to have 100 million users by 2023 [3], demonstrating not only growth but the multiple applications it can have as an example of interdisciplinarity, where it intervenes in different contexts from different areas of knowledge. Among these areas, one of the most relevant or most affected has been education. Positively, we can say that GenAI has contributed to both the work and activities of teachers and students.

At first, in support of teachers, it has managed to make their time efficient through automated review as well as feedback. In this perspective, adaptive learning is also listed, which allows teachers to consider the diversity of their students for better learning [4]. On the other hand, in the case of students, it is presumed to provide help with questions, receive immediate feedback, as well as potentiate critical thinking, in addition to offering, in the same way as teachers, more personalized forms of learning, editing text in real time, and strengthening their creativity [5].

However, the excessive and poorly regulated growth of this type of AI has brought consequences in actual practices across all educational sectors and problems that are becoming a point of attention in different countries and levels of schooling, with a focus especially on ethical uses, which in turn generate controversies directly related to the learning process of students and developed knowledge.

Beyond this, GenAI is not a technology inserted in any educational system in a curricular way, nor is it proposed by any educational policy or institutional structure of any country, so currently this technology depends 100% on the legislation and protection of private companies [3], making regulation in education impossible and how it intervenes in it, leaving the problem in actions that fall on institutional policies, teaching practice, and student awareness.

B. The vulnerable K-12 sector

Regarding the most vulnerable educational sectors, we can find that there are investigations related to the use of this technology at different levels such as higher or professional

education, on the contrary, a gap stands out in the educational sector internationally called K-12 [6], referring to those students who are between 5 and 18 years old, which includes the initial high school training level. In the Mexican context, this is equivalent to basic-upper secondary education. This sector is considered highly vulnerable because it is in a critical development period involving cognitive, emotional, and social aspects [5]. It is worth mentioning that of the few investigations found regarding this sector, most of them are based on bibliographic analysis methods, addressing the topic primarily through theoretical lenses rather than empirical investigation, this reveals a critical need for deeper studies on GenAI's effects and practical approaches to contemporary educational challenges.

One of the most described debates in different investigations concerns risks in school practices related to ethics, as well as cognitive problems that abuse of GenAI can bring in a student's learning process, where excessive information seeking and use of GenAI as a tool for explanation and text generation stands out. It is found that this technology is mostly used in contexts of subjects related to STEM fields, which include Science, Technology, Engineering, and Mathematics [6]. For the above, in this research based on a didactic intervention that aims to combat risky practices of GenAI use, in the first approaches with participants (students), trends are found regarding the mentioned uses.

"It explains more things to me in more detail, and I don't have to be searching in pages and pages that give me different points of view." - S3

"...because, well yes, as I already said, it is the use you give it. So, well, there are people who use it in exams, there are people who complete high school just because of that." - S8

C. The critical thinking gap in GenAI use

Lin and Tan [5] mention that it is important to highlight the overestimation of real capabilities that students give to this technology, specifically when the generated information is incorrect due to the origin of its data. Students can replicate and validate it without being aware that it is not reliable, coupled with the lack of contextualization of said data, what UNESCO has called "Lack of understanding of the real world" by GenAI [3], these practices of searching for and generating complete compositions on concepts and theory, can lead to a lack of recognition of authorship, as AI generated content is derived from existing Internet data. A risk is the lack of awareness about information property rights [3]. Although AI generates original text, for example, it is always based on someone else's texts.

Given these inquiries, we begin to identify the problem, and we can describe that there is an absence of critical use of GenAI that allows distinguishing between its real capabilities, what it can and cannot do, as well as recognition that its operation is restricted or limited and how it can generate faults in authorship or intellectual property and that this can contaminate academic spaces and educational processes with false information. Despite the few studies related to the topic, in Spain, after applying surveys to some adolescents, a study concluded that, related to critical thinking, the main topic related to what was described above, more than 40% shared on some occasion information originated with GenAI that they later analyzed and turned out to be false [7]. This aligns with the statistic within the same study that mentions that 80% of adolescents use GenAI to obtain information.

D. Objective

For the above, this research poses as its objective to promote the development in upper secondary students of critical thinking about the use of Generative Artificial Intelligence through a didactic intervention, which allows them to make responsible and mediated use of this tool to potentiate their skills for the learning process and for research, obtaining as previous analysis, the need to foster critical and reflective thinking in students that allows them to discern the real capacity of GenAI, as well as knowing how to use it to potentiate their skills.

II. Theoretical Framework

A. Direct impact of AI in education

AI has acquired a growing presence in various social sectors, with education being one of the most impacted in recent years. In general terms, AI can be defined as the set of computational systems designed to perform tasks that traditionally require human intelligence, such as reasoning, learning, decision-making, and problem-solving [8], in this way, in the educational field, these capabilities have allowed the development of tools oriented toward learning personalization, automation of administrative processes, and optimization of teaching practice.

Meanwhile, various studies point out that the incorporation of AI in education should not be understood only as a technological advance, but as a structural change in the ways of teaching and learning, which implies pedagogical, curricular, and methodological transformations [4]. In this sense, AI can contribute to the creation of more flexible and adaptive learning environments, provided that its integration is mediated by clear pedagogical criteria and adequate teacher training.

B. Generative AI: the background of transformation

Within the AI field, GenAI represents one of the most recent and disruptive developments impacting society. This type of system is characterized by its ability to generate original content such as texts, images, videos, code, or music, from the analysis of large volumes of data and recognition of complex patterns [3]. Unlike other AI systems oriented primarily toward classification or prediction, GenAI relies on

advanced machine learning models, particularly deep neural networks, which allow it to produce coherent and relevant responses from interaction, generally with conversational interfaces or chatbots, this characteristic has facilitated its adoption in educational contexts.

However, some authors warn that GenAI works exclusively with previously existing information and lacks understanding of the real world, so its responses may contain errors, biases, and decontextualized information [3]. This limitation is particularly important for understanding its constraints, especially in the educational field, where the validity and reliability of information are fundamental pieces for meaningful learning.

C. Critical thinking and digital skills in AI use

In relation to critical thinking, it is added that it constitutes a key competence for lifelong learning and for participation in digitalized societies. In the educational context, it is defined as the ability to analyze, evaluate, and reflect consciously on information, arguments, and sources, to make informed decisions [9].

Paul and Elder, propose a framework for understanding and developing critical thinking structured around three components: the first are the elements of thought; purpose, question at issue, information, inferences, concepts, assumptions, implications, and point of view, which are present in every thinking act, the second are intellectual standards such as clarity, precision, accuracy, relevance, and logic, applied to evaluate the quality of thinking, and the third are intellectual traits like humility, integrity, and autonomy, which a critical thinker develops progressively. Together, these components describe thinking as a process that can be observed, evaluated, and improved, which makes this framework applicable to educational contexts where the goal is to foster conscious and reflective reasoning in students [13].

The relationship between critical thinking and use of digital technologies is mainly relevant in the case of GenAI since, although these tools can support learning by offering immediate and personalized explanations, their use without pedagogical mediation can limit the development of higher cognitive skills by favoring passive reception of information [5].

Various studies agree that the formation of critical thinking in relation to AI must be intentional and guided, integrating into didactic activities that promote reflection on the scope, limitations, and risks of these technologies [10]. This situation acquires significant relevance in upper secondary education, a stage in which students begin to consolidate study habits and academic practices, which can be significantly conditioned by confused use of GenAI.

D. Ethical challenges and the central role of teacher mediation

Regarding ethical considerations in the use of Generative AI in education, important challenges are posed, mainly related to content authorship, information reliability, personal data protection, and equity in access to technology [3]. Thus, these elements take on relevance when analyzed in student populations considered vulnerable, as occurs at the upper secondary education level. The literature highlights that the absence of clear normative frameworks and specific educational policies for GenAI use has transferred responsibility for its regulation to educational institutions and largely to teachers [5].

In this context, the teacher plays a central role as mediator of technology use, advising students toward responsible practices that favor learning and reduce associated risks. To conclude this section that allows us to identify GenAI concepts and the contexts that surround it, it is important to add that teacher training in topics related to AI and its educational implications is identified as a determining factor for adequate integration of these tools in the classroom [6], in this context, solid teacher training around the functioning, limitations, and risks of GenAI is fundamental to guide its educational use critically and reflectively, through pedagogical intervention, the teacher can promote the development of critical thinking in students and prevent bad practices or dependencies that affect their cognitive, academic, and ethical development.

III. METHODOLOGY

The present research develops from a qualitative approach, dealing with the analysis of the subjective in individuals that includes emotions, culture, thoughts, and realities, with an exploratory design of interpretative character. This is because the study's objective was not to measure effects or establish causality relationships, but to understand how students with whom the didactic intervention was carried out construct criteria, reflect, and make decisions around GenAI use in educational contexts, attending to cognitive, discursive, and formative processes that emerge from the participants' own experience. This approach is pertinent when analyzing complex, contemporary, and situated educational phenomena, especially those related to emerging technologies whose incorporation is still in an initial phase within the K-12 educational sector [11].

A. The didactic intervention

The didactic intervention is specified as a module of the Basic Computing I subject, with a duration of 4 hours of weekly work, for 4 weeks, within the first semester of the upper secondary level of the *Instituto Politécnico Nacional* (IPN*)*, specifically at the *Centro de Estudios Científicos y Tecnológicos 18 "Zacatecas"*. It is oriented to promote transformations in usage criteria, academic practices, and reasoning processes associated with GenAI, through theory and guided practices with the purpose of "using Generative Artificial Intelligence tools ethically and critically to support documentary research processes, structuring of academic texts and content verification, demonstrating understanding of their applications and limitations in the educational field."

The intervention was conducted in a classroom setting as an online course format, with an explicit process for opening, developing, and concluding each topic, some of the activities included teacher presentations, exercises to assess prior knowledge and use of AI for reflections on the responses and pattern analysis, with an emphasis on reflection at the end of each topic.

Additionally, it was proposed to guide students in understanding the possibilities, limitations, and risks associated with GenAI use, avoiding use without criteria that tries to substitute human reasoning and favoring its employment as a support tool for analysis, research, and academic production in formal educational contexts. After the intervention, a pretest-posttest evaluation design of qualitative nature was incorporated that allowed contrasting students' initial perceptions with those expressed upon completing the intervention.

B. Educational context and participants

The study was developed in an educational context corresponding to the upper secondary level of the IPN in Mexico, which is part of the K-12 educational sector and is characterized by serving students who are transitioning through a key formative stage for the development of critical thinking, self-regulation of learning, and construction of ethical criteria regarding digital technology use. The participating students are between 15 and 16 years old.

For this research method, fourteen students were selected through intentional sampling attending to the case study, which in qualitative exploratory research helps us with the interest of analyzing participants' experiences and discourses [11]. Two students (one man and one woman) were selected from each of the seven existing groups of the generation enrolled in 2025, and who are at the extremes of digital knowledge according to competencies demonstrated at the beginning of the semester.

The students presented heterogeneous previous experiences in the use of GenAI tools, mainly associated with basic academic activities, which allowed identifying various initial approaches to this technology and reinforced the pertinence of analyzing the phenomenon from a situated and contextualized perspective.

C. Frameworks and instruments

The design of the didactic intervention and data collection instruments was oriented from contemporary international frameworks in AI literacy and ethical use of emerging technologies in education focused on K-12, using as main reference the AI4K12 initiative and, in a complementary way, UNESCO's Guide of recommendations for GenAI use in education and research, AI4K12 framework has been developed specifically for K-12 educational sector contexts and emphasize the need to promote critical, responsible, and pedagogically mediated understanding of AI use in early formative stages [12][3][6].

D. Instruments and data collection

Data collection was performed through semi-structured interviews applied at two moments of the formative process, with the objective of recovering students' discourse before and after the didactic intervention, this type of instrument allows exploring perceptions, experiences, usage criteria, and reflection processes associated with GenAI from the participants' own perspective, a strategy used in the analysis of educational practices mediated by emerging technologies [6][5]. To guide and delimit the scope of interviews and the subsequent information analysis, the instrument was structured in five dimensions based on research objective and conceptually aligned with AI4K12 and UNESCO, adapting them to the upper secondary level context and educational use of GenAI.

TABLE I
ANALYSIS DIMENSIONS AND INSTRUMENT SCOPES

Dimension	Scope
Perception about GenAI	Analyzes how students perceive and recognize GenAI use and potential in an academic environment.
Representation and reasoning	Recognizes how students use GenAI to process information, solve problems, or make decisions, and recognize this technology's limitations.
Learning mediated by GenAI	Analyzes how students' learning process is affected in terms of critical uses and skill development.
Critical interaction with GenAI	Describes students' interaction with GenAI through conscious and critical forms via natural language.
Ethical considerations	Identifies students' perspective regarding risks and GenAI affectations in inclusive academic environments and collaborative work.

The pre- and post-intervention interview instruments were each composed of ten items and a final open-ended reflection, designed to systematically address the dimensions proposed for this study, which were grounded in the AI4K12 and UNESCO frameworks. Each item was deliberately aligned with a specific dimension, ensuring coherence between the theoretical foundations and the methodological design of the research.

The data collection procedure was developed sequentially, beginning with the application of the pretest interview as diagnostic, followed by the implementation of the course as didactic intervention during a period of four weeks and concluding with application of the posttest interview to each participant. These interviews were conducted personally and audio recorded, which allowed establishing a comparative framework between discourses collected at both moments and analyzing transformations in usage criteria, reasoning

processes, and forms of interaction with GenAI associated with the formative experience.

Data analysis was performed through a qualitative approach of interpretative character, oriented to identify patterns, variations, and transformations in students' discourse from comparison between interviews applied before and after the didactic intervention mediated by defined dimensions. Audio recordings were transcribed in full, and the responses to each item were systematically classified according to the five proposed dimensions. To reduce potential researcher interpretation bias, Claude.ai was used as an AI-assisted analytical tool, enabling a structured classification of student responses by dimension. The resulting classifications were subsequently reviewed and validated by the research team, ensuring analytical consistency and interpretive rigor prior to the final analysis.

There was also a concentration on identifying categories related to forms of GenAI use, information validation criteria, decision-making, degree of cognitive dependence, and ethical reflection, allowing understanding how participants resignified GenAI use throughout the course and developed their critical thinking [5][10].

IV. Results and Findings

Data obtained from interviews were transcribed for analysis. However, it is important to mention that in a qualitative research process, especially where perceptions and forms of thinking are recovered, analysis does not begin with text review, on the contrary, it begins from the moment each interview start, thus allowing through a continuous process to observe even gestures and reactions of students to questions, their confidence in responding, as well as the tone in their words.

A first approach to the data allowed us to obtain systematic results according to the stated dimensions; In the pre-intervention state, we could find that repeatedly students were aware of how GenAI was generally used, describing situations such as those mentioned by participant S1 who describes: "*Everyone does exams with AI... I feel they are using AI in a bad way, right?*" Or as participant S3 mentions: "*Many instead of using it as support, as I said about summarizing two hundred pages to make a summary, they simply ask for the summary, copy and paste and, well, they really didn't do anything.*" However, on few occasions did they accept that they were part of those practices, so the context of previous investigations and organizations regarding fears of use with lack of criticism is a reality in student communities within K-12.

A. Perception about GenAI

Before intervention, GenAI was conceived mostly as an instrumental tool, associated with speed, ease, and reduction of effort. A pragmatic use was identified, with scarce problematization of its impact on learning, an uncritical perception predominated, centered on "solving tasks.", post-intervention, a reconfiguration of perception was observed, transitioning toward GenAI as a cognitive support tool, not as a substitute for thinking. A more reflective valuation appears about its potential and risks, evidencing an initiation of metacognition regarding learning mediated by AI. Curiously, the range of use increases, evidencing that it is used with greater security and confidence.

B. Representation and reasoning about GenAI uses

Initially, reasoning was mainly operative and reproductive, besides passive use. GenAI was used to generate direct answers, summaries, or complete texts, with limited awareness about errors, biases, or information superficiality. Post-intervention, more analytical reasoning was identified, where students recognize the need to contrast information, formulate better questions, and evaluate response pertinence. Indications of instrumental critical thinking emerge: conscious use, with questioning of generated results, even performing cross checking of information, allowing disqualification of erroneous or false information. S8 expressed*: "For example, what I said about... for example, in text correction, that since it doesn't know a... that is, it doesn't determine a context, it can't identify the context, well it doesn't know if it's correct or not, that is, it marks it as incorrect, but it really can be correct."*.

C. Learning mediated by GenAI

Initially, learning was perceived as dependent on the tool, with risk of cognitive passivity, GenAI was seen as facilitator of the final product more than the learning process. Post-intervention, a displacement toward mediated learning was evidenced, where GenAI is integrated as support to understand, structure ideas, or initiate investigations, but recognizing the need for one's own cognitive effort. This suggests an advance toward learning self-regulation. The student acquires an active role in AI use, where they control what they consume of what is generated.

D. Critical interaction with GenAI

Interaction was mostly reactive initially: answers were accepted without deep questioning, language used in interaction tended to be simple and not very reflective. Post-intervention, more conscious and strategic interaction was observed: students describe adjustments in prompts, asking for explanations, verifying results, and dialoguing with the tool.

This evidence development of critical skills of interrogation and evaluation, besides recognition of tool limitations, such as contextualization and particularities of reality, assigning use only for simple procedural tasks, leaving out human functions like creativity and reflection.

E. Social and ethical considerations

Initially, ethical considerations were incipient or superficial. "Not copying" was recognized, but without deep understanding of authorship, technological dependence, or social impact. Post-intervention, the ethical perspective broadened toward responsible use, academic honesty, and

equity in access. An initial awareness appears about risks of dependence, disinformation, and unethical use, which constitutes a key component of critical thinking.

F. The paradigm transformation

From the dimensions and the analysis, we can conclude that after implementation of the didactic intervention, the main impact was the paradigm change in use and perceptions of GenAI, managing to go from instrumental use to critical and reflective application. Therefore, the transformation was generated at a deep level in students' thinking, considering perspectives of use, information validation, limitations, as well as potential. In the following quote we can observe what was expressed by a student:

"What I observed with this course was that truly an artificial intelligence will never resemble the human one. Well, human thought. So, I classify it that way. Then, I classify them as tasks that merit reflection, that involve feelings, emotions, unique thoughts or opinions, I leave them aside and that is, that is what AI cannot do, because AI is not, is not going to think or feel for you." - S12

The transformations documented across the five dimensions could be grounded in UNESCO's Guide of recommendations for GenAI use in education and research, AI4K12 framework and specifically Paul and Elder's Critical Thinking Framework. The shift from instrumental to reflective GenAI use may reflect a development in the elements of thought, as students transitioned from unexamined assumptions about AI-generated content toward questioning its purpose, evaluating information, and recognizing the consequences of uncritical use. The emergence of conscious prompt formulation and cross-checking of information may indicate the application of intellectual standards including accuracy, relevance, and depth. The ethical broadening observed in dimension E may align with intellectual traits including humility and integrity, suggesting that the intervention contributed to a restructuring of students' dispositions toward AI-mediated knowledge. Collectively, these findings suggest that the paradigm transformation observed may represent a development of critical thinking in which students began to take greater ownership of their reasoning in relation to GenAI.

V. DISCUSSION AND CONCLUSIONS

With the above, it is demonstrated that with teacher guidance, reflected in the didactic intervention, it was achieved in addition to a development in critical thinking for validation and classification of AI uses and capabilities, the skill to develop more descriptive and structured prompts adding to the specificity and complexity of instructions, as well as ethical awareness regarding topics like plagiarism, technological dependence, and responsible and measured use of the tool.

In the first section of this research related to the GenAI problem in education, it was stated how teachers' knowledge and perceptions affect how students see this technology, in addition to this, this research proves that transformation of how K-12 sector students see, perceive, and use GenAI is possible. Therefore, with these affirmations, we can conclude that of the stated problems, the solution for critical use of this tool must originate from the classroom, implemented through teacher guidance. So, like any other competence, it will depend on teachers' training and profile for there to be a transformation in students, affirming that teacher intervention can indeed modify forms of thinking.

A. Implications for educational practice

The findings of this research have significant implications for educational practice at the upper secondary level. First, they demonstrate that structured pedagogical interventions can effectively transform students' relationship with GenAI from passive consumption to active, critical engagement. This suggests that rather than banning or ignoring GenAI in educational settings, institutions should focus on developing comprehensive literacy programs or subjects that equip students with the skills to use these tools responsibly and effectively.

Second, the study highlights the critical role of teacher preparation. For teachers to effectively guide students in developing critical thinking about GenAI, they themselves must possess deep understanding of these technologies, not just their technical functioning, but also their limitations, biases, and ethical implications. This underscores the urgent need for professional development programs that prepare educators to navigate the complexities of AI mediated learning environments.

B. Limitations and future research

With this study, we leave open the questions: Is the responsibility for how students use GenAI a consequence of teachers? Could a didactic intervention in the form of training or teacher updating action change their perspective, allowing a change in their practice regarding the use of this technology? Future research should explore longitudinal effects of such interventions, examine the sustainability of developed critical thinking skills over time, and investigate how these competencies transfer to other contexts and technologies.

While this study provides meaningful insights into GenAI literacy development, it is not without limitations. The relatively small sample size and the specific institutional context in which it was conducted may constrain the generalizability of the findings. Furthermore, although the short duration of the intervention already evidenced meaningful transformation in students' GenAI literacy, it would be worthwhile to continue this line of research in order to examine whether the developments observed are sustained

over time. These limitations, however, open promising avenues for future research, as they invite replication of this investigation across different settings, populations, and timeframes. Additionally, comparative studies across different educational levels and cultural contexts would provide valuable insights into the universality and cultural specificity of GenAI literacy development.

C. Final reflections

This research contributes to the growing body of literature on GenAI in K-12 education by providing empirical evidence of how targeted pedagogical interventions can foster critical thinking and responsible technology use among adolescents. The transformation observed in students from uncritical consumers to thoughtful, strategic users of GenAI demonstrates that the challenges posed by these emerging technologies are not insurmountable. Rather, they present opportunities for reimagining education in ways that prepare students not just to use technology, but to understand it, question it, and leverage it as a tool for genuine learning and intellectual growth.

As GenAI continues to evolve and permeate all aspects of society, the educational sector must proactively address both the opportunities and challenges it presents.

This study suggests that with appropriate pedagogical frameworks, teacher preparation, and institutional support, we can cultivate a generation of students who are not passive recipients of AI generated content, but critical thinkers capable of harnessing these powerful tools while maintaining their intellectual autonomy, ethical grounding, and capacity for creative, human-centered problem-solving.

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