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Reading profiles in the age of LLMs using a mixed-method approach with higher education students

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Abstract

The rapid integration of large language models in higher education is transforming students' reading practices and their approaches to academic texts. This study investigates how university students' reading profiles evolve when shifting from engagement with conventional scholarly materials to interactions mediated by generative artificial intelligence tools, with particular attention to critical information analysis as a central dimension of critical thinking. A classroom-based activity was implemented in which students examined an argumentative text opposing linguistic purism while having access to large language models with different performance capacities. The analysis focused on how students incorporated model-generated outputs into their interpretative and evaluative processes.

Results indicate a polarization effect associated with the use of higher-capacity models: some students demonstrated enhanced critical engagement, using the tool to contrast perspectives and refine arguments, whereas others adopted a more credulous stance, accepting generated content with minimal scrutiny. Notably, strong prior reading skills did not consistently predict critical use of generative artificial intelligence. Several students with demonstrated competence in critical reading engaged uncritically with synthetically generated responses. These findings underscore the complexity of students' interactions with generative artificial intelligence and highlight the need for targeted pedagogical strategies to promote critically informed and reflective usage practices.

Keywords: Artificial Inteligence, Large Language Models, Critical Thinking, Reader Profile, Higher Education

Introduction

The public release of ChatGPT in November 2022 marked a crucial moment in the integration of artificial intelligence (AI) into everyday life, with particularly significant implications for education. These technologies have transformed the ways in which information is accessed, how learning processes are carried out, and how complex problems are addressed. In this sense, the ability to critically analyze information has become an essential skill in academic environments. Evaluating arguments, comparing sources, and making well-reasoned decisions ensures that these tools support the construction of knowledge and the development of thinking.

In this context, large language model (LLM) serves not only as intermediaries for accessing information but also as systems capable of generating synthetic, adaptive, and context-sensitive content. This capability has substantially transformed university reading practices. Reading is no longer limited to engaging with original texts but increasingly involves interaction with algorithmically generated responses. Consequently, a hybrid reader profile is emerging, combining traditional reading practices with the use of LLM as cognitive support tools.

The ways in which students process and use information in this environment affect not only their reading comprehension but also their capacity to construct sound arguments, reconsider positions, and participate critically in academic discussions. This transformation raises important questions about the evolution of reading skills in higher education, particularly in relation to critical analysis, source evaluation, and the construction of academic knowledge.

The aim of this article is to examine how the use of LLM influences the development of critical thinking (CT) skills among university students, with a particular focus on how they interact with texts and adopt critical stances while reading. The study aims to contribute to a deeper understanding of how these technologies are reshaping reading practices in higher education, while providing information for rethinking the role of reading and the development of critical skills in an increasingly technology-influenced academic environment.

State of the art

The origins of the modern concept of AI can be traced to the mid-twentieth century. A seminal milestone was the 1955 Dartmouth Conference, widely regarded as the formal birth of AI as an academic and research discipline (McCarthy, Minsky, Rochester, & Shannon, 2006). Since then, advances in computational power, data availability, and algorithmic design have expanded the capabilities of intelligent systems. A transformative breakthrough occurred with the introduction of the Transformer architecture Vaswani, Shazeer, Parmar, et al. (2017), which enabled the creation of models capable of processing and generating natural language with unprecedented coherence and contextual sensitivity. This innovation paved the way for large-scale generative models and culminated in the public adoption of systems such as ChatGPT beginning

in 2022, significantly accelerating the integration of generative AI into academic and educational practices (Kasneci, Seßler, Küchemann, et al., 2023).

Unlike earlier digital tools, such as web search engines or academic databases, that primarily facilitate access to existing information, LLM generate novel textual outputs based on statistical patterns learned during training (Zhang, Li, Cui, et al., 2023). This generative capacity alters the way students interact with academic knowledge. Reading and information seeking are no longer confined to direct engagement with primary or secondary sources but they increasingly involve mediated interactions with algorithmically generated content. As a result, a broader paradigm change is emerging in education, challenging traditional models of teaching, learning, and academic reading.

Due to the increasing influence of generative AI on educational systems, some international organizations are establishing regulatory frameworks and policy guidelines to regulate and guide its application. Notably, UNESCO has assumed a leading role in this effort by proposing core principles and recommendations for the responsible incorporation of AI in education. These efforts aim to ensure that AI technologies are deployed in ways that are ethical, transparent, safe, and pedagogically meaningful (Holmes, Miao, et al., 2023).

A central element of these initiatives is the recognition that educational systems must prepare citizens who are not only capable of using AI tools but also able to critically evaluate their outputs and implications. Accordingly, UNESCO has proposed two complementary AI competency frameworks (one designed for students and another for teachers) which integrate technical knowledge, cognitive skills, and ethical dispositions. These frameworks are intended to become an integral component of contemporary educational curricula, supporting the development of informed and responsible engagement with AI technologies (Cukurova, Miao, et al., 2024; Miao, Shiohira, et al., 2024). Within this perspective, the availability of powerful tools such as LLM does not automatically translate into improved learning outcomes. Rather, meaningful educational benefits depend on the development of appropriate critical and reflective competencies. For this reason, CT is identified as a foundational pillar within emerging AI competency frameworks.

This emphasis on CT is particularly relevant in the context of generative AI. Although LLM can produce responses that appear coherent and reliable, these outputs may nonetheless be inaccurate, biased, or decontextualized (Zhang et al., 2023). The literature conceptualizes CT as a multifaceted construct encompassing both cognitive skills and affective dispositions that enable individuals to engage in reasoned and reflective judgment (Facione, 1989). CT skills include interpretation, analysis, evaluation, and inference, while dispositions refer to attitudes such as curiosity, and a willingness to verify information through multiple sources. Furthermore, CT involves reflective engagement with theories, evidence, and their interrelations, representing a metacognitive and strategic approach to understanding and evaluating information (Kuhn, 1989).

Emerging research suggests that the use of LLM can significantly influence the activation of these processes. When used reflectively, such systems may support metacognitive engagement and promote deeper reasoning (Lo, 2023). Conversely, when users uncritically delegate cognitive tasks to the system, reliance on AI

may inhibit critical engagement and reduce the activation of higher-order cognitive processes (Gerlich, 2025).

Among the different skills of CT, critical information analysis holds particular importance in higher education, as it is closely tied to academic reading and the construction of disciplinary knowledge. This competence involves evaluating the credibility of sources, identifying potential biases, comparing competing arguments, and situating information within coherent theoretical and empirical frameworks (Facione, 1989).

Objectives

The objectives guiding this study are as follows:

- O1: Characterize the reading and LLM usage profiles of students.
- O2: Examine the relationship between students' reading profiles and their LLM usage profiles.
- O3: Analyze whether differences in reading and LLM usage profiles are linked to the specific LLM employed by each student.

Methods

This study adopts a mixed-methods design to examine how LLM usage influences students' critical information analysis skills and reading profiles. A face-to-face classroom activity, focused on the reading and critical analysis of an argumentative text, was conducted over approximately 50 minutes to ensure the authenticity and integrity of students' responses. To facilitate international accessibility, the following examples presented in this article have been translated from the original Catalan source material into English, maintaining strict fidelity to the original data and findings.

Participants were first provided with two different definitions of linguistic purism to establish a shared understanding of the concept. They were then asked to respond to the following question: "After reading these definitions of purism, what is your stance on purism? Please justify your answer". It should be noted that, when answering this question, students were not permitted to access any LLM.

In a second phase, students read an argumentative text that adopted a critical stance toward linguistic purism. The text addressed a socially relevant issue that has been widely debated in Andorra, particularly following the approval of Act 6/2024 on the official language (Govern-d'Andorra, 2024). This topic also provided a shared starting point, as it had not previously been explored with the university students who participated on the activity. The critical position presented in the text was intended to generate cognitive conflict and stimulate the activation of CT by encouraging students to analyze arguments, compare perspectives, and reassess prior beliefs, key components of CT (Blair, Allen, Bailin, et al., 2021). After completing the reading, students were allowed to use a LLM to answer the following questions. To promote students' critical positioning, they were asked to answer questions based on the CRITIC model developed by Bartz (2002), which is designed to structure text analysis. In fact, the activity first required students to identify the author of the text and to assess the

author's credibility and expertise. In particular, they were asked: "Who is the author of the text? Do you think he is an expert on the topic?". Students were then asked to analyze the author's stance on linguistic purism and the arguments supporting that position. To guide this analysis, they responded to the following questions: "Does the author stand for or against linguistic purism? Justify your answer by showing what the most important arguments the author wants to convey about purism are.". Finally, each student produced an argumentative essay in which they adopted a personally reasoned position on linguistic purism. The task was introduced with the following prompt: "Write an argumentative text positioning yourself on purism by presenting arguments and counter-arguments.".

The study population comprised all on-campus students at the Universitat d'Andorra (UdA) who were enrolled in courses during the second semester of the 2024-2025 academic year (N = 171), representing the fields of education sciences, computer science, and business administration. Of these, 82 students completed the activity, organized into three groups. One group did not have access to a LLM, whereas the other two were permitted to use one. The present study focuses exclusively on the two groups that used an LLM. The distinction between these two groups lay in the capacity of the model employed, with the aim of examining whether technical differences between models influence students' reading profiles and the critical analysis strategies they activate. This design enables exploration not only of the overall impact of LLM usage but also of the relationship between model capacity and the type of interaction it generates.

The server infrastructure supporting LLM interactions was based on an architecture developed at the UdA (Dorca Josa & Bleda-Bejar, 2024), ensuring rigorous methodological control, data traceability, and privacy through the use of locally executed open-source LLM in an educational context. The system was deployed on a workstation equipped with an Intel i9 processor, 64 GB of RAM, and an NVIDIA RTX 4090 GPU with 24 GB of VRAM, resources sufficient to run multiple models simultaneously without performance degradation. The operating system was GNU/Linux Debian 12, using the official NVIDIA drivers. The web interface, developed with OpenWebUI (shown in Figure 1), enabled students to interact with server-hosted models via Ollama in a conversational format comparable to ChatGPT, but under controlled conditions. The LLM configuration remained at its default settings in OpenWebUI, while Ollama was configured to allow up to five simultaneous execution threads per model, enabling the server to manage five concurrent requests without loss of performance.

Two LLM with different capacities were deployed within the same technological environment, ensuring that any differences in usage or outcomes could be attributed to model characteristics rather than external variables. The lower-capacity group used Gemma3 1B, selected for its lightweight architecture and suitability for simulating less complex assistants (Gemma-Team et al., 2025). The higher-capacity group used Mistral-NeMo 12B, chosen for its more advanced architecture, multilingual training, and greater capacity to generate coherent and analytically rich responses (Mistral-AI-Team, 2024). Both models are open-source and readily integrable into controlled environments, ensuring technical feasibility.

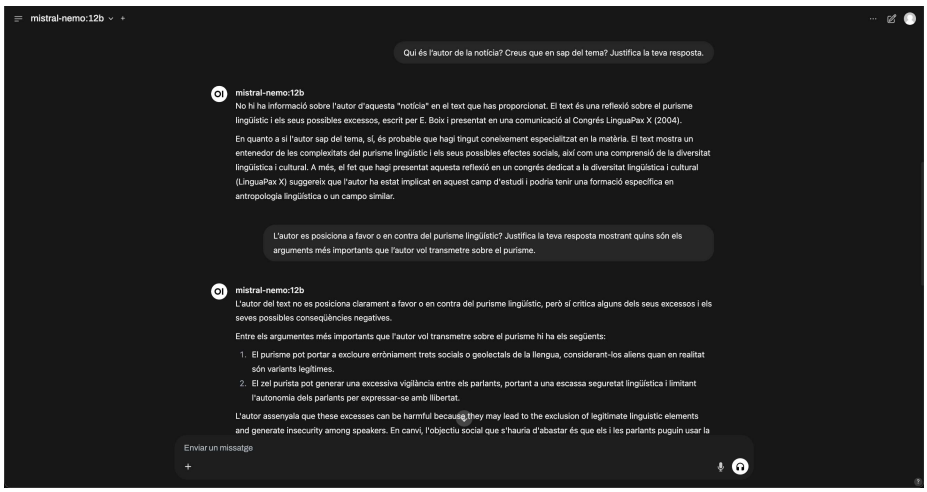


Fig. 1 Screenshot of the web service to interact with the LLM

To evaluate students' reading profiles, responses to the activity were analyzed in terms of their positions on linguistic purism before and after reading the text, as well as the justifications provided. These responses enabled the identification of changes in argumentative positioning and in the quality of justifications, which serve as direct indicators of the activation of critical information analysis skills. To examine students' LLM usage profiles, the students' final argumentative texts and the prompts they generated to write those texts were analyzed. The profiles were defined based on the classification proposed by Oliveras, Márquez, and Sanmartí (2014), from which four distinct reading profiles were identified (see Table 1).

A bottom-up approach, based on students' responses, was used to derive the categories. The coding process was also informed by prior research on questioning typologies, particularly the framework of Song (2016). Expanding upon these emergent categories, a four-level analytic rubric were designed to systematically characterize patterns of LLM usage, structured around three criteria: the integration of LLM-generated responses into students' texts, the types of questions asked of the LLM, and students' argumentative positioning. The four usage profiles are characterized by these criteria and are described in Table 2.

Results

O1: Characterize the reading and LLM usage profiles of students

In order to address the first objective of the research, the responses before and after reading the text and the definitions presented were applied to categorize the reading profile of each student. Table 3 presents examples of students' responses regarding their positions on linguistic purism before and after reading the provided text, categorized by each reading profile.

Table 1 Reading and LLM usage profiles definitions

Profile	Definition for reader	Definition for LLM usage
Credulous	Accepts the content of the text without questioning it. The initial position changes easily after reading, with arguments being assumed as truths without being contrasted.	Accepts and reproduces the LLM's responses in an almost literal manner, showing little to no independent judgment.
Ideological	Maintains the initial position rigidly. The text is interpreted through prior beliefs, and arguments that contradict them are rejected.	Uses the LLM selectively to reinforce a pre-existing position, disregarding information that contradicts it.
Partially critical	Demonstrates a certain capacity for questioning. Some aspects of the initial position are reconsidered after reading, but the arguments in the text are not systematically analyzed.	Uses the LLM as partial support, incorporating some reformulation and personal voice, but still lacking sufficient critical distance.
Critical	Analyzes the text in a reflective and well-argued manner. Ideas are contrasted with prior knowledge, and the initial position may be maintained or modified in a reasoned and justified way.	Employs the LLM in a clearly instrumental way, critically contrasting and reworking its outputs with the user's own analysis.

Regarding the allocation of the LLM usage profile to each student was determined by a majority of criteria. However, the classification for the critical profile required a more stringent standard: at least two criteria needed to satisfy the threshold for the partially critical level, with the third criterion reaching the critical level. This distinction is exemplified by a specific case wherein the student's engagement varied across the assessed criteria. Regarding the first criterion, while the LLM defined linguistic purism as "an ideology that seeks to determine which elements of a language are authentic or desirable, and to condemn or exclude others", the student reformulated this notion by stating it "aims to determine which elements of the language are authentic, and therefore pure, and which elements are the result of barbarisms". This limited reformulation justified assigning a partially critical level for this criterion. Similarly, the second criterion, focusing on the prompts directed at the LLM, was evaluated as partially critical. The queries formulated ("explain the text to me in detail" and "write an argumentative text with justified arguments against linguistic purism") prioritized content generation and explanation over systematic or reflective critical follow-up. In contrast, the third criterion pertaining to the positioning adopted within the final argumentative text reached the critical profile level. In this instance, the student presented different kind of arguments and counterarguments. Initially acknowledging the coherence of purism, noting that "this idea of purism seems coherent and beneficial for the conservation of the Catalan language", the student further argued that it ensures

Table 2 LLM usage profiles evaluation rubric

Criterion	Credulous	Ideological	Partially critical	Critical
Integration of LLM responses	LLM outputs are reproduced verbatim, with no modification or personal elaboration.	LLM responses are selectively incorporated to confirm a pre-existing viewpoint, while contradictory information is ignored.	LLM outputs are partially reformulated and combined with some degree of personal elaboration, though critical distance remains limited.	LLM responses are integrated in a reflective and instrumental manner, involving substantial reworking and contrast with the student's own knowledge.
Types of questions	Questions are reproductive, closely replicating the initial prompt without deeper inquiry.	Questions are closed or weakly open-ended and primarily aimed at reinforcing a specific position.	Questions are more varied and research-oriented, but typically lack systematic critical follow-up.	Questioning is productive and exploratory, actively seeking multiple perspectives through comparison, contrast, and critical analysis.
Argumentative positioning	No clear position is articulated regarding the controversy addressed.	Positioning is grounded mainly in personal beliefs and supported by a limited range of arguments.	An explicit position is articulated in relation to the controversy, although argumentation remains limited in scope.	Positioning is expressed through well-structured argumentation integrating arguments for and against of diverse nature.

Table 3 Examples of reader profiles

Reading profile	Before the text	After the text
Credulous	"I agree with purism"	"After reading this text, my position is that I am against purism because it can be harmful in the sense that it can lead to an intolerant attitude; it can also lead to discrimination against people."
Ideological	"My position is indifferent, as I believe that everyone is free to speak their language however they want."	"My position remains the same, as anyone should be able to speak their language in the way they feel most comfortable without anyone else judging them."
Partially critical	"In favor."	"He is right, I think that to some extent it's important to preserve it because in the end speaking a language well is what keeps it alive. We also shouldn't overdo it and let it be spoken in a correct but free way."
Critical	"I think the concept of purism is correct, after all we have to preserve languages and the good use of them."	"I think the concept is correct, but the problem lies in the extreme of it. I am in favor of preserving the Catalan language, but I would never take the concept to an extreme since it could be a factor that divides Catalan speakers instead of uniting them."

the language remains "pure and rich, remaining faithful to its origins". However, the student subsequently critiqued this stance by highlighting its exclusionary potential, arguing that purism "can exclude common words from the language". The argument culminated in the conclusion that such an approach is "so strict and inflexible that I think that ultimately it does no good to Catalan speakers", given that "as in all things in life, extremes are not good".

Representative examples illustrating the application of the assessment criteria for each profile are presented below. Specifically, the criterion evaluating the integration of LLM-generated content into argumentative texts is detailed for each profile. In every case, the model's output is displayed alongside the corresponding student-produced text to ensure direct comparison.

Profile: Credulous

In this case the student has shown an absolute credulous profile, reproducing verbatim the response generated by the AI tool without any sign of critical processing or personal rewriting. This verbatim coincidence demonstrates a lack of autonomous reflection and a total dependence on the external source, which invalidates any claim to develop proper argumentation.

LLM response: "So, in my view, purism is an excessive and counterproductive stance (...). Languages have always been in constant contact and have mutated together (...) variants considered impure often have important cultural value (...). By eliminating these variantsin the name of purism, one runs the risk of losing this linguistic and cultural heritage. On the other hand, I believe that it is possible to defend a standard variant of the language for formal or official uses, but at the same time accept and value all local

and sociolectal variants (...). It is important to rememb"

Argumentative text: is verbatim the same as the LLM response

Profile: Ideological

This example illustrates a student who selects only those ideas that corroborate their initial perspective on the topic. There is no evidence of a critical exploration process regarding the information generated by the model, nor of an approach aimed at contrasting arguments or reconsidering one's own stance.

LLM response: "Linguistic purism (...) has been a recurring theme in linguistic criticism. (...) Its tendency towards exclusion (...) represents a threat to linguistic diversity. (...) One of the most key arguments (...) is the belief that language is a territory of security. (...) Language (...) is not a space of security, but a place of diversity. (...) Linguistic difference (...) is an essential element for the complexity of a language. One argument against purism is that linguistic "purification" can be a mechanism of social control. (...) The concern with surveillance (...) can be a symbol of the imposition of an ideology. (..) Language is a space for debate (...) and its "purification" must be a process of debate, not exclusion. (...) Linguistic difference is considered a problem, and expression is limited. (...) This situation can discourage creativity. (...) Linguistic diversity (...) must be prioritized. Instead of seeking "purification", it is necessary to foster debate. (...) In conclusion, linguistic purism (..) can be a threat to linguistic diversity. It is essential that linguistic criticism does not become a mechanism of social control, but an instrument for the defense of linguistic freedom. (...)"

Argumentative text: "Linguistic purism is a problem. The quest to purify language can limit linguistic diversity. Surveillance can be dangerous, and it can stop being a debate. We need to prioritize linguistic diversity and creativity."

Profile: Partially critical

The student exhibits a partially critical stance. He successfully synthesizes the key points of the LLM's response and acknowledges both the arguments in favor of standardization and the risks of social tension associated with purism. However, he fails to offer a sufficiently robust personal reformulation, which prevents him from transforming this information into a complete and original argument.

LLM response: "Purism is a linguistic stance that advocates the exclusive use of the considered "pure" or traditional form of a language, rejecting dialectal variations, neologisms, and external influences. (...) One of the arguments in favor of purism is the idea that language should be standardized and normalized in order to ensure clear and understandable communication between speakers. Purism establishes a common linguistic norm that everyone must follow, thus avoiding regional or individual variations that could generate confusion. (...) Another counter-argument is that purism can lead to linguistic discrimination by considering certain variants of the language as "less empty" or "inferior". This attitude can generate social tensions and even conflicts between speakers of the same language, especially in situations of multilingualism. (...) Ultimately, it is necessary to find a balance between the preservation of the language and its natural evolution, without generating linguistic discrimination or social tensions."

Argumentative text: "One of the benefits of purism is the fact that the idea must be standardized and must be clear and one in order to favor communication. In addition,

it is also defended that in this way the language would be preserved and preserved over the years. But on the contrary, it can become a reason for tension between the different dialects since there can be judgments between the different dialects."

Profile: Critical

The student demonstrates a critical attitude, as he does not limit himself to summarizing the LLM's response, but assimilates it to make his own reasoning. Unlike the generated response, the student contextualizes the argument specifically in the Catalan reality, introducing notions such as linguistic security and the exclusion of everyday use that the LLM had not raised with such precision. The ability to balance the understanding of the theoretical benefits of purism with its negative practical application, and to do so with a personal and reflective style, demonstrates a deep analysis of the social consequences of the linguistic norm.

LLM response: "Linguistic purism is an ideology that seeks to determine which elements of a language are authentic or desirable, and to condemn or exclude others. (...) But this idea of linguistic purity is problematic, because languages are dynamic and constantly changing. They cannot be controlled or immobilized by strict rules. Therefore, seeking an imaginary linguistic "purity" is a frustrating and counterproductive attempt. (...) Finally, linguistic purism can lead to an excessive standardization of language that hinders creativity and expression. (...) In conclusion, linguistic purism is a trend that presents several problems and is not desirable. It is important to recognize the dynamic nature of languages, accept the different legitimate varieties, and allow them to evolve naturally without being limited by strict norms."

Argumentative text: "Linguistic purism is an ideology that has as its main objective to determine which elements of the language are authentic, and therefore pure, and which elements are the result of barbarisms and must be excluded from the Catalan language. On the one hand, apparently, this idea of purism seems coherent and beneficial for the conservation of the Catalan language. This is so, since purism allows you to recover and maintain the original and pure form of the language. In this way, the social use of the Romance language pure and rich, being faithful to its beginnings. However, on the other hand, like everything in life, extremes are not good. In this specific case, purism seeks to maintain a rich and pure language but at extreme levels, surpassing itself and coming to exclude common language items. Therefore, it is so strict and inflexible that I think it ultimately does no good to speakers of the Catalan language, as it creates a situation in which Catalan-speaking people do not feel comfortable speaking their own language and do not feel linguistic security when speaking."

Representative examples illustrating the interactions observed across the various LLM usage profiles are presented in Table 4. Specifically, this section details the prompts employed in each case, showing the different ways in which students engage with this kind of technology.

The following examples illustrate the assessment criterion concerning the argumentative stance adopted by students in their argumentative texts across different profiles. Table 5 presents representative cases ranging from the credulous profile, which relies heavily on the model's output and lacks any independent positioning, to the critical profile, which formulates a personal and nuanced stance.

Table 4 Interactions observed in each profile based on evaluating the types of interactions addressed to the LLM

Credulous	"(This question is mandatory) Write an argumentative text positioning yourself on purism by presenting arguments and counter-arguments. Find the information you need".
Ideological	"write an argumentative text with justified arguments against the purism of the language".
Partially critical	"why be against the purism of a language?"; "why be in favor of the purism of a language?"
Critical	"what do you think about purism?"; "Write the argument in favor of the sentence I formulate: In relation to purism it adapts to certain statements that are listed in the text, I find it appropriate to comment that an excess of purism applied to society could have sweet implications"; "on the other hand, argue negatively with the following sentence: Otherwise, I find it appropriate and necessary to carry it out on certain occasions, an example would be in the performance of university projects".

O2: Relationship between reading and LLM usage profiles

To address the second objective, a descriptive analysis was performed to examine the reading profiles alongside the LLM usage profiles. The association between these two profiles was investigated using a contingency table.

Table 6 reveals distinct disparities between the distribution of reading profiles and LLM usage profiles. In terms of reading behaviors, credulous students constitute the largest group at 42%, followed by critical students at 28%. The ideological profile accounts for 16% and the partially critical profile for 14%. Conversely, regarding LLM usage, the majority of students are clearly concentrated in the credulous profile at 60%, indicating a predominantly non-critical approach to these tools. Partially critical profiles represent nearly one quarter of the sample at 23%, while the critical profile stands at 12% and the ideological profile at 5%, which remain minority categories. The comparison between these distributions suggests a transition toward less critical profiles when using LLM compared to reading practices. Specifically, there is a notable reduction in the proportion of critical and ideological profiles alongside a marked increase in the credulous profile. This pattern indicates a potential gap between the critical competencies developed through reading and the actual practices employed when using generative AI tools.

Table 7 reveals a non-linear relationship between reading profiles and LLM usage profiles. Students with a credulous reading profile constitute the largest group with 18 cases. These are primarily concentrated in credulous usage (13 cases), although a smaller proportion adopts ideological, partially critical, or critical usage profiles. The ideological reading profile, comprising 7 cases, displays a more dispersed distribution, encompassing credulous, partially critical, and critical usage profiles, yet includes no cases associated with ideological LLM use. Similarly, among the 6 students with a partially critical reading profile, credulous LLM usage clearly predominates, marked by

Table 5 Student argumentative positioning observed in each profile

Credulous	Language purism is a concept that aims to preserve the unique characteristics of a language. This concept can be seen from different points of view, since it is true that it allows a language to be preserved in its pure form, but it can also present disadvantages. Firstly, we can cite some arguments in favor of purism: - it allows the cultural identity of the language to be preserved, and therefore the original identity of the language - this contributes to preserving and giving each language its own linguistic heritage - it allows each language to be purely characterized and its own identity to be extracted and recognized. Finally, we also find different points that can position us against language purism: - it is impossible to maintain 100% purity of a language, since there are many dialects and multilingual speakers, who speak the language but with different variants. - the fact of excluding these variants creates a social exclusion of foreign dialects or speakers, thus possibly causing cultural and linguistic discrimination.
Ideological	Linguistic purism is a problem. The quest to purify language can limit linguistic diversity. Surveillance can be dangerous, and it can stop being a debate. We need to prioritize linguistic diversity and creativity.
Partially critical	First of all, purism is a linguistic trend that seeks to preserve the purity of a language. Purism can be harmful in that it can lead to an intolerant and exclusive attitude towards linguistic and cultural differences, and can lead to discrimination against people who speak different languages ??or linguistic varieties. On the other hand, purism is about preserving the cultural and national identity of a linguistic group. Maintaining clarity and coherence in communication is a plus. Personally, I think I am against purism.
Critical	Purism is an ideology that wants to preserve which elements are authentic or not in a language. Purism excludes errors that it considers basic and wants a language to be spoken the same in all places without taking into account the variation of the language according to changes in space. First, purism as I have indicated tends to ignore the varied nature of languages. If the same language changes words or indicates them in a different way, purism excludes this social area and does not consider them as speakers of the same language. Excluding, in any area is the perfect example of not being rich in plurality. If we excluded people who speak a different language we would be delimiting a space and a limit causing many people to abandon the language and move on to a more permissive one for errors and that can communicate with the whole world. Purism seeks essence and perfectionism, if someone does not speak correctly or does not fit into the standards indicated by purism, they will not be able to communicate with others who do and will create a symptom of inferiority for the simple fact of speaking the same language correctly but not being purist. Purism is important to implement in areas such as education or formal communication since it is essential that students understand and learn a language correctly subject to changes but with the minimum possible errors. Here, purism is important but always recognizing that no matter how much some say "vermilion" and others "red" both are totally valid and communication between them can be established without problems. Thanks to the educational purist base. In conclusion, I think that purism must appear but only in key areas of human language and not prevent what seems like a grammatical or spelling error from being implemented in the language in the future. If we achieve this balance we will find a language very rich in grammar and changes.

Table 6 Frequency of reader profile and LLM usage profile

	Credulous	Ideological	Partially critical	Critical
Reader profile	42%	16%	14%	28%
LLM usage profile	60%	5%	23%	12%

a complete absence of both ideological and critical usage profiles. These findings indicate a lack of direct correspondence between the level of criticality in reading and the engagement with these tools. Finally, while the 12 students with a critical reading profile exhibit greater diversity in their usage patterns, the credulous profile remains the most frequent category. Conversely, critical and ideological uses of the LLM remain minority categories across all reading profiles. Overall, these data suggest that possessing a more critical reading profile does not necessarily guarantee an equally critical use of LLM, thereby reinforcing the notion of a misalignment between critical reading practices and the critical appropriation of generative AI technologies.

Table 7 Contingency table for reader profile and LLM usage profile

	LLM usage profile				
Reader profile	**Credulous**	**Ideological**	**Partially critical**	**Critical**	**Total**
Credulous	13	1	2	2	18
Ideological	3	0	2	2	7
Partially critical	4	0	2	0	6
Critical	6	1	4	1	12
Total	26	2	10	5	43

O3: Influence of LLM capacity on profiles

Regarding the last objective, which consists of determining whether the differences in reading profiles and in the use profiles of LLM are related to the type of LLM used by the students. Figures 2 and 3 show, respectively, the distribution of students according to their reading profiles and their use profiles of LLM. As shown in Figure 2, the distributions of credulous, ideological, and partially critical reading profiles are largely similar between the two groups. In contrast, the critical reading profile exhibits a more pronounced disparity, with higher representation among students who used the higher-capacity LLM. This finding suggests a potential association between exposure to more advanced tools and an enhanced capacity for critical reading.

The results shown in Figure 3 determine that, despite the difference in capacity between the two LLM, a higher number of students present a credulous usage profile when using Mistral-NeMo 12B compared to those using Gemma3 1B. At the same time, a higher proportion of critical and partially critical usage profiles are also

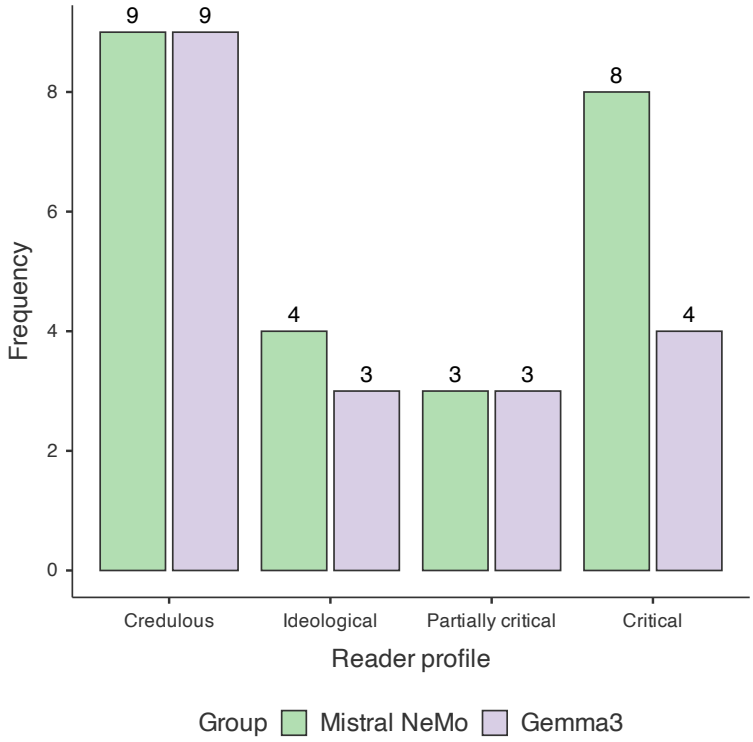


Fig. 2 Distribution of the reader profile by group

observed among students using Mistral-NeMo 12B. This pattern points towards a certain polarization in the use of the model with the highest capacity. On the one hand, appropriate use may favor more critical practices and, on the other hand, the higher quality and fluency of the responses generated may lead to a less questioned acceptance of the results, thus encouraging a more credulous interaction with the model.

Conclusion

Comparisons between groups based on the capacity of the LLM used reveal a polarized pattern. The use of higher-capacity models is associated with an increase in both critical and partially critical usage profiles, but also with a rise in credulous ones. This duality suggests that improvements in model quality act as an ambivalent factor. On the one hand, more capable models may support reflective practices among students who already possess well-developed critical strategies. On the other hand, they may reinforce overconfidence in the tool and reduce the perceived need to verify or crossreference information, a tendency highlighted by Kosmyna et al. (2025).

The findings highlight a critical misalignment between students' traditional reading profiles and their LLM usage profiles. While many students adopt critical approaches

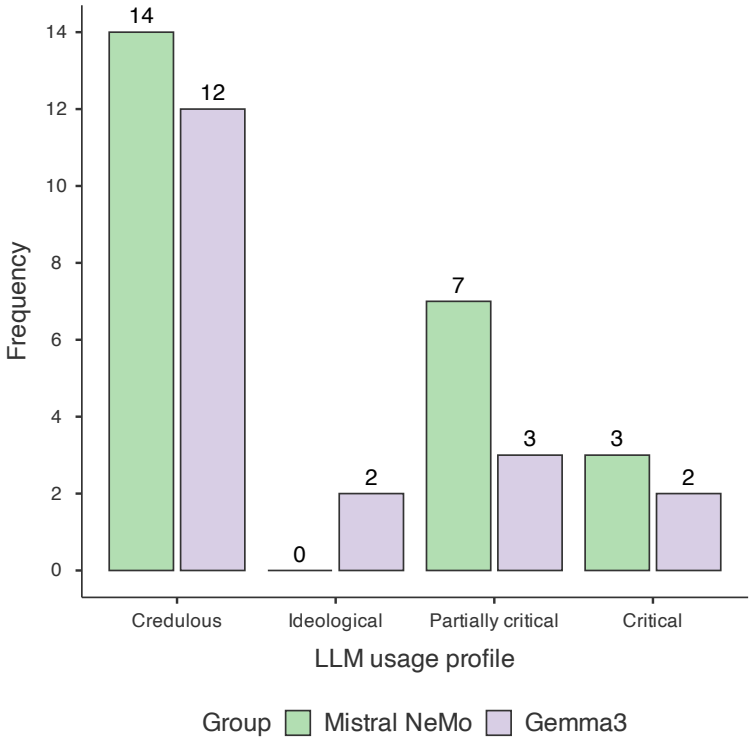


Fig. 3 Distribution of the LLM usage profile by group

when analyzing traditional argumentative texts, this skill set does not transfer to generative AI tools. Instead, data reveals a significant transformation toward more credulous usage patterns. This paradox is largely driven by the conversational nature of these models and their high coherence, which encourage uncritical acceptance. Specifically, even students with an explicitly critical reading profile often revert to credulous positioning when interacting with well-formulated outputs, as the perceived fluency of the tool reduces the inclination to verify or cross-reference information. The low agreement between reading and usage profiles confirms that personalized conversational environments can distort how content is evaluated, shifting cognitive effort from gathering information to a superficial processing of generated text.

These results align with Lee et al. (2025) regarding the dynamics of CT, reinforcing the observation that confidence in a tool's capabilities often correlates with reduced verification efforts. Consistent with Southworth, Migliaccio, Glover, et al. (2023), this underscores an urgent need for educational interventions that go beyond traditional critical reading instruction. Future pedagogical strategies must specifically address the mechanics of these tools, aiming to promote conscious and reflective usage where students maintain their critical rigor even within highly persuasive, AI-generated contexts.

It is important to acknowledge that the final sample consisted of 82 participants from a total population of 171 students, resulting in an estimated margin of error of 8% at a 95% confidence level. However, given the qualitative nature of the collected data, this statistical limitation has reduced relevance regarding inference. The study's primary objective focuses on understanding the influence of LLM on higher education students' critical text analysis skills rather than on generalizing the results. Nevertheless, future research should consist of a larger sample size that is representative enough to allow for valid generalization.

Declarations

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Clinical trial number. Not applicable.

Ethics, Consent to Participate, and Consent to Publish declarations. This study was conducted in accordance with the principles of the Declaration of Helsinki and was approved by the Academic Board of the University of Andorra, which acted as the competent ethical review body for this research. The research design was structured to minimize potential risks and safeguard participants' rights throughout the data collection process. Informed consents were obtained from all participants prior to their involvement. Before data collection commenced, participants were informed about the study's objectives, assured of the voluntary nature of their participation, and guaranteed confidentiality and anonymity. To ensure privacy, all collected data were analyzed in an aggregated and anonymous format for academic publication.

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