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Perceptions of Generative AI among Higher Education Students: Utility, Risks, Cognitive Impact, and Training Needs

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ABSTRACT

The widespread emergence of generative artificial intelligence (AI) has marked an unprecedented turning point in the landscape of higher education. This technological phenomenon poses a structural challenge to traditional pedagogical models, compelling academic institutions to urgently reevaluate both their teaching methods and their assessment criteria. In this context of disruption, it becomes imperative to evaluate the real impact of this technology and to delineate a pedagogical response that transcends mere prohibition or unregulated use. The present study is framed within this necessity, adopting as its primary objective an in-depth analysis of the perception of higher education students in the social sciences regarding AI. The study focuses on three axes of perception: the practical utility of AI, the identification of ethical and academic risks inherent in its use, and the explicit demand for training to manage this tool. The methodology employed relies on a quantitative design using a five-dimension Likert-type questionnaire covering the constructs of utility, risk, reliability, cognitive impact, and training needs. The collected data were subjected to inferential analysis using Student's t-test and Pearson's correlation coefficient. The results reveal an adoption that is driven fundamentally by operational efficiency. The most conclusive finding is the demand for training for faculty, highlighting a gap in such instruction. The study emphasizes the urgent need for a redefinition of curricula to equip both students and faculty to manage risks, overcome skepticism regarding reliability, and utilize AI as a tool in a critical and responsible manner.

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1. Introduction

The widespread emergence of generative artificial intelligence (AI), exemplified by models such as ChatGPT, has marked a turning point in contemporary society and, particularly, in the educational field. Secondary and baccalaureate (high school) education, owing to its nature as a transition toward higher education and the job market, stands at the front line of this technological revolution. Unlike preceding digital tools, such as search engines and learning management system (LMS) platforms, generative AI offers capabilities for content creation, synthesis, and problem-solving that directly challenge traditional teaching and assessment methods (Gómez, 2023).

This context is characterized by accelerated and, inevitably, unequal technological adoption. The adolescent population, categorized as "digital natives" (Prensky, 2001), has immediately incorporated these tools into their academic routines, motivated by the pursuit of efficiency and time optimization. However, this rapid integration has largely occurred without clear institutional guidance, creating a regulatory vacuum that poses both ethical and pedagogical challenges (Semenov, 2023). It is this gap between the ubiquitous adoption by students and the absence of clear faculty guidelines that defines the need for the present research. Comprehending students' perception regarding the utility, risks, and cognitive implications of AI becomes fundamental for designing an effective and equitable educational response.

Nonetheless, the integration of AI into education also introduces significant challenges. Issues pertaining to privacy and security, lack of trust, cost, and potential algorithmic bias are among the hurdles that must be addressed (Jarrah et al., 2022; Harry, 2023). Furthermore, it is essential to consider ethical aspects, such as ensuring accessibility, transparency, and equity within AI-driven educational systems (Harry, 2023; Nguyen, 2023). The theoretical framework below establishes the conceptual and theoretical bases for interpreting this complex dynamic.

The main objective of this study is to assess student perceptions regarding artificial intelligence (AI) in the academic context, focusing on how they view it and how they utilize it. To this end, the following secondary objectives are established:

- To measure whether students perceive that AI helps them understand complex concepts, improves the quality of their assignments, or whether it is an effective study tool.
- To determine whether AI reduces the time dedicated to tasks or helps them organize information, or if they frequently use it to summarize texts.

- - To evaluate the self-perception of how AI use impacts critical thinking, creativity, the motivation to delve deeper, or dependence on faculty.

- - To ascertain the level of concern regarding plagiarism or academic dishonesty, the reliability of AI responses, and opinions on its prohibition in the classroom.

- - To investigate the demand for training from faculty, the view of AI as an essential tool for future employment, and whether academic assessment should change.

Background

Artificial intelligence (AI) is broadly defined as the field of computer science dedicated to creating systems that are capable of performing tasks that traditionally require human intelligence, such as reasoning, language interpretation, and problem-solving (Norvig, 2021). Within this broad spectrum, generative artificial intelligence (GAI) represents a specialized subcategory based on deep learning models—in particular, large language models (LLM)—designed not only to process information but also to generate original content, such as text, images, code, or multimedia, derived from the patterns learned during training (Brown et al., 2020). These models, which are capable of producing new information rather than merely classifying or recognizing existing data, have significantly expanded the possibilities for automation and assisted creativity across numerous domains.

AI has had a transformative impact on a wide range of industries, and education is no exception (Yeruva, 2023). Several studies have highlighted the potential of AI to reshape teaching and learning, promoting more personalized, engaging, and efficient educational experiences (Alneyadi et al., 2023). In academic settings, AI has become an influential tool for guided writing, information synthesis, advanced search, and problem-solving, thereby directly affecting students' production of academic work and the development of digital competencies. Among its strengths are the democratization of access to knowledge, improved operational efficiency, and its contribution to practices aligned with the Sustainable Development Goals (SDGs), particularly inclusive and high-quality education. However, this transformative potential is accompanied by significant challenges, including algorithmic bias, digital inequality, and the high environmental cost associated with large-scale AI systems (Dwivedi & Al-Banna, 2025).

According to Lee et al. (2023), although AI has historically focused on replicating human capabilities, in educational environments, the emphasis is shifting: rather than imitating human cognitive flexibility, current priorities lie in how AI systems interact with learners and generate meaningful educational outcomes. In this context, the emergence of multimodal models such as GPT-4 and Gemini represents a major advancement, as they integrate multiple channels of processing—text, image, audio, and video—thus enabling more inclusive instructional strategies and improving the diversity of teaching, learning, and assessment formats. This multimodality offers educators new opportunities to design learning environments that are more adaptive and responsive to students' varied cognitive profiles.

In the case of Gemini, Imran and Almusharraf (2024) highlight its capacity to create differentiated materials, design activities tailored to different competency levels, and provide additional explanations for students who face specific challenges or require further support. Gemini also excels in delivering real-time, personalized feedback, analyzing student work, and suggesting improvements or additional resources. Such capabilities constitute a valuable pedagogical tool for promoting self-assessment, autonomous learning, and emotional regulation when facing academically demanding tasks.

Similarly, Koubaa et al. (2023) emphasize that ChatGPT is a promising tool for resolving questions, generating explanations, and supporting self-directed learning. However, they note that its variable performance necessitates cautious and complementary use alongside traditional learning methods, avoiding overreliance and ensuring that students continue to develop critical thinking skills. To achieve this balance, the authors underline the importance of providing educators with clear guidelines for integrating AI tools in ways that harmonize traditional pedagogical approaches with innovative practices.

In higher education, the implementation of AI has the potential to profoundly transform teaching–learning dynamics. Models such as GPT have demonstrated their capacity to offer personalized recommendations, facilitate collaboration and academic communication, and enhance learning outcomes through adaptive strategies. Nevertheless, challenges remain regarding ethical considerations, data privacy, and the need for adequate teacher preparation to integrate these technologies in a coherent and responsible manner (Gadekallu et al., 2025).

Regarding the performance of current AI models, recent studies show that both GPT-4 and Gemini score highly on objective evaluation measures; however, GPT-4 tends to outperform Gemini on subjective dimensions such as relevance, coherence, structural clarity, and creativity (Lang et al., 2024). The authors conclude that LLMs not only reduce the time and effort required to produce educational materials but also enable the generation of a broader variety of resources aligned with diverse pedagogical objectives. Although they note the necessity of carefully reviewing AI-generated content—given the potential for inaccuracies or biases—they highlight the significant promise of LLMs in enriching higher education.

Finally, research by Kim and Kwon (2023) and Ayanwale et al. (2022) emphasizes that AI literacy from the teachers' perspective has become essential. Both studies argue that educators must acquire specialized knowledge to effectively understand, evaluate, and integrate AI technologies in the classroom. They also stress the need to rethink curricula, learning environments, and pedagogical approaches to ensure an ethical, inclusive, and educationally meaningful integration of AI.

Research Methods

This study adopts a quantitative research approach with a descriptive and correlational design, which is particularly useful for this type of investigation because it allows for the systematic measurement of students' perceptions and the identification of patterns across a large group. Quantitative methods make it possible to compare groups objectively, detect significant differences, and examine relationships between variables such as usefulness, risks, and training needs (Ghanad, 2023). This provides a solid empirical basis for understanding how AI is being adopted in higher education and for informing evidence-based educational decisions.

Sample

The target population of the study consisted of students enrolled in higher education programs in the social sciences in Spain. A nonprobabilistic convenience sampling method was employed. The final sample included 100 participants, ensuring 100% adoption of the tool according to the screening data, which allowed the study to focus exclusively on the perceptions of active users. The inclusion criteria were being a student within the specified educational levels and having used generative AI (such as ChatGPT or Gemini) for academic tasks within the past three months.

Data Collection

Prior to administering the final questionnaire, a pilot test was conducted to evaluate the clarity, coherence, and adequacy of the instrument. The pilot was carried out with a small group of 15 students from the same target population, ensuring that the structure and content of the items were appropriate for higher education learners familiar with generative AI tools. Feedback from the pilot participants enabled minor refinements in wording and item sequencing to improve comprehension and response fluency. Additionally, a preliminary reliability check was performed to confirm the internal consistency of the main dimensions. Once these adjustments were completed, the final version of the questionnaire was distributed digitally to the full sample.

The data were collected through a self-administered, anonymous questionnaire distributed in digital format. The measurement instrument was based on a five-point Likert scale (where 1 = strongly disagree and 5 = strongly agree) to assess participants' level of agreement with a series of specific statements.

The questionnaire was structured along five key thematic dimensions to ensure comprehensive coverage of the phenomenon: (I) Usefulness and Effectiveness, (II) Time Saving and Efficiency, (III) Skills and Personal Learning, (IV) Ethics and Risks, and (V) Need for Teacher Training. Each dimension comprised multiple items. It is important to note that, for the Skills and Ethics dimensions, reverse coding was applied to negatively worded items (e.g., "AI limits my critical thinking") to ensure that, in the analysis, higher mean scores consistently reflected a positive or favorable perception of the tool's impact.

The raw data obtained from the questionnaire were processed and analyzed using SPSS Statistics 29. The analysis was conducted in three phases.

In the first phase, a descriptive analysis was performed. Arithmetic means (and standard deviations) were calculated for each item and for the composite dimensions. This allowed for the identification of the overall level of agreement among students and the degree of dispersion or ambiguity surrounding each perceptual theme.

The second phase involved a comparative (inferential) analysis to examine statistically significant differences between groups. To this end, the following tests were used:

- Student's *t*-test for independent samples, employed to compare means between dichotomous groups of interest, such as high-use versus low-use AI users, or differences in perceptions between students who received clear guidelines and those who did not.

- Analysis of variance (ANOVA), applied to determine whether significant differences existed in perception scores (e.g., demand for training) based on variables with more than two categories, such as educational level (secondary school, upper secondary/baccalaureate, and vocational education and training).

In the third and final phase, a correlational analysis was conducted. Pearson's correlation coefficient was calculated to determine the magnitude and direction of the linear relationship between continuous variables. This was essential for assessing whether the perception of Efficiency was systematically related to perceived Usefulness, or whether Training correlated with reduced concern regarding Ethical Risks.

For all inferential analyses, a significance level of $p < 0.05$ was established to determine statistical significance.

Analysis and Discussion of Results

The analysis is structured around the characterization of the sample, the descriptive study of perceptions using composite variables, and the exploration of significant differences through differential and correlational analyses.

Profile of the Sample and Adoption Patterns

The results obtained allow for reflection on several relevant aspects concerning the use of generative artificial intelligence (GAI) in the university context, particularly among first-year students. To begin with, the sample—composed predominantly of students aged 18 to 21 years, with a mean

age of 19.5 years—reflects the profile of digital natives who have been accustomed from an early age to technological environments and learning dynamics mediated by digital devices. This finding is particularly significant, as the literature indicates that younger students tend to integrate emerging tools such as GAI more naturally into their academic and personal routines (Kim & Kwon, 2023).

Regarding gender, the distribution shows a majority of women (63%), which aligns with patterns observed in various studies on university participation within social sciences and humanities programs. However, this characteristic does not appear to have a direct impact on the AI adoption patterns in the present study, suggesting instead that the incorporation of such technologies may be more closely related to access, technological familiarity, and perceived usefulness than to sociodemographic factors.

One of the key findings is the high frequency of generative AI use among participants: 58% of the students reported employing it intensively or regularly, either weekly or even daily. This figure confirms the rapid consolidation of these tools as a common, almost intrinsic component of academic work. As noted in recent studies (Koubaa et al., 2023; Lang et al., 2024), GAI not only facilitates task completion but also becomes embedded in broader academic processes such as study planning, writing, revising materials, and exploring new topics. Therefore, the high rate of use observed reinforces the notion that students are already immersed in a digital ecosystem in which AI constitutes an organic part of their learning experience.

However, this intensive use contrasts sharply with a critical issue: the lack of teacher guidance. The fact that 88% of students reported having received no clear instructions from their instructors is a concerning indicator and carries significant pedagogical implications. The absence of institutional or instructional guidelines creates a largely self-directed and unregulated learning environment in which students adopt these tools on the basis of their own judgement, without the pedagogical scaffolding needed to promote ethical, effective, and educationally sound use.

This finding is consistent with literature that highlights the growing gap between the rapid adoption of AI by students and the slower adaptation of teaching staff, many of whom lack specific training in educational AI (Ayanwale et al., 2022). Such lack of guidance not only increases the likelihood of improper or uncritical use—such as excessive dependence, misinformation, or issues of authorship—but also limits the transformative potential of these technologies for improving teaching and learning.

Descriptive Analysis of Perception Dimensions

To assess students' attitudes, five composite variables or dimensions were generated by calculating the mean of the associated Likert-scale items (1 to 5), where 5 represents the most positive or favorable perception (Table 1).

Table 1. Descriptive statistics.

Perception dimensions	Composite items	Mean	Standard deviation
Training	Work relevance, desire for training, changes in assessment	4.05	0.84
Efficiency	Time reduction, organization, summarization/ searching	3.86	0.77
Usefulness	Helps understand concepts, improves quality, superior effectiveness	3.40	0.81
Ethics/Risks	Plagiarism concern (recoded), reliability, prohibition (recoded)	3.16	0.91
Skills	Critical thinking limitation, motivation, dependence	3.14	0.94

Source: Authors' own elaboration.

The hierarchy of mean scores shows that the demand for Training (4.05) and the perception of Efficiency (3.86) are the most strongly rooted attitudes among students. This pattern reflects a pragmatic view of AI: students value its capacity to optimize academic performance and actively seek training to maximize its potential in their future professional contexts. This finding aligns with recent research indicating that AI literacy has become an emerging competency valued by both students and employers (Kim & Kwon, 2023; Ayanwale et al., 2022).

The dimensions of Usefulness (3.40), Ethics/Risks (3.16), and Skills (3.14) display scores close to the midpoint (3.00), which—together with relatively high standard deviations—suggests ambivalence and a lack of consensus regarding the deeper pedagogical impact and ethical implications of generative AI. Notably, Reliability presented the lowest mean score of all individual items (2.11), indicating that students do not trust the accuracy of AI-generated responses. Despite the high frequency of use of tools such as ChatGPT or Gemini, students express a considerable degree of distrust regarding the precision and truthfulness of the outputs produced by these systems. This finding reflects a phenomenon already identified in the literature: perceived usefulness does not necessarily correspond to full confidence in the informational quality of AI outputs (Koubaa et al., 2023). Such distrust may stem from previous experiences with errors, imprecise responses, inconsistencies, or increased public awareness of the limitations and biases inherent to generative systems.

Differential Analysis: Student's t-Test

A Student's *t*-test for independent samples was conducted to determine whether significant differences existed in the composite variables according to sociodemographic and usage-related factors.

Usefulness and Frequency of Use

Perceptions of Usefulness were compared between the high-use group (weekly/daily, $n = 58$) and the low-use group (monthly/rarely, $n = 42$).

A statistically significant difference was found ($t = 2.15$, $p = 0.034$). The high-use group reported a significantly higher perception of Usefulness (3.55) than the low-use group (3.23). This result suggests that familiarity with and intensive experience using AI reinforce students' conviction regarding its value for supporting concept comprehension and improving the quality of academic work.

Ethics/Risks and Teacher Guidance

Perceptions of Ethics/Risks were compared between students who reported receiving clear guidance ($n = 12$) and those who did not ($n = 88$).

No statistically significant difference was observed between the groups ($t = 1.63$, $p = 0.125$). Although the group with guidance exhibited a numerically higher mean (3.45 versus 3.13), the lack of significance suggests that, given the very small size of the guided group and the strong polarization of this variable—particularly evident in the item on plagiarism (1.40)—the mere existence of communication is insufficient to generate a statistically detectable consensus on risk management across the sample.

Correlational Analysis of the Dimensions

A Pearson correlation analysis was conducted among the five dimensions to map the internal structure of students' perceptions (Table 2).

Table 2. Correlational analysis of the dimensions.

Relationship	r coefficient	p value	Strength and direction
Usefulness versus Efficiency	0.73	< 0.001	Very strong, positive
Usefulness versus Training	0.58	< 0.001	Strong, positive
Efficiency versus Training	0.54	< 0.001	Strong, positive
Efficiency versus Skills	0.40	< 0.001	Moderate, positive
Skills versus Training	0.39	< 0.001	Moderate, positive
Ethics/Risks versus Training	0.31	0.002	Moderate, positive
Efficiency versus Ethics/Risks	0.30	0.002	Moderate, positive

Source: Authors' own elaboration.

Instrumental Coherence

The strongest and most highly significant correlation was found between Usefulness and Efficiency ($r = 0.73$). This finding demonstrates that, for students, the value of AI lies in a mutually reinforcing cycle: the tool that helps them understand better (Usefulness) is also the one that facilitates their work and saves time (Efficiency).

Correlations between Training, Usefulness, and Efficiency in AI Use

The Training dimension correlates strongly with both Usefulness ($r = 0.58$) and Efficiency ($r = 0.54$). This pattern indicates that students who already perceive greater instrumental benefits from AI are the ones who most actively demand its formal integration into education. This is not a request coming from less competent users; rather, it is a call for improvement and official recognition from the most convinced and engaged users.

This finding is significant because it challenges the assumption that the demand for training emerges from insecurity, lack of competence, or a need for remedial support among inexperienced users. On the contrary, it is students who have already incorporated AI as an effective and valuable resource in their study practices who advocate for its formalization and explicit inclusion in the curriculum. This phenomenon aligns with previous research showing that AI literacy is an increasingly prominent demand, especially among users who recognize the transformative potential of these tools and aspire to employ them in ethical, safe, and efficient ways (Kim & Kwon, 2023; Ayanwale et al., 2022).

Thus, the observed correlation highlights that training is not perceived as compensatory support but rather as a strategy for enhancement and professionalization. Students who are most convinced of AI's advantages seek an institutional framework that legitimizes, regulates, and strengthens its use, reducing current uncertainty and fostering responsible academic practices. This aligns with the widely acknowledged need in literature to equip students with advanced AI competencies to meet the demands of future academic and professional contexts (Lee et al., 2023).

Cognitive and Ethical Implications

Efficiency and Skills ($r = 0.40$): The positive and moderate correlation between Efficiency and self-perceived Skills challenges the concern that time-saving might hinder cognitive development. Instead, students who use AI efficiently tend to perceive that the tool does not limit them cognitively. This result can be interpreted as evidence that the automation of operational tasks frees cognitive capacity, enabling students

to focus on more complex aspects of learning. This interpretation is consistent with research suggesting that well-integrated AI can optimize learning by shifting effort away from routine tasks toward higher-order cognitive processes (Lang et al., 2024; Koubaa et al., 2023).

Training and Ethics/Risks (r = 0.31): The positive correlation between the demand for Training and the perception of Ethics/Risks (in the favorable direction) is particularly important. It implies that the way to overcome ethical concerns and polarization is not prohibition, but literacy. AI training reduces ethical uncertainty and fosters a more mature and informed understanding of the risks and benefits associated with these tools. This finding provides empirical support for recent scholarly claims advocating for replacing prohibitionist approaches with educational strategies centered on ethics, transparency, and digital responsibility (Ayanwale et al., 2022; Kim & Kwon, 2023). This correlation suggests that AI education may play a pivotal role in mitigating polarization, promoting informed practices, and fostering a safe and constructive framework for use among both students and teachers.

Conclusions

The conclusions of this study are articulated around the research objectives and reflect the current state and strategic implications of artificial intelligence (AI) in the learning processes of higher education students. The findings indicate that the usefulness and effectiveness of AI are perceived positively, and this perception strengthens with increased experience. Rather than being viewed as a temporary trend, AI is validated by students as a performance-enhancing tool that provides tangible academic benefits. This recognition is strongly driven by the dimension of time saving and efficiency, which emerges as the pragmatic engine of AI adoption. The strong correlation between efficiency and usefulness highlights a key synergy: AI is valued because it optimizes tasks, reduces operational workload, and frees cognitive resources. This cognitive liberation should be understood as a foundation for pedagogical redesign, shifting student effort from low-level tasks such as information retrieval toward higher-order processes such as deep analysis, interpretation, and critical thinking.

Regarding the objective related to skills development and personal learning, the study reveals greater ambiguity. Students are divided on whether AI limits their critical thinking or independence. However, the moderate correlation between efficiency and skills challenges the deficit-based narrative surrounding AI. Instead, it suggests that, under appropriate use conditions, automation can redirect mental effort toward more complex cognitive operations. In terms of ethics and risks, the study identifies a strong critical awareness—particularly regarding the reliability of AI-generated responses, which received the lowest mean score in the entire dataset. Although concerns about plagiarism appear highly polarized, the primary factor sustaining this uncertainty is the lack of clear guidance, with 88% of students reporting no explicit instructions from their instructors. It is important to underscore that students do not support banning AI tools; rather, they express caution rooted in the absence of institutional frameworks and pedagogical orientation.

The most decisive conclusion relates to the objective of training and teacher involvement, which emerges as the study's central strategic imperative. Students recognize AI as essential for their academic and professional future and actively request teacher-led guidance to enable effective and responsible use. Crucially, this demand for training is driven by the most advanced users—those who already perceive the highest levels of usefulness and efficiency. These users seek to maximize the benefits they have already experienced and call for a structured, institutionalized framework for AI integration. Moreover, the moderate correlation between training and ethics/risks suggests that AI literacy is the most effective mechanism for reducing ethical polarization, mitigating plagiarism-related concerns, and fostering informed, autonomous decision-making. Training equips students with the critical judgment required to navigate the risks and potentials of AI responsibly.

Overall, the study concludes that the appropriate educational response must involve active curricular integration of AI and a redefinition of assessment systems. This transformation is necessary to move from unregulated, instrumentally driven AI use to a formal academic competency that is ethically grounded and pedagogically guided. Rather than restricting AI, higher education institutions should embrace it as a powerful educational tool, managing ethical risks through structured training, transparent guidelines, and the cultivation of critical thinking.

Limitations

All empirical research is subject to inherent constraints derived from its methodological design, and the current study on the perception of artificial intelligence (AI) is no exception. Acknowledging these limitations is crucial for the accurate interpretation of the results and for guiding future research directions.

The primary limitation lies in the sample selection method. The use of a nonprobabilistic convenience sampling strategy prevents the statistical generalization of the findings to the entire population of higher education students in Spain. This convenience bias implies that the sample, which consisted of users who responded to a specific (digital) call, may overrepresent individuals with greater interest or digital competence. This potential bias could inflate the perceived utility and efficiency toward higher values.

Furthermore, the data collection instrument, based on a five-point Likert scale, inherently limits data depth. The purely quantitative approach does not allow for an exploration of the underlying reasons, personal narratives, or complex usage strategies that inform student responses, particularly in ambiguous areas such as skills development and personal learning.

Related to this, a potential social desirability response bias exists when addressing sensitive topics such as ethics and plagiarism, where participants may have adjusted their answers to align with academically acceptable conduct.

Contextual and temporal limitations are significant. The constant technological evolution of tools such as ChatGPT and Gemini implies that student perceptions and usage patterns could change rapidly. Moreover, the study was conducted during a period of transitional regulatory vacuum (with 88% of institutions lacking clear guidelines). This means that the future implementation of AI regulations or literacy programs could substantially modify the observed results, particularly the correlations related to teacher training and ethical risks.

In summary, the findings should be interpreted as a valuable snapshot of the perception status among active users in an unregulated environment. Future research endeavors should aim to expand the sample size and incorporate mixed-methods methodologies.

Conflict of Interest

The authors of this publication declare that there are no conflicts of interest.

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