Enhancing Performance in Academic Tasks: Challenges and Opportunities in University Students' Use of ChatGPT

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Abstract

The use of ChatGPT has brought about a revolution in education and the completion of academic tasks, especially for high school and university environments. In this pilot study, we recruited twenty-eight university students to qualitatively and quantitatively analyse the performance of an academic task using the internet, including the possibility of using ChatGPT. The tasks performed by each student were recorded while their screen activity and eye movements were being captured. The results show that only the third part of the students used ChatGPT for their searches in completing the academic task. They also reveal that the main difficulties encountered by the university students analysed were as follows: formulating search terms in a search engine or prompts in ChatGPT, selecting sources based on reliability elements beyond the title of a result, comparing sources consulted, integrating and comparing information from diverse sources, and citing references properly. Based on these results, we conclude that university students' use of the Internet, specifically ChatGPT, would require greater attention from their educators. For example, training courses should be carried out, and more emphasis could be placed on the subjects that they regularly take in their university programs, to help students overcome those difficulties and to enhance the potential of the internet and, specifically ChatGPT, to learn, taking profit of the affordances of these tools when are used adequately.

Keywords: ChatGPT, higher education, academic tasks, learning, eye movements

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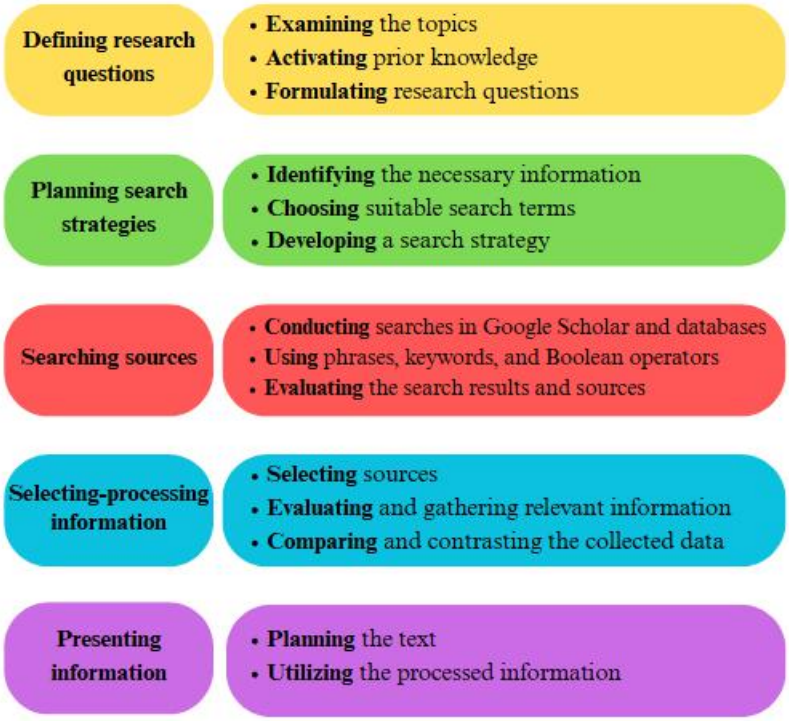
Introduction

The rapid emergence of generative artificial intelligence (AI) is transforming educational paradigms, particularly in how students engage with learning tasks and academic knowledge production. Tools such as ChatGPT (OpenAI, 2022), which enable users to generate coherent text, summarise information, and simulate interactive dialogue via simple textual prompts, have introduced a paradigm shift. In this new context, information access and processing no longer depend solely on active search strategies but increasingly on the ability to formulate effective queries and critically interpret algorithmically generated responses. Consequently, the approach university students take when completing academic tasks is evolving, presenting new challenges in terms of information literacy and critical thinking (Frerejean et al., 2019; Garcia & Badia, 2017; Romero-Rodríguez et al., 2023).

A substantial body of research highlights persistent deficiencies among higher education students in areas such as formulating effective search queries, evaluating the reliability of sources, integrating information from diverse references, and citing sources correctly (Argelagós et al., 2022; Brand-Gruwel et al., 2009; Lanning & Mallek, 2017; Leichner et al., 2014). These deficits are particularly concerning given the centrality of digital information management, not only to academic achievement, but also to autonomy and lifelong learning (ACRL, 2016). Merely having access to digital tools does not equate to being able to use them effectively (Pifarré & Argelagós, 2020). Without targeted guidance and instruction, students often struggle to engage critically with the abundance of content available to them online.

The concept of Information Problem Solving (IPS), as proposed by Brand-Gruwel et al. (2009), refers to the complex set of cognitive and metacognitive skills required to identify, locate, evaluate, and use information effectively to resolve an academic task or inquiry. The IPS model outlines five core stages: defining the research question, planning the search strategy, locating relevant information, processing and evaluating retrieved content, and organising and presenting the information in a coherent, academically appropriate form. Although this model has been validated in multiple contexts (Argelagós & Pifarré, 2012; Boetje et al., 2024; Frerejean et al., 2019; Garcia et al., 2021), the recent advent of generative AI tools like ChatGPT requires the reconsideration of established models and practices, particularly regarding how students interact with digital information and construct meaning from it.

Figure 1
Information Problem-Solving (IPS) Skills (Left Column) and Subskills (Right Column) for Reviewing Scientific Literature, Inspired by Brand-Gruwel et al. (2009) and Adapted From Argelagós et al. (2022)



Unlike traditional search engines that provide users with lists of indexed web pages, ChatGPT generates coherent and plausible-sounding narratives that respond directly to user prompts. While this represents a significant advancement in AI-driven information access, it can become pedagogically problematic if students lack the skills to assess the credibility, relevance, and accuracy of the content produced. As Mitchell et al. (2021) note, the use of AI in academic settings can foster an illusion of mastery—students may feel confident in their outputs without recognizing the epistemological or factual flaws they may contain. Furthermore, the lack of source transparency, the presence of algorithmic biases, and users' limited understanding of the model's inner workings further heighten the risk of uncritical reliance (Hyland, 2016; Promma et al., 2025).

This dynamic highlights the urgent need for a redefinition of digital literacy in higher education. As argued by Castelló (2014) and Garcia et al. (2021), digital literacy must transcend technical navigation skills and instead incorporate metacognitive awareness, ethical sensitivity, and epistemological understanding. Effective use of tools like ChatGPT depends not only on technical fluency but on a nuanced understanding of how to formulate prompts, detect quality indicators in information outputs, verify factual accuracy, synthesise content from multiple sources, and integrate those insights into academically rigorous texts (Promma et al., 2025; Swales & Feak, 2004). Consequently, a significant portion of recent academic literature emphasises the development of critical thinking, information evaluation, and integrative academic writing as core competencies in higher education (Argelagós et al., 2022; Romero-Rodríguez et al., 2023; Wopereis et al., 2015).

Despite the growing relevance of generative AI in education, empirical research on its actual use in authentic academic settings remains limited. Although students are increasingly

adopting tools like ChatGPT to assist with academic tasks, there is a lack of systematic research analysing how these interactions take place and what cognitive strategies are employed—or overlooked—in the process. Preliminary evidence suggests that students often use ChatGPT in superficial ways, focusing on obtaining ready-made content or paraphrased explanations, without engaging in deeper validation, comparison, or integration of information (Kacperski et al., 2025; Romero-Rodríguez et al., 2023). This indicates a disconnect between tool availability and students' ability to use it for higher-order academic purposes.

In response to this situation, educators and institutions must adapt their pedagogical strategies. As Francom (2016) and Van Merriënboer et al. (2025) argue, teaching complex skills like IPS requires instruction based on whole-task approaches—realistic, integrated, and transferable learning experiences. Instruction must not only teach students how to use AI tools, but also how to interrogate their outputs, triangulate them with other sources, identify gaps or inaccuracies, and construct academically sound arguments (Kacperski et al., 2025). Such approaches align with the tenets of the 4C/ID instructional design model, which emphasises authentic learning tasks, progressive scaffolding, and emphasis on transfer to real-world academic contexts (Frerejean et al., 2019; Van Merriënboer et al., 2025).

In this regard, the present study seeks to contribute to ongoing academic discourse by exploring how university students engage with the digital information, including generative AI tools, when completing a real academic task. Specifically, it examines whether students use the tool, how they do so, and what challenges arise during the information-seeking and knowledge-construction processes. Unlike prior studies focused exclusively on outcomes, this research emphasises the processes involved in digital information interaction, including decision-making, source evaluation, integration, and citation.

This Study

This study seeks to conduct both a qualitative and quantitative analysis of how a cohort of university students utilises the internet—particularly with reference to the potential use of ChatGPT—to complete an academic task. By observing participants' digital behaviour directly, the research aims to uncover patterns of use, recurrent challenges, and the core competencies required for effective online information retrieval and academic writing (Argelagós et al., 2022; Argelagós et al., 2023; Brand-Gruwel et al., 2009). Particular emphasis is placed on how students formulate search queries, assess the credibility of sources, and synthesise and reference the information obtained.

In this study, both screen recording and eye-tracking technologies were employed to capture in detail each participant's decision-making process, offering insights into the cognitive steps underlying academic task resolution in a digital context.

Method

Participants

The study involved twenty-eight undergraduate students enrolled in various social sciences and education-related degree programs. Students participated voluntarily, and all signed informed consent forms before participation. Although they self-reported having intermediate

to advanced digital competence, none of them had received formal training in the academic use of generative AI tools such as ChatGPT.

Procedure

Each participant was asked to complete an individual academic task, which required searching for information on a specific topic and composing a short-written report or argumentative response. Students were free to use any digital tools available on the internet, including ChatGPT. During the activity, both their screen activity and eye movements were recorded using screen-capture software and an eye-tracking device. This setup enabled precise observation of which digital elements attracted the participants' attention and for how long.

The task had a maximum duration of 20 minutes. Upon completion, participants were asked to watch the video recording of their task performance. As they watched, they were instructed to verbally describe the specific actions they had taken, the reasons behind each action, and what they had been thinking at each moment. This retrospective verbalisation session also lasted 20 minutes. Finally, students were briefly asked about their general feelings during the task and whether they had encountered any particular difficulties. While these final comments did not take the form of structured interviews, they provided additional contextual insights into the students' subjective experiences.

Data Collection

Data collection for this study was implemented through a multi-modal strategy that combined behavioural tracking technologies with post-task reflections. This integrative methodology enabled the capture of both observable user interactions and students' interpretations of their task performance. The triangulation of three distinct data sources —screen recordings, eye-tracking metrics, and participant feedback— provided a comprehensive and layered understanding of students' engagement with the academic task.

Screen recording. Each participant's on-screen activity was continuously recorded using screen-capture software installed on the computer. These recordings documented the full digital trace of participant behaviour, including interactions with web browsers, search engines, academic databases, and generative AI tools such as ChatGPT. The data included the sequence of visited websites, and detailed interaction patterns such as keyword entries, scrolling behaviour, tab-switching, and instances of text copying. This visual-log data offered a temporally precise reconstruction of each student's decision-making trajectory, revealing how information was accessed, evaluated, and operationalised during task execution.

Eye-tracking data. To further explore participants' visual attention and cognitive engagement with digital stimuli, a screen-based eye-tracking system was employed throughout the task. The device captured fixation durations, saccades, and gaze paths. These data were crucial for discerning whether students engaged in close reading or surface scanning, whether their source selection was guided by titles, metadata, or visual prominence, and how they processed search engine results or AI-generated responses. The eye-tracking data thus complemented the screen recordings by adding a perceptual dimension to behavioural analysis.

Post-task video-based reflection. Immediately after completing the academic task, participants engaged in a retrospective reflection session guided by their screen recordings. As they watched their task performance video, they were asked to describe, step by step, the specific actions they had taken, the purpose behind each action, and the thoughts or decision-making processes associated with each moment. This method allowed for a richer reconstruction of cognitive and strategic processes that were not directly observable through screen and eye-tracking data alone. In addition to this structured reflection, participants were briefly asked about their emotional responses and any difficulties they had faced during the task. These post-task accounts added a valuable subjective layer to the behavioural and perceptual data.

Data Analysis

The analysis was conducted using the video recordings of participants' screen activity, which were systematically coded according to a coding scheme constructed following the basis of previous studies on information problem-solving (Argelagós & Pifarré, 2012; Argelagós et al., 2022; Brand-Gruwel et al., 2009; Garcia et al., 2021) and adapted to the generative IA tools. Considering the five IPS skills, an analysis was conducted to determine the degree of accuracy or quality attributed to the different subskills of each skill (see Figure 1). This methodology facilitated the transformation of qualitative observations into structured quantitative data, thereby allowing for a more rigorous and replicable examination of students' task engagement.

The coding protocol enabled researchers to trace both temporal dynamics and behavioural patterns within each participant's task performance, with a particular focus on decision-making processes, search strategies, source selection, and information integration. Descriptive analysis was employed to identify recurring behaviours, assess the frequency and manner of ChatGPT usage, and document the nature of the difficulties encountered during the task. By adopting this mixed-methods approach —integrating qualitative coding with quantitative representation—, the study offers a nuanced and empirically grounded account of how university students navigate academic tasks in digitally mediated learning contexts.

This study has the approval of the Ethics Committee of the Universitat de Girona (CEBRU00048-23).

Results

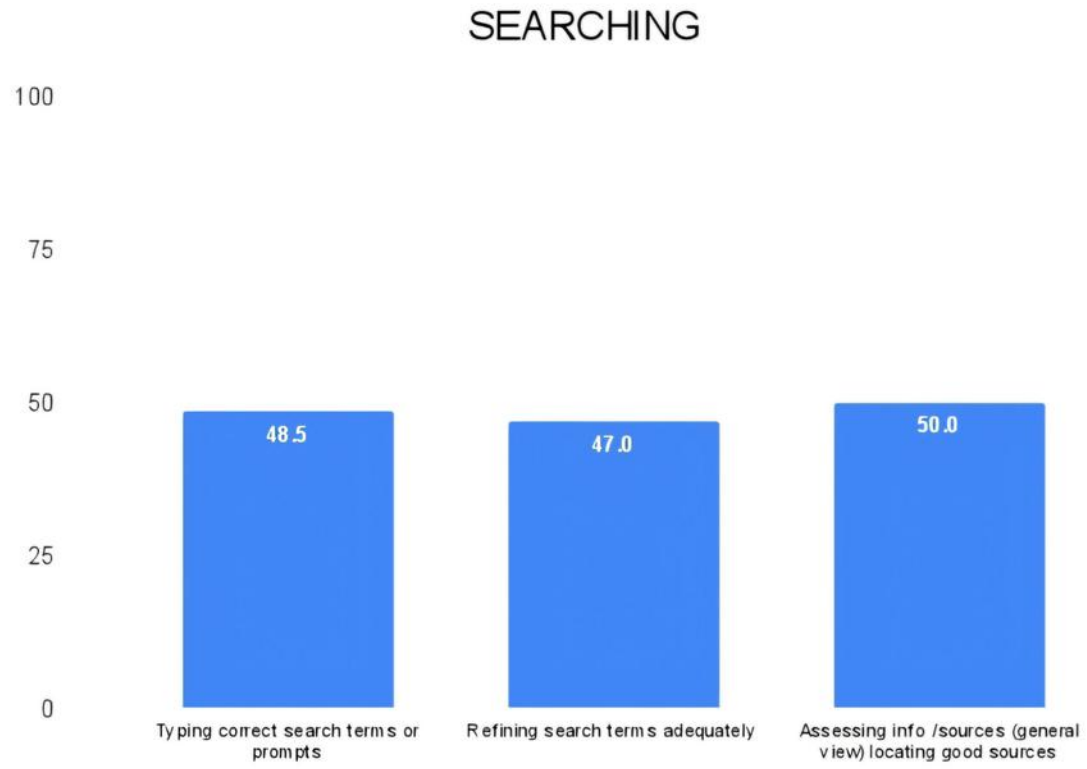
The results of the study indicate that only one-third of the participating students used ChatGPT to carry out the necessary research and to complete the proposed academic task. These results suggest a relatively limited integration of AI-assisted support into their academic workflows, despite the potential benefits that such tools may offer in terms of efficiency, idea generation, and access to information. The study allowed complete freedom to decide the sources to be used. The results show a greater tendency to consult sources such as Google, Google Scholar or other more specific websites. The tendency to use AI is lower than the tendency to search using other sources. Nevertheless, a portion of students did make use of ChatGPT to complete the task.

Results also revealed the main difficulties encountered by the university students analysed. The most revealing results are to be found in the skills "Searching", "Selecting", and "Presenting".

Figure 2 shows the subskills of the "Searching" skill. They are "Typing correct search terms or prompts", "Refining search terms adequately" and "Assessing info / sources (general view) locating good sources". The scores in this category were all very low, with the highest score being fifty out of one hundred in the "Assessing info / sources (general view) locating good sources" subskill.

As can be seen in the punctuation of the remaining subskills ("Typing correct search terms or prompts" and "Refining search terms adequately"), they exhibited difficulties in formulating search terms in a search engine or prompts in ChatGPT. The scores are forty-eight and a half out of a hundred and forty-seven out of a hundred respectively.

Figure 2
Average Adequacy of Searching Subskills



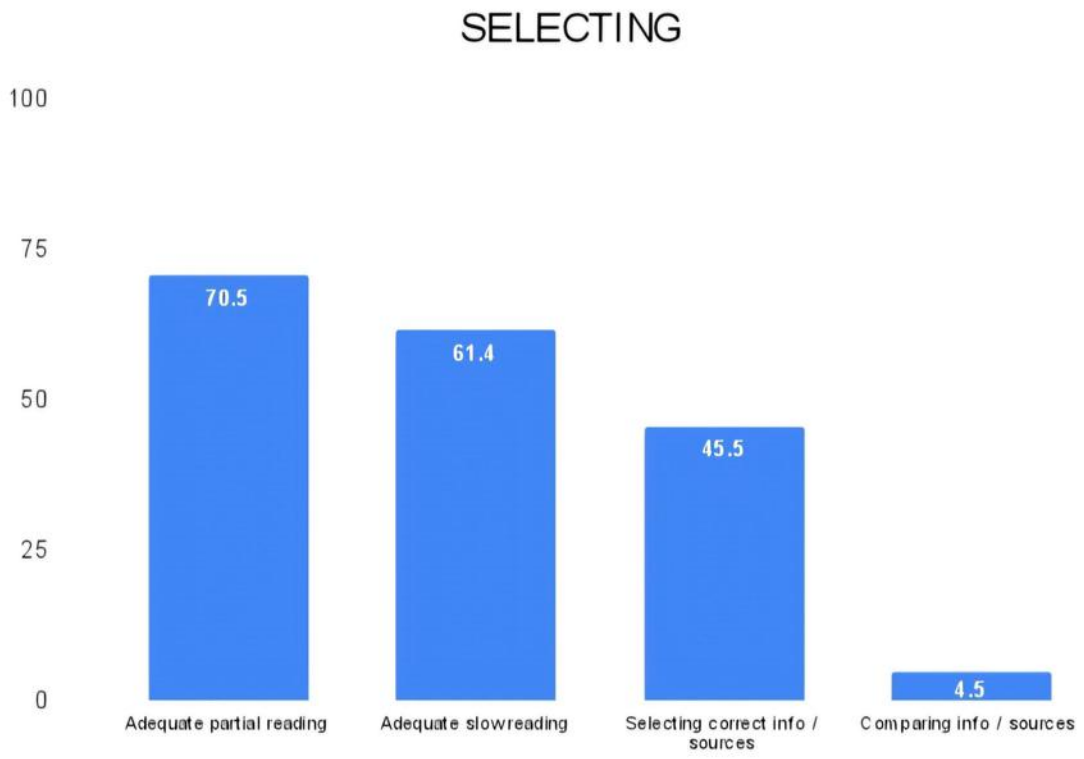
The next skill analysed was "Selecting", which has four subskills (see Figure 3): "Adequate partial reading" (seven point five out of one hundred), "Adequate slow reading" (sixty-one point four out of a hundred), "Selecting correct info / sources" (forty-five) and "Comparing info / sources" (only four out of a hundred).

The scores indicate a partially correct and slow reading process to some extent; however, difficulties remain in the other subskills. One difficulty identified was related to the selection of sources based on reliability criteria beyond the title of the result, as seen in Figure 3. Students generally failed to consider key indicators of source reliability, such as the author, publication site, or institutional affiliation, thereby demonstrating limited capacity for critical evaluation and validation of digital information. The participants, on many occasions, only looked at the title of the source to decide whether to access it or not. This often led them to consult sources lacking consistent credibility.

In addition, problems were observed in comparing the sources consulted, with a score of 4.5 out of 100. Students showed limited ability to analyse and contrast different pieces of information obtained from various sources on the same topic—an essential process for validating the accuracy and objectivity of retrieved information.

This lack of critical comparison likely hindered the construction of more solid and well-founded arguments, as well as the ability to identify potential biases or limitations in the sources used. As a result, it made the process of creating deeper and more rigorous knowledge more difficult.

Figure 3
Average Adequacy of Selecting Subskills



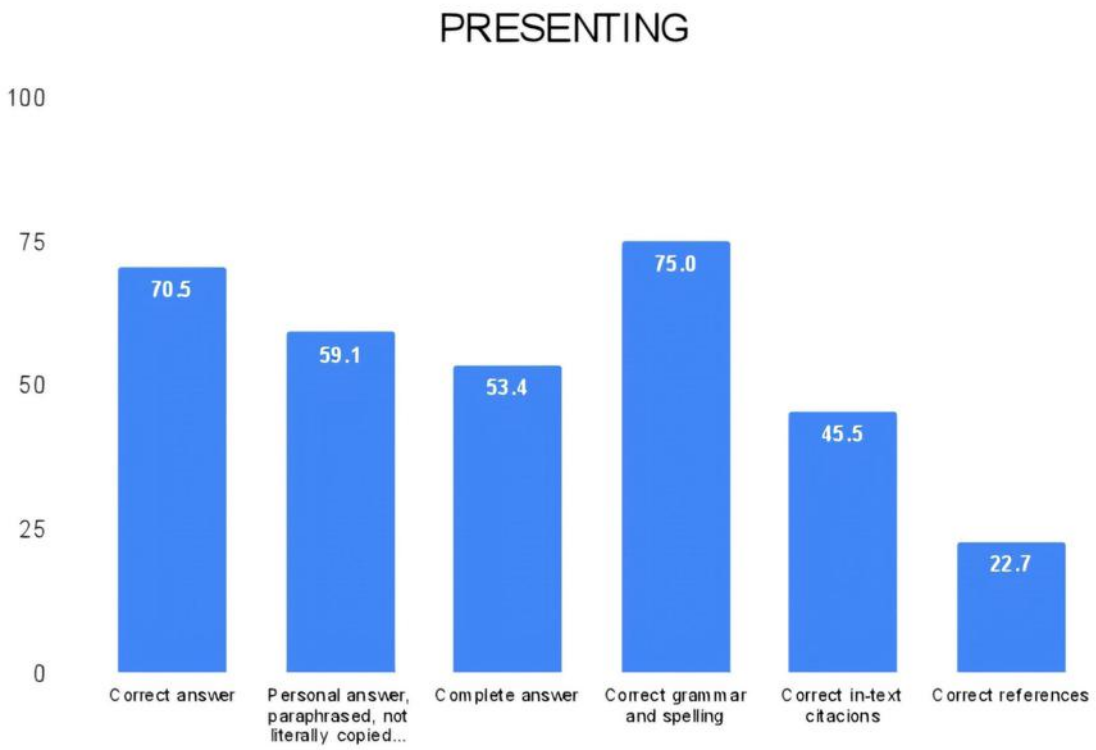
The last skill that has been analysed is “Presenting”, which has de following subskills: “Correct answer”, “Personal answer, paraphrased, not literally copied”, “Complete answer”, “Correct grammar and spelling”, “Correct in-text citations”, and “Correct references”.

The challenge of integrating and comparing information from diverse sources was also noted in presenting the information (see Figure 4), that refers to the process of organising, synthesising, and critically contrasting information to construct a more comprehensive and substantiated understanding of a given subject. Many students showed difficulties in making this synthesis, as they often limited themselves to superficially summarising the ideas, without delving into the implications or the connections between the different sources.

Finally, a recurrent issue was observed in the proper citation of references. Students demonstrated a lack of familiarity with the APA citation standard, often including references that were incorrectly formatted according to the model’s guidelines. Furthermore, many students did not use the available tools for managing bibliographic references effectively —

such as reference management software— which could have helped them adhere more easily to the established standards.

Figure 4
Average Adequacy of Presenting Subskills



In conclusion, the results of the study show that, although students have access to advanced tools such as ChatGPT and other digital resources, many still use other basic internet sources to conduct various searches. Nevertheless, those who do use AI continue to exhibit significant gaps in key aspects of academic research in the digital age.

Discussion and Conclusion

Previous empirical research has evidenced a notable lack in the cognitive framing and process-oriented analysis of student–AI interactions, particularly with generative tools, such as ChatGPT. The present study, through implementing a multimodal and multi-layered methodological design, facilitates a more granular exploration of the perceptual dimension within behavioural analytics. The obtained data substantiate prior findings concerning the limitations of digital competencies among university students.

Notably, the participants demonstrated a marked predisposition to rely on conventional information retrieval systems, such as Google and Google Scholar, over ChatGPT, despite the potential advantages this AI tool can offer in terms of efficiency and information access (Zhang & Yang, 2025).

A critical insight emerging from this investigation pertains to the cognitive and procedural deficiencies manifested during academic task execution. Participants exhibited substantial challenges in articulating precise search queries and inappropriate use of subject-specific

vocabulary —phenomena previously documented by Leichner et al. (2014), Lanning and Mallek (2017), and Argelagós and Pifarré (2017). Moreover, findings indicate an underdeveloped criticality in the appraisal, cross-referencing, and synthesis of retrieved information. Eye-tracking and screen-recording data revealed a superficial engagement with credibility markers such as authorship attribution and institutional affiliation, thereby impeding epistemically rigorous knowledge construction and argumentation, core skills within the IPS framework (Brand-Gruwel et al., 2009) and central to instructional models like the Four-Component Instructional Design (4C/ID) (Frerejean et al., 2019; Van Merriënboer et al., 2025). These outcomes also align with the concerns raised by Van Dis et al. (2023), who caution against the potential of AI tools to engender epistemic overconfidence, whereby students overestimate the validity of generated outputs absent critical verification.

Furthermore, the widespread misapplication of APA citation standards and limited recourse to bibliographic management tools underscore a broader unfamiliarity with scholarly conventions. This deficiency, as highlighted by Swales and Feak (2004) and Suntoro et al. (2023), reflects inadequacies in academic literacy, particularly in the domains of documentary practices and scholarly communication.

Finally, it is essential to underscore that the responsible use of generative AI in academia should not be seen as a threat to academic integrity. On the contrary, it represents an opportunity to rethink the role of educators, the design of academic tasks, and the modalities of assessing learning. Rather than imposing prohibitions or restrictions, educational institutions must strive to cultivate critical, reflective, and competent AI users (ACRL, 2016; Cassany, 2015; Sparks et al., 2024). This involves embedding AI literacy within curricula and promoting a culture of transparency, accountability, and scholarly rigour in how such tools are employed. Only by doing so can the full pedagogical potential of AI be harnessed to foster meaningful learning and the development of thoughtful, autonomous learners.

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