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University Students' Purposeful Engagement with Generative AI: Differentiating Tools, Functions, and Goals

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Structured Abstract

Purpose – The paper examines university students' choice of specific AI tools, ChatGPT, Grammarly and Gemini, to complete academic tasks. It aims to contribute to existing debates on AI in higher education by examining students' differentiated engagement with GenAI tools. Based on this examination, the paper proposes a set of guidelines for GenAI literacy (Gen-AIL) development to support purposeful and informed tool use in higher education.

Design/methodology/approach – The study reported in the paper used a mixed-methods online survey, combining Likert-scale items and open-ended questions. Four hundred and forty-one students completed the survey. Quantitative data was analysed using a Chi-Square test, and qualitative data was thematically analysed to complement statistical results.

Findings – The paper provides empirical insights on the relationship between choice of AI tools and academic tasks. Results indicate that ChatGPT use was strongly linked to generating ideas and planning, while Grammarly was associated with writing and feedback. By contrast, Google Gemini use appeared comparatively diffuse across task categories.

Research limitations/implications – Because of the highly contextualised sample used, the results may lack generalisability. Moreover, the study may have been strengthened by incorporating in-depth interviews. Therefore, future research could adopt mixed-methods longitudinal designs.

Practical implications – The paper highlights the need to embed critical digital literacy development to support purposeful and informed tool use in higher education and provides a set of guidelines for implementation.

Originality/value – By examining the statistical association between academic tasks and tool selection, the paper fills the gap in our knowledge of student choice of specific AI tools to complete academic tasks. Based on this examination, it proposes guidelines for GenAIL development.

Keywords: University student practices, GenAI engagement, GenAI literacy (Gen-AIL)

1. Introduction

Research on the integration of generative artificial intelligence (GenAI) in higher education has grown exponentially over the past three years, investigating aspects as diverse as human-AI interaction (e.g., Edwards et al., 2025; Wang et al., 2023; Zhang et al., 2025), pedagogically informed frameworks for learning (e.g., Khalifa & Albadawy, 2024; Kim et al., 2025; Tseng & Warschauer, 2023), and literacy development (e.g., Baskara, 2023; Lim & Tan-Chia, 2023). While much of this research has examined GenAI integration from a macro-institutional or pedagogical perspective, studies focusing on students' experiences and perspectives are only beginning to emerge (e.g., Authors, 2025; Kohnke, 2024; Stroud & Du, 2025).

This study empirically examines university students' selection of specific GenAI tools, such as ChatGPT, Grammarly¹, and Gemini, for the completion of academic tasks. It advances current debates on AI in higher education by demonstrating how students engage with these tools in differentiated and task-sensitive ways. The findings show that tool choice is mediated by student agency, challenging assumptions of passive adoption and uncritical acceptance of GenAI outputs. The paper therefore argues for the systematic embedding of GenAI literacy (GenAIL) to enable purposeful, informed, and context-sensitive use of GenAI tools, and proposes a set of pedagogically grounded guidelines for its development in higher education.

2. Understanding tool selection: Fit, self-regulated learning and new literacies

Research on the integration of generative artificial intelligence (GenAI) in higher education has expanded rapidly, examining aspects such as human-AI interaction (Edwards et al., 2025; Wang et al., 2023; Zhang et al., 2025), pedagogical frameworks (Khalifa & Albadawy, 2024; Kim et al., 2025; Tseng & Warschauer, 2023), and literacy development (Baskara, 2023; Lim & Tan-Chia, 2023), among others. While much of this scholarship has focused on institutional responses and instructional design, sometimes from a rather opportunistic approach to AI tools use, an emerging body of research is beginning to foreground students' experiences and decision-making practices (Authors, 2026; Kohnke, 2024; Stroud & Du, 2025).

¹ Although it was designed to be a grammar checker, Grammarly has now evolved to incorporate generative AI features and as such it is considered a GenAI tool (Mekheimer, 2025).

Studies on students' experiences reveal that their engagement, defined here as the "continuum from nonuse to sustained interaction with digital technologies" (Salza & Samuel, 2025, p. 2) with GenAI is neither uniformly enthusiastic nor homogeneously sceptical. Rather, engagement appears differentiated across tasks and contexts. Students report appreciating GenAI for efficiency, creativity, and linguistic support, yet simultaneously express concerns about reliability, overreliance, and authorship.

What remains underexplored, however, is how students select specific tools such as ChatGPT, Grammarly and Gemini for specific academic purposes. Understanding tool selection requires moving beyond attitudes toward a more fine-grained conceptualisation of task demands, regulatory processes, and literacy practices.

2.1 Task–technology fit and tool selection

Task–Technology Fit (TTF) theory explains how technology is used by assessing the fit of technology to users' tasks and requirements and posits that performance outcomes depend on the alignment between task characteristics and technological affordances (Goodhue & Thompson, 1995; Marikyan & Papagiannidis, 2025). Applied to GenAI in higher education, this perspective invites closer examination of how students perceive the "fit" between academic tasks and specific AI tools.

Studies suggest that students often conceptualise GenAI tools as multi-functional academic assistants capable of supporting searching, drafting, proofreading, and idea generation (Kim et al., 2025). Positive evaluations of GenAI frequently derive from perceived affordances such as efficiency, creativity enhancement, and linguistic scaffolding (Stroud & Du, 2025; Baskara, 2023). For example, Joo and Belcher (2025) report a case in which ChatGPT functioned not merely as a translator but as a contextual explainer, supporting comprehension and strategy development during academic reading. Such findings illustrate perceived task–technology fit at the micro level, where specific affordances align closely with immediate academic needs. Other studies (e.g., Kohnke, 2024; Nakatani & Jiang, 2025; Sousa & Cardoso, 2025) have shown students' agency by balancing efficiency provided by the new technology and critical decision making by considering epistemic risks presented by GenAI's hallucinations.

Similarly, Black and Tomlinson (2025) demonstrate that students strategically deploy GenAI to support higher-order writing tasks, conceptualising AI as a "more expert other" that enables progression within their zone of proximal development. In these instances, tool selection appears deliberate rather than passive, suggesting that students evaluate fit in

relation to cognitive demand and are capable of striking a balance between innovation and academic integrity.

Conversely, reports of dissatisfaction and anxiety can be interpreted as instances of perceived misfit. Concerns about overreliance, reliability, or reduced creativity (Kohnke, 2024; Lin & Chen, 2024) point to tensions between task complexity and technological limitations. As revealed by the results of this study, where epistemic risk is high—such as in research-related tasks—students’ confidence in AI tends to decline, indicating that perceptions of fit are sensitive to the nature of the academic activity.

From a TTF perspective, therefore, positive engagement reflects perceived alignment between tool affordances and task demands, while critical detachment signals perceived misalignment. This interpretation then shifts the analytical focus from general attitudes to situated decision-making in which the demands of a task and technological affordances play a more central role in tool selection.

2.2 Self-regulated learning across the writing process

While TTF explains how students may evaluate the alignment between tools and tasks, it does not fully capture the temporal dimension of academic work, especially when it comes to academic writing. Writing unfolds across iterative phases—planning, drafting, revising—and each phase involves distinct regulatory processes. Self-regulated learning (SRL) theory, that explains how students set their learning goals and regulate their cognition, motivation, and behaviour to achieve these goals (Turan et al., 2022), provides a complementary lens for understanding how GenAI is integrated into these phases in tasks such as academic writing.

In the forethought phase (before writing), students may use GenAI for idea generation, topic exploration, or structural planning. Research indicates that students appreciate AI’s capacity to reduce cognitive load at this stage (Stroud & Du, 2025), suggesting that tool use may function as strategic scaffolding. However, social influences and hedonic motivations (Wang & Yin, 2025) also shape adoption decisions, complicating purely instrumental accounts.

During the performance phase (while drafting), GenAI tools are often used for language support, paraphrasing, and structural refinement. Here, AI can act as a monitoring aid, supporting metacognitive awareness. Yet, studies also report concerns about diminished creativity or emotional detachment (Lin & Chen, 2024), raising questions about how AI-mediated drafting may influence motivational regulation.

In the self-reflection phase (after writing), tools are frequently used for proofreading and feedback. Luo, Wang, and Hew (2026), in their study of an AI-based recommender system designed to support SRL, found that although overreliance was limited, students expressed unease about potential dependency. Such findings seem to suggest that AI may support evaluative regulation while simultaneously introducing new regulatory challenges. Viewed through an SRL lens, GenAI use is embedded within cycles of planning, monitoring, and reflection. Tool selection may therefore reflect students' attempts to regulate cognition, motivation, and performance across writing phases. Importantly, these views reveal that perceived overreliance is not merely a technological issue but a regulatory one.

2.3 Academic literacies, authorship, and the emergence of Gen-AIL

Beyond instrumental fit and regulatory processes lies a broader question of authorship and literacy in academic tasks like writing that implicates the role that Gen-AI can play. Writing, viewed from an Academic Literacies (AcLit) perspective, is not a neutral skill but a socially situated practice embedded in disciplinary epistemologies (Lillis & Scott, 2007). As such, academic practices like writing are shaped by the social, cultural, and physical contexts in which they take place and GenAI is now playing an important role in how these practices happen. Reports of both appreciation and anxiety we have reviewed above can be interpreted within this literacy framework. Students' valuation of GenAI as authoritative or expert-like (Kohnke, 2024; Black & Tomlinson, 2025) suggests shifting perceptions of epistemic authority, whereas concerns about creativity loss, authenticity, and human contact (Lin & Chen, 2024; Malmström et al., 2023) reflect tensions around voice and ownership.

GenAI tools represent not simply productivity aids but mediational resources that may reconfigure relationships between writer, text, context and disciplinary knowledge. In this sense, GenAI literacy refers to the capacity to understand, use, critically evaluate, and ethically manage generative AI tools and their outputs. It extends beyond functional knowledge and prompt engineering to encompass cognitive, critical, and ethical competencies, which are enacted in relation to specific disciplinary contexts and epistemic practices.

Positioning GenAI within the context of literacy transformations allows us to conceptualise Generative AI Literacy (Gen-AIL) not as a discrete technical competence but as an extension of academic literacy development. In this sense, tool selection becomes an authorship decision and agency: choosing whether, when, and how to delegate cognitive labour to AI, which at the same time constitutes a form of epistemic positioning.

2.4 Toward a task-sensitive understanding of GenAI tool selection

Taken together, these perspectives suggest that students' engagement with GenAI cannot be reduced to positive or negative attitudes. Instead, tool selection appears to be shaped by:

- Perceived task–technology fit
- Regulatory demands across writing phases
- Negotiations of authorship and epistemic agency

Taken together, task–technology fit, self-regulated learning, and academic literacies provide a multi-layered model for understanding students' selection of GenAI tools. At the instrumental level, students evaluate the perceived alignment between task demands and technological affordances (TTF). At the processual level and in relating to academic writing, they integrate AI within cycles of planning, monitoring, and reflection across phases of academic work (SRL). At the socio-epistemic level, tool selection reflects negotiations of authorship, voice, and epistemic agency within disciplinary literacy practices (AcLit). Rather than viewing GenAI adoption as a binary of acceptance or resistance, this integrated model conceptualises tool selection as situated decision-making shaped by perceived fit, regulatory strategy, and literacy positioning. This model underpins the present study's investigation of how students select specific GenAI tools across academic tasks and writing phases, and how such selections contribute to the development of Generative AI Literacy (Gen-AIL).

However, empirical research has yet to examine systematically how students select specific GenAI tools across different academic tasks. Addressing this gap is crucial for informing pedagogical approaches that move beyond generic AI training toward the development of context-sensitive GenAI literacies. The present study therefore investigates the extent to which students' selections of GenAI tools are shaped by the nature and phase of academic tasks, contributing to a more nuanced understanding of Gen-AIL as situated, developmental, and literacy-embedded as opposed to an opportunistic view of GenAI tools by university students.

3. Methodology

3.1 Design

To address the research question, an anonymous online survey was developed using Jisc Online Surveys (see Appendix). After defining the research problem (we know little about

how university students select GenAI tools for academic tasks) and setting the aims of the study, we designed the survey items informed by the key themes from the literature. The items were then organised from general to specific and piloted. After the piloting phase, items were calibrated accordingly.

The survey combined multiple-choice, Likert-scale, and open-ended items to capture both quantitative patterns and qualitative rationales for students' use of GenAI tools. The mixed-methods design allowed for triangulation of results, with quantitative data mapping usage patterns and qualitative responses providing insight into students' reasoning. The survey design was chosen for its efficiency in collecting data from a broad cross-section of the student population at the university.

3.2 Participants

A total of 443 students participated in the study, recruited through voluntary response sampling via university email and VLE announcements. Following the removal of two incomplete submissions to maintain the integrity, validity, and accuracy of the dataset, the final sample comprised 441 students ranging from foundation to doctoral levels (Table 1). Participants identified as 57% female, 41% male, and 1% preferred not to disclose their gender. The sample reflected considerable diversity, with students representing 68 national backgrounds (Table 2) and a wide range of academic disciplines across the three colleges: Design, Creative and Digital Industries; Liberal Arts and Sciences; and the Business School. It is important to note that the use of voluntary response sampling may have introduced self-selection bias, as students with stronger opinions about GenAI tools could be overrepresented; this limitation is taken into account when interpreting the findings.

Table 1. Participants by level of study

Level of study	Percentage (%)
Foundation	4
First-year undergraduate	27
Second-year undergraduate	23
Third-year undergraduate	17
Master's	26
Doctoral	3
Total	100

Table 2. Participants by national background

Nationality (most frequent)	Number of students
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British	147
Sri Lankan	55
Indian	48
Italian	17
Pakistani	14
Other nationalities (n = 63)	160
Total	441

After English, the most frequently reported languages were Spanish, French, Hindi, Sinhala, Arabic, and Urdu, reflecting the university's multicultural and multilingual community. As to their academic disciplines, participants came from a wide range of academic fields, representing the three colleges at the university: Design, Creative and Digital Industries, Liberal Arts and Sciences, and the Business School.

3.3 Procedures

The survey was piloted with a small number of students to ensure clarity and reliability and items were calibrated before the survey was distributed more widely. Following revisions, internal consistency was measured by means of Cronbach's alpha which resulted in a coefficient of 0.80, considered to be adequate for research purposes. The final form of the survey consisted of 22 items divided into two sections. Section A gathered demographic information (e.g. gender identity, nationality, languages, and area of study), while Section B focused on students' use and experiences of GenAI tools. Question types included multiple-choice, Likert-scale, and open-ended items.

3.4 Data Analysis

Quantitative analysis was conducted using SPSS. As participants were allowed to select multiple AI tools for each academic task, responses generated repeated tool-use observations nested within individuals. The contingency table therefore represents aggregated tool-use events rather than mutually exclusive person-level categories. While Chi-square test assumes independence of observations, the analysis was conducted to examine distributional patterns of tool-use across tasks rather than to model individual-level predictive relationships. This distinction is important, as the unit of analysis is the tool-use event rather than the individual participant.

A Chi-square test was conducted to assess the association between task type (six categories) and AI tool used (ChatGPT, Gemini, Grammarly). The analysis yielded a statistically significant association, $\chi^2(10) \approx 350$, $p < .001$. To assess the magnitude of this

relationship, Cramér's V was calculated. The resulting effect size ($V \approx .33$) indicates a moderate association between academic task and tool selection. Given the sample size and repeated-response structure, results are interpreted as reflecting patterned distributions of AI tool use across tasks rather than independent person-level choice behaviour.

Open-ended responses were coded in NVivo following Braun and Clarke's (2006) six-phase thematic analysis: familiarisation, coding, theme development, review, definition, and reporting. Incomplete or inaccurate responses were excluded or regrouped as appropriate. This approach was selected for its flexibility and suitability for identifying patterned meanings across textual data, enabling both the organisation of students' perspectives and the development of interpretive insights. An iterative coding process was used, whereby initial codes were progressively refined and grouped into broader themes that captured recurring ideas within the dataset. Integration of mixed methods was achieved through a complementary approach, whereby quantitative findings identified patterns of GenAI use, and qualitative themes provided contextual depth and explanation for these patterns.

3.5 Ethics

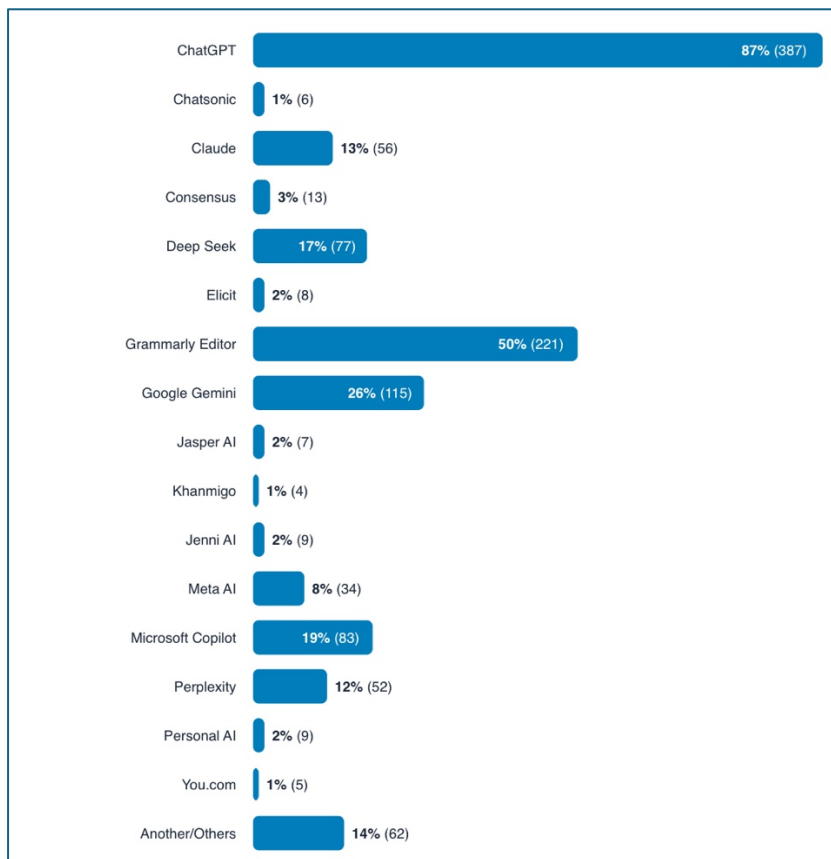
Ethical approval was granted by the university ethics committee (ETH2425-2437). Participation was voluntary, informed consent was obtained in writing, and data collection complied with general data protection regulation and institutional policies. Contact details of the research team were provided in case of concerns.

4. Results

Five items in the survey closely investigated participants' choice of GenAI tools to complete specific academic tasks, moving from a general to a more detailed perspective. Items 7, 11, and 15 examined the use of GenAI tools quantitatively, focusing on tool selection and the stage of the academic task at which GenAI was used. Items 8 and 16 complemented these with qualitative data on participants' rationales for tool choice and stages at which they chose the tools.

As shown in Figure 1, the three most commonly used GenAI tools were ChatGPT (87%), Grammarly Editor (50%), and Google Gemini (26%). Given the wide range of choice, these results clearly show that ChatGPT, Grammarly, and Google Gemini are the preferred GenAI tools among the participating students.

Figure 1. Students' use of GenAI tools for academic work



ChatGPT is clearly the most frequently cited and trusted general-purpose tool, especially for text generation, explanation, and feedback. Grammarly is preferred for proofreading and grammar. On the other hand, Google Gemini is comparatively mentioned, mostly for inspiration and summaries. These results are illustrated with qualitative data in Table 3.

Table 3. Preferred GenAI tools with qualitative data

GenAI tools	Brief explanation	Examples from qualitative data
ChatGPT	Most frequently cited and trusted tool in the data for general purposes	“Answers received from ChatGPT usually help tremendously with tasks I am completing.”, “Sometimes it spits out nonsense... but if you tell it exactly what to do, it gives the perfect response.”, “ChatGPT perfectly explains theoretical concepts and helps me get clear and concise notes.”
Grammarly	Second most frequently cited for	“It proofreads all my work ensuring I don’t make any mistakes.”,

	mechanical aspects of writing	• “I mainly use it for grammar and punctuation, which it does effectively.”, • “Sometimes Grammarly’s feedback isn’t correct in the context of my writing.”
Google Gemini	Occasionally cited for ideas and summaries	• “Gemini helps when I’m stuck for ideas or need inspiration.”, • “I use it to get perspectives or to summarise key points before I start writing.”

Interestingly, qualitative data from Item 8 revealed that, in some cases, students’ choice of GenAI tools had been influenced, or even predetermined, by university policy that recommends the use of Grammarly, their lecturers or the design of their discipline-specific modules as exemplified in the following quotes:

“We used an AI platform in class, based on our course. Unfortunately, I cannot recall its name.” “Midjourney (forced part of modules in my course).”

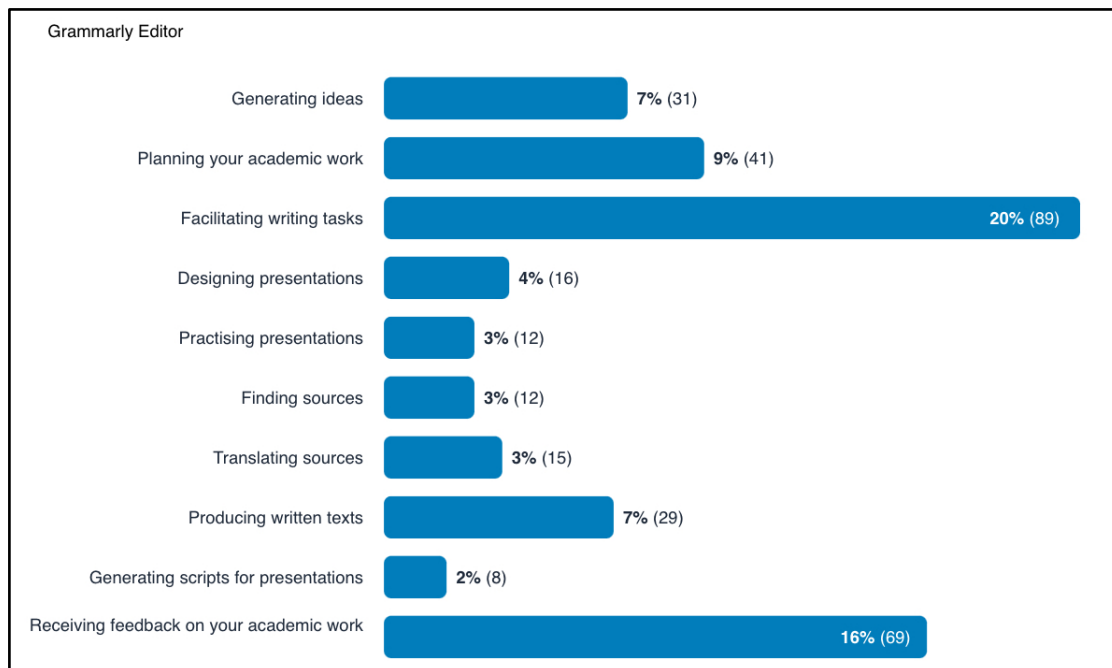
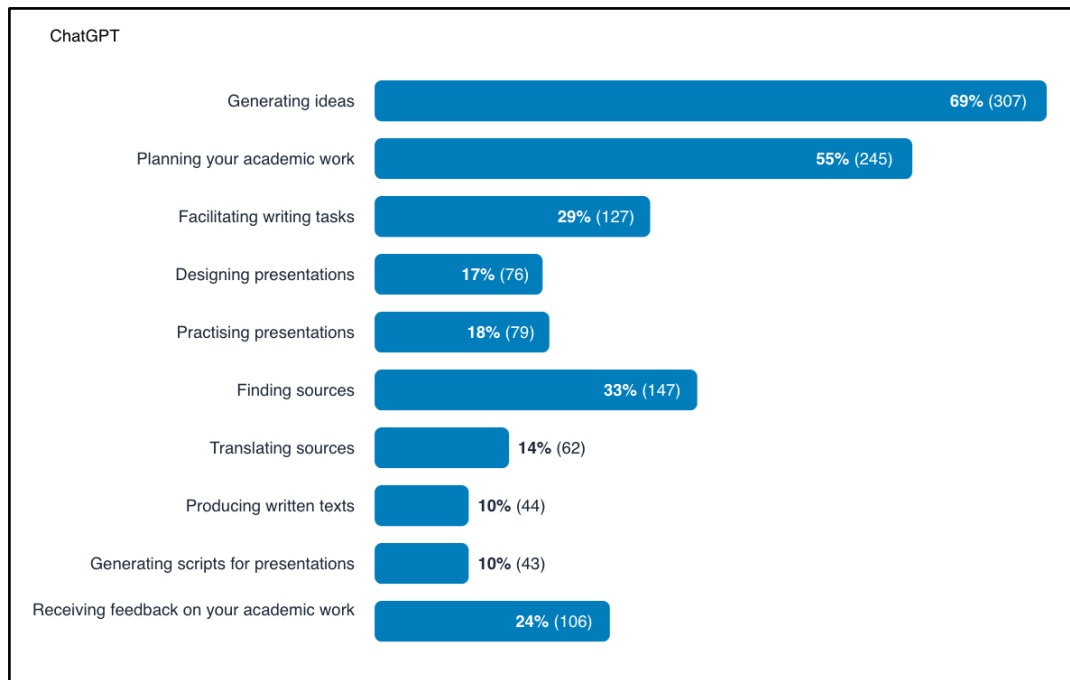
“For our last module, we were originally told we would use AI only in the ideation stage of our design.”

“On two modules we’ve been told to use Grammarly.”

These quotes illustrate the growing integration of GenAI into higher education curricula, where institutional and disciplinary decisions can shape students’ engagement with particular tools.

A more nuanced picture emerges when students were asked to match specific academic tasks with the top three tools they used. Figures 2 and 3 present these associations, highlighting how students differentiated between GenAI tools based on task type.

Figure 2. Academic tasks by GenAI tool: ChatGPT, Grammarly, Gemini



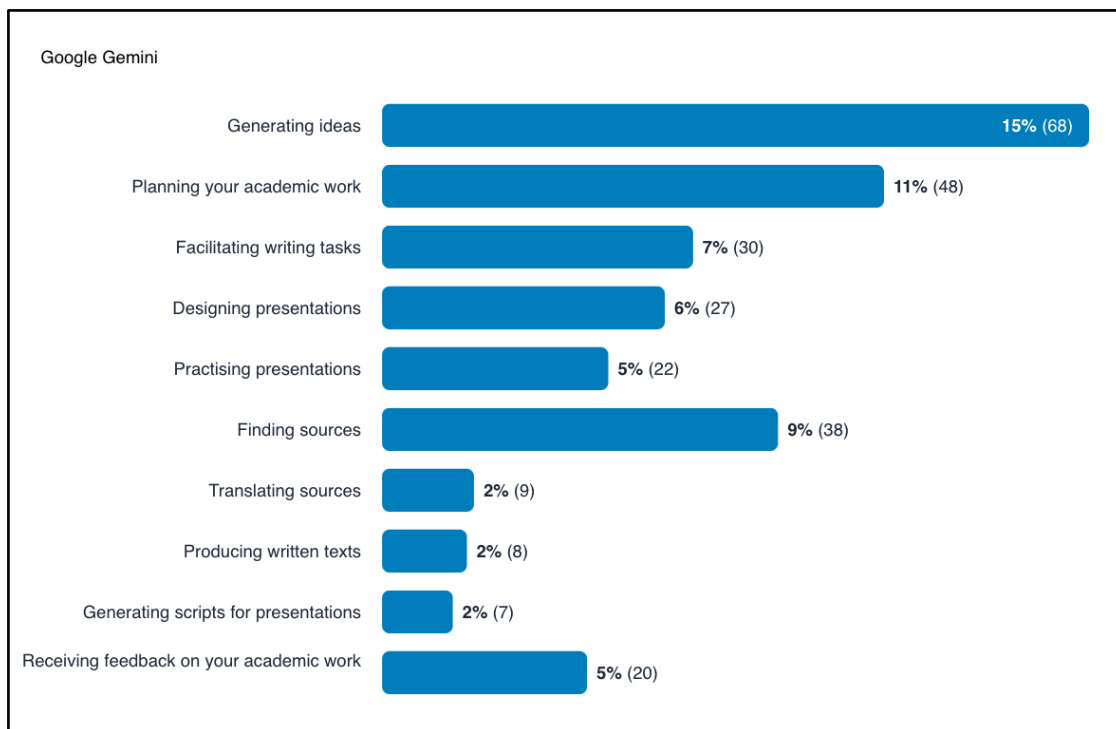
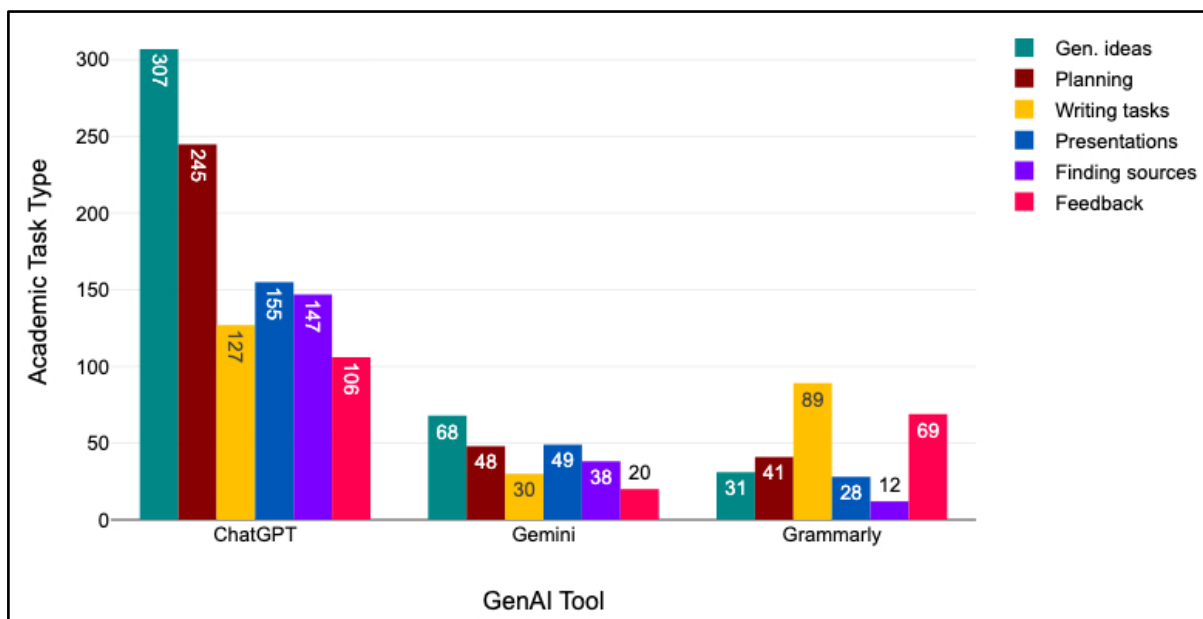


Figure 3. Selection of GenAI tools by academic task type



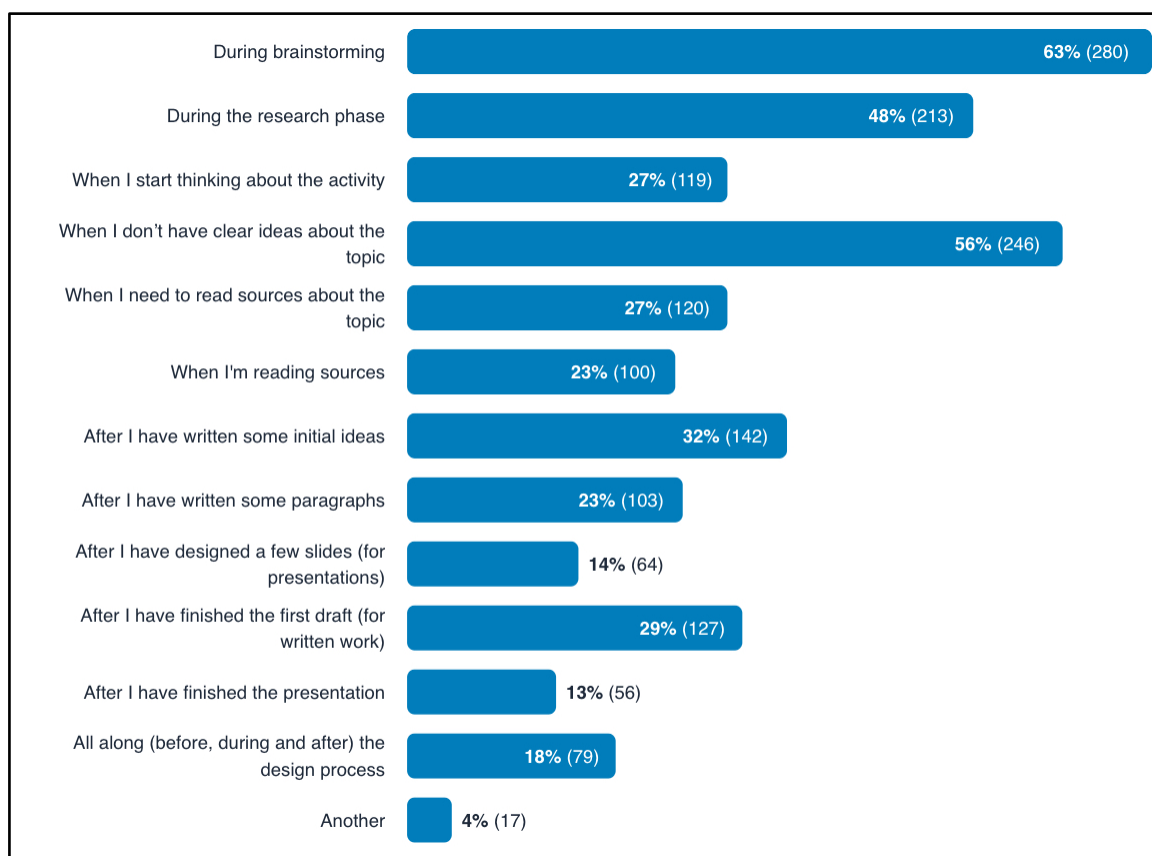
The qualitative data from the survey further illustrates the students' choice of tools for different academic tasks they need to complete as summarised in Table 4

Table 4. Academic tasks and associated tools with qualitative data

Academic Task	Associated tools	Typical uses	Examples from qualitative data
Writing and editing	ChatGPT, Grammarly	• Drafting essays • Rewording sentences • Improving grammar • Coherence	• “It refines my work in a better way and helps me come up with a more polished draft.” • “Grammarly aids in producing coherent text that is grammatically correct.”
Idea generation and brainstorming	ChatGPT, Gemini	• Generating ideas • Exploring perspectives • Overcoming writer’s block	• “It gives other perspectives to think about, different angles to enhance my work.” • “It helps brainstorm when stuck.”
Feedback and revision	ChatGPT, Grammarly	• Providing comments on structure, coherence, and clarity; • Identifying weaknesses	• “Gives good feedback that is easy to modify.” • “The feedback helps me better my work instead of just copying and pasting.”
Research and sourcing	ChatGPT	• Summarising topics • Explaining difficult concepts • Suggesting (but not always reliable) sources	• “It can be very direct/specific but sometimes the sources are made up.” • “I always check if the sources are real or not.”
Presentation and structure planning	ChatGPT, Gemini	• Generating outlines and slides • Organising arguments logically	• “Helps build my initial essay plan in a cohesive way.” • “I can get PowerPoint presentations ready within minutes.”

Item 15 on the survey explored the stages of academic tasks at which students turned to GenAI tools to either facilitate or complete the task. Figure 4 shows the most common of such stages. As can be seen, the four most commonly identified by the students are 1) when brainstorming, 2) to clarify ideas on a topic, 3) when doing research and 4) after some initial writing.

Figure 4. Academic tasks stages and GenAI tools



Qualitative comments provided in item 16, however, seem to suggest that participating students used GenAI mainly as an editing tool during and after writing: “I use AI for formal writing and to check spelling”, “To double check if a paragraph is flowing well or if it has a disjointed feel due to my wording”, “When a section of text is done I use grammarly to check spelling and make sure everything written makes sense.” and “I use AI (Grammarly) to check my writing during and after the writing process.” Table 5 shows a summary of the main stages of academic work when students reported using GenAI tools.

Table 5. Main stages of work when students use GenAI tools

Stage of academic work	Description	Examples from qualitative data
Before writing	Used for clarifying the assignment, generating initial ideas, or exploring key concepts	“To find ideas it is a great tool, there is no right or wrong to that.” “It helps brainstorm when I’m stuck at the start.”
During writing	Used to support drafting and rewording sentences; students query AI to clarify	“If you ask the right question, you can get quite an exceptional answer.”

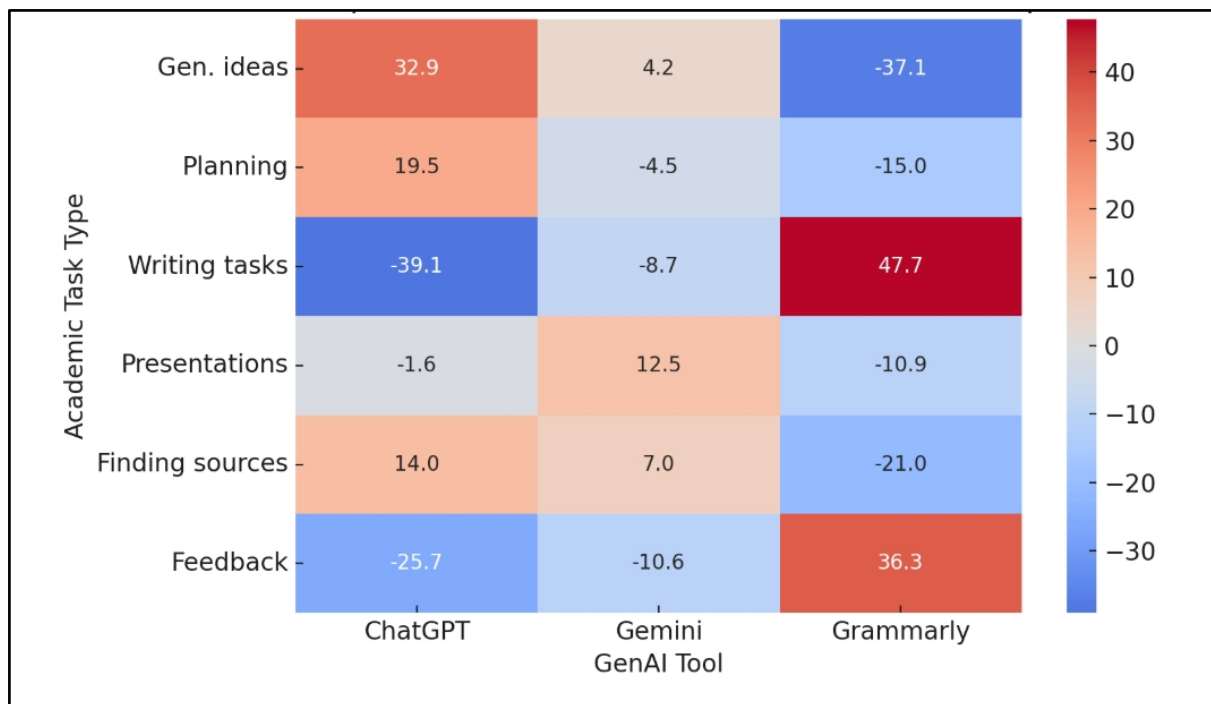
	concepts or extend arguments	• “Sometimes I continue the dialogue to clarify what I need.”
After writing	Used for revision, editing, and feedback (the most common stage of use)	• “I find it very useful for reviewing my drafts to see what could be improved.” • “I use it to check grammar and make sure my sentences make sense.”
When stuck or overwhelmed	Used as a form of cognitive or emotional support when students lose direction or feel unsure.	• “It really helps give me clarity when I feel overwhelmed by information.” • “Helps me when I am struggling with something; it provides guidance.”

To address the research question (To what extent are students’ selection of GenAI tools shaped by the nature of the academic task?), a Chi-square test of independence was conducted. The results showed a significant association between academic task type and GenAI tool used, $\chi^2(10, N = 1,530) = 169.76, p < .001$. This indicates that students’ choice of tool varied systematically according to task type.

As illustrated in Figure 5, the heatmap shows that ChatGPT was used substantially more than expected for generating ideas and planning, but less for writing and feedback. In contrast, Grammarly Editor was used far more than expected for writing and feedback-related tasks, consistent with its established function in language refinement and some of the qualitative comments provided by the students. Google Gemini’s usage was relatively even across task categories, showing no major deviations from expected frequencies.

These results suggest that students align the affordances of specific GenAI tools with distinct academic tasks, reflecting an emergent differentiation in their GenAI practices. This pattern signals a gradual shift towards more purposeful and critical engagement with GenAI technologies in higher education contexts.

Figure 5. Heatmap of academic task type by GenAI tool



These results indicate that students' selection and use of GenAI tools are not random but task-dependent, reflecting a growing awareness of the distinct affordances and limitations of each tool. This emergent differentiation suggests that students are developing forms of GenAIL: learning to select, adapt, and evaluate tools according to the academic demands they face. Such literacy development also highlights shifting learning identities, as students move from passive users of technology to active agents making informed decisions about how, when, and why to integrate GenAI into their academic work. The next section discusses the results in light of existing literature on GenAI integration and critical digital literacies, and the evolving human-AI relationship in higher education.

5. Discussion

The findings of this study demonstrate that university students are moving decisively from early experimentation with GenAI towards more strategic and task-sensitive use. In line with recent research (e.g., Lim & Tan-Chia, 2023; Stroud & Du, 2025), students no longer engage with GenAI as a homogeneous resource but differentiate between tools such as ChatGPT, Grammarly, and Google Gemini, aligning each with specific stages of academic work as explained by the TTF theory. This shift provides clear empirical evidence of a transition towards deliberate, context-responsive engagement, underpinned by an increasing awareness of the affordances, limitations, and risks associated with different systems (Authors, 2026). This pattern appears to be driven by students' developing sensitivity to the alignment

between task demands and perceived tool affordances. Rather than selecting tools generically, students evaluate the epistemic requirements of tasks (e.g., idea generation versus accuracy-sensitive writing) and match these with the perceived strengths and limitations of specific systems. This suggests that tool use is mediated not simply by availability and passive adoption, but by an emergent form of task–technology fit enacted in practice.

This differentiation reflects the development of tool-specific awareness. As shown in both the quantitative and qualitative datasets, students identify, for example, the value of Grammarly for local text-level editing, ChatGPT for idea generation and feedback, and Gemini for summarising and planning. Unlike earlier studies in which tool use appeared more opportunistic or undifferentiated (e.g., Ead & Ismael, 2024; Lee et al., 2024), the patterns observed here indicate a more sophisticated understanding of what each system can and cannot do effectively (Khalifa & Albadawy, 2024; Lim & Tan-Chia, 2023). Importantly, the comparatively diffuse pattern of Gemini use is particularly revealing. Rather than indicating random use, this distribution may reflect the absence of a clearly differentiated functional identity for Gemini within students’ tool repertoires. In contrast to ChatGPT and Grammarly, whose affordances are more readily stabilised in practice, Gemini appears to occupy a more ambiguous position, suggesting that tool adoption is contingent not only on technical capability but also on how consistently those capabilities are recognised, interpreted, and routinised by users. This constitutes evidence of an emerging GenAI literacy (Authors, 2026; Jisc, 2023), characterised not only by strategic tool selection but also by critical evaluation of reliability, epistemic boundaries, and potential bias, and mediating between authorship and text.

Students’ reflections on accuracy, limitations, and appropriate use demonstrate a developing capacity to judge when, how, and why a tool adds value as a form of self-regulated learning. This supports growing evidence that students are cultivating forms of critical digital literacy (Authors, 2026; Baskara, 2023; Kim et al., 2025), using GenAI not as a shortcut but as a resource for thinking, drafting, and refining their work. At the same time, this emerging metacognitive awareness remains uneven. While students demonstrate the ability to critically evaluate outputs in some contexts, their reliance on GenAI for early-stage tasks such as idea generation and planning may still shape the direction of their thinking in less visible ways. This raises questions about the extent to which agency is fully preserved or subtly redistributed through interaction with AI systems. The strong association between task type and tool choice identified in this study reinforces the view that GenAI engagement is

becoming embedded within students' everyday academic routines, encompassing both pragmatic and reflective dimensions of learning.

Beyond this differentiation, the findings also indicate that these patterns are becoming routinised within students' academic practices. The findings show that students' use of GenAI is systematically aligned with the functional demands of specific academic tasks. The consistent pairing of particular tools with particular activities (e.g., ChatGPT for idea generation and feedback, Grammarly for editing, Gemini for planning) indicates a clear shift from exploratory use towards integrated literacy practices. Although these pairings may appear intuitive, their systematic nature points to the emergence of patterned, socially shared ways of working with GenAI. This aligns with previous research suggesting that GenAI is reshaping not only what students do but how they approach learning processes (Tseng & Warschauer, 2023; Wang et al., 2024). The findings also suggest that GenAIL, as any form of academic literacies, is not a stable or fully acquired competence but a situated and evolving practice. It is enacted through ongoing judgements about when and how to engage with GenAI, shaped by prior experience, task context, and institutional cues. This reinforces a trajectorial understanding of literacy development, in which students move from exploratory engagement towards more reflexive, context-sensitive, and critically informed use.

Importantly, the study also demonstrates that GenAI adoption is not solely a matter of individual choice but is mediated by institutional and pedagogical contexts. Instances of lecturer-directed tool use and discipline-specific integration emerging from the results highlight the role of curricular design, assessment practices, and local policy environments in shaping student engagement. This indicates that students' agency is not exercised in isolation but is structured by institutional conditions, including assessment design, tool endorsement, and disciplinary norms. As such, GenAIL development is not only an individual achievement but a distributed outcome of sociotechnical arrangements within higher education. This finding supports recent calls for institutions to move beyond restrictive or compliance-driven approaches to GenAI (e.g., Authors, 2026; QAA, 2024; Jisc, 2023) and to adopt more developmental and inclusive frameworks. The evidence suggests that institutional responsibility is central: without structured guidance, students' developing literacies risk remaining uneven and fragmented.

In this context, the findings provide a strong rationale for positioning GenAIL as a core graduate attribute. While students are already developing informal and experience-based understandings of GenAI, these practices are often shaped by individual experimentation rather than systematic support. Embedding GenAIL within curricula would enable students to

consolidate this emergent awareness into purposeful competence, including the ability to evaluate outputs critically, understand epistemic and ethical implications, and apply discipline-specific criteria to tool use. Aligning GenAIL with broader digital capability frameworks (Jisc, 2023) and employability agendas can therefore enhance both academic integrity and pedagogical innovation.

More broadly, the findings point to a reconfiguration of the human–AI relationship in learning. Echoing conceptualisations of GenAI as a sociotechnical actor (Edwards et al., 2025), students’ engagement with tools such as ChatGPT and Grammarly reflects an increasingly integrated interplay between human judgement and algorithmic suggestion. This suggests that agency is not simply retained or diminished but reconfigured. Students do not merely use GenAI tools; they coordinate with them, delegating certain forms of cognitive processing while retaining evaluative control. This results in a hybridised form of academic practice in which cognition and authorship are distributed across human and non-human actors, particularly in processes of ideation, drafting, and revision.

Overall, this study provides empirical evidence that students’ engagement with GenAI is both differentiated and evolving. Their practices are shaped by task demands, perceived affordances, and institutional contexts, while also reflecting the development of critical and metacognitive awareness. By evidencing how tool–task alignment, rather than tool availability alone, structures student engagement, the study refines current understandings of GenAI use in higher education. It shifts the focus from adoption to enactment, showing that students actively configure AI tools within their academic practices rather than passively incorporating them (e.g., Lim & Tan-Chia, 2023; Stroud & Du, 2025). Crucially, the findings highlight the need for universities to embed GenAI literacy within curricula to support purposeful, ethical, and context-sensitive use. In doing so, the study advances understanding of how GenAI can function not as a shortcut, but as a catalyst for more reflective, equitable, and future-oriented learning practices.

Beyond pedagogical implications, there are also important societal considerations concerning equity, access, and linguistic inclusion in the use of GenAI in higher education. While students in this study demonstrate increasing strategic and critical engagement with tools, such engagement is not uniformly distributed across the sample. Access to more advanced, subscription-based versions of GenAI systems (e.g., premium tiers with enhanced reasoning capabilities or multimodal affordances) may have created differentiated learning opportunities, privileging those with greater financial resources. In addition, variability in students’ prior digital literacies and institutional support structures can further widen

participation gaps, particularly for underrepresented or less technologically confident groups as some of our data reveal. Linguistic and cultural dimensions also warrant attention. As most GenAI tools are predominantly trained on English-language data and Western epistemological norms, multilingual students may encounter limitations in both the accuracy and cultural relevance of outputs, potentially reinforcing existing inequities in academic knowledge production. These dynamics suggest that GenAI literacy should be conceptualised not only as an individual competence but as a socially situated and institutionally mediated practice. Consequently, higher education institutions have a critical role to play in mitigating inequities through inclusive policy frameworks, equitable access to tools, and explicit pedagogical support that addresses linguistic diversity and cultural representation in AI-mediated learning environments.

6. Guidelines for GenAIL development

Based on the discussion presented above, this section proposes a set of guidelines for developing GenAIL and suggests pedagogical activities for its implementation. The guidelines (see Table 6) are grounded in four core principles that underpin the development of meaningful GenAIL in higher education. First, they emphasise purposeful use rather than tool familiarity, shifting the focus from learning how to operate specific platforms such as ChatGPT, Grammarly, or Gemini to understanding why, when, and to what epistemic ends particular tools should be used. Second, the guidelines draw on principles of critical digital literacy, encouraging students to interrogate AI-generated outputs, recognise biases, evaluate trustworthiness, and understand the boundaries and risks of automation. Third, they adopt a trajectorial perspective (Author et al., 2024), recognising that GenAIL develops over time as students move from initial exploration to procedural competence and, ultimately, to more critical and reflective forms of engagement. Finally, the guidelines are situated and disciplinary, acknowledging that GenAI use is shaped by disciplinary norms and expectations; as such, they promote context-sensitive pedagogical integration rather than generic, tool-focused training. This principled approach provides a foundation for designing learning environments that support informed, responsible, and reflective engagement with GenAI tools.

Table 6. A multi-layered set of guidelines for developing GenAIL in higher education

Guidelines layer	Focus areas	Possible pedagogical activities
Task–tool alignment literacy	• Matching academic tasks to GenAI affordances • Differentiating functions (idea generation, structuring, editing, feedback, fact-checking, translanguaging) • Recognising limitations (hallucinations, superficial reasoning, lack of disciplinary depth)	• Task-deconstructing workshops • Comparative exercises: “Which tool for which task and why?” • Prompting labs using the same task across different GenAI tools • Student-created tool-task maps for upcoming assignments
Epistemic literacy for human–AI collaboration	• Understanding the boundaries of AI vs human reasoning • Evaluating credibility, accuracy, and disciplinary validity of AI outputs • Identifying epistemic risks (over-reliance, homogenised thinking) • Developing judgement about when <i>not</i> to use AI	• Boundary-negotiation activities: “What can AI do here, and what must I do?” • Critical comparison of AI-generated arguments with discipline standards • Annotation tasks highlighting AI-improved vs student-authored sections • Workshops on verifying claims and triangulating AI output with scholarly sources
Reflexive identity literacy	• Examining how AI shapes learner identity, agency, and authorship • Understanding trust formation and processes of self-regulation • Ethical self-authorship and academic integrity • Reflecting on the emotional and motivational dimensions of AI use	• Reflective journals tracing students’ evolving identity in relation to AI • Small-group dialogues on “Who is the thinker here?” • Case studies of ethical dilemmas involving AI • Identity-positioning tasks analysing shifts across the semester
Technical and procedural literacy	• Effective and safe prompting practices • Understanding data privacy, tool settings, and platform differences • Managing versions and documenting GenAI use	• Prompt-crafting labs • Troubleshooting sessions: “Debug your AI interaction” • Guided exploration of transparency, privacy, and data-handling settings

	Operating across multiple platforms (ChatGPT, Grammarly, Gemini, discipline-specific tools)	Mini-tutorials on managing chat histories, drafts, and revisions
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To translate the four principles in Table 6 into practice, the guidelines can be operationalised through a staged implementation model that unfolds across the academic year. This staged approach recognises that students’ engagement with GenAI evolves over time and therefore sequences learning activities to align with their developing competencies, needs, and identities. Rather than offering one-off workshops or tool-focused training, the model integrates GenAI literacy development into ongoing teaching, gradually moving students from initial exploration and uncertainty towards purposeful, critical, and disciplined use. Each stage scaffolds a different dimension of literacy: task-tool alignment, epistemic judgement, reflexive identity work, and technical proficiency, supporting students as they build confidence, agency, and critical awareness in their interactions with GenAI tools.

These guidelines are directly grounded in the empirical patterns identified in this study. First, the significant association between academic task type and GenAI tool use ($\chi^2(10, N = 1,530) = 169.76, p < .001$), together with the observed clustering of ChatGPT for idea generation and planning and Grammarly for writing and feedback, provides clear evidence for the emergence of task–tool alignment literacy, with students matching tool affordances to specific academic functions. Second, qualitative reports of verifying sources, recognising inaccuracies (e.g., “sometimes the sources are made up”), and expressing lower trust in research-related uses point to the development of epistemic literacy, with students critically evaluating the reliability and disciplinary validity of AI outputs. Third, students’ reflections on when and how to use GenAI (e.g., using tools “when stuck” or to “clarify ideas”) and their positioning of AI as a support rather than a substitute indicate emerging reflexive identity literacy, as learners negotiate agency, authorship, and appropriate use across stages of academic work. Finally, the reported use of multiple tools across stages of the writing process, before, during, and particularly after writing for revision and editing, demonstrates emerging technical and procedural literacy, as students learn to operationalise GenAI within academic workflows. Together, these findings show that GenAIL is enacted as a multi-dimensional and situated practice, emerging through students’ ongoing alignment of tools, tasks, and epistemic judgements.

The guidelines also lend themselves to concrete implementation across disciplinary contexts. In STEM fields, for example, students might use GenAI tools to generate

explanations of scientific concepts and then evaluate these against empirical evidence, thereby developing both task–tool alignment and epistemic literacy. In business and management and education, students could employ different tools to produce components of a report (e.g., idea generation, structuring, editing) and critically reflect on their effectiveness, fostering procedural and reflexive dimensions of literacy. In humanities and English for academic purposes (EAP) contexts, comparative writing tasks using multiple tools, combined with reflective commentary on authorship and voice, can support the development of all four layers. Across these contexts, the guidelines enable educators to move beyond generic AI guidance towards structured, discipline-sensitive pedagogies that support purposeful, critical, and ethically informed engagement with GenAI.

7. Conclusion

This study set out to explore how university students select and use GenAI tools to complete academic tasks and how their choices vary according to the nature and stage of the task. The findings provide new evidence of students' differentiated and purposeful engagement with GenAI tools, showing how they align specific tools such as ChatGPT, Grammarly, and Google Gemini with particular academic tasks. Students' growing awareness of tool affordances and limitations suggests an emerging form of Gen-AIL, in which technological choices are shaped by reflection, disciplinary expectations, and institutional contexts.

While the study offers valuable insights into students' GenAI practices, it is not without limitations. The data was drawn from a single, highly contextualised university sample, which constrains the generalisability of the findings. Moreover, although the survey design captured both quantitative and qualitative dimensions, it could have been strengthened by incorporating in-depth interviews or focus groups to explore students' motivations and evolving perceptions more deeply. Future studies adopting mixed-method longitudinal designs could further illuminate how university students' differentiated and purposeful engagement with GenAI tools develops over time and across disciplines.

Despite these limitations, the study contributes to growing scholarship on the integration of GenAI in higher education by evidencing how students' engagement is both diverse and critically mediated. It highlights the need for universities to embed Gen-AIL development across curricula, equipping students to use GenAI tools purposefully, ethically, and reflectively. In this respect, the article offers a multi-layered set of guidelines for developing meaningful GenAIL in higher education. Implementing these guidelines can help

institutions ensure that GenAI functions not merely as a productivity enhancer but as a learning partner that fosters agency, creativity, and inclusion in contemporary higher education.

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Appendix

Section A- Demographic data

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1. Your gender identity (Please select an option) *

- ☐ Woman
- ☐ Man
- ☐ Transgender/Trans woman
- ☐ Transgender/Trans man
- ☐ Non-Binary
- ☐ Intersex
- ☐ Prefer not to reply
- ☐ Another

2. Your nationality *

0/32,000 characters

3. Languages you can speak, read, and/or write.

0/32,000 characters

4. Degree you are studying *

Please fill in this field.

0/32,000 characters

5. Year of study (Please select an option) *

- ☐ Foundation
- ☐ UG- Year 1
- ☐ UG- Year 2
- ☐ UG- Year 3
- ☐ PG- Masters
- ☐ PG-Doctoral

Previous

Next

Section B- AI use for academic work

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6. How long have you been using AI tools for academic work?

- ☐ Have never used AI tools before
- ☐ Less than one year
- ☐ One year
- ☐ About 2 years
- ☐ About 3 years

7. What AI tool/chatbot do you usually use for your academic work? (Choose as many tools as you use.) *

- ☐ ChatGPT
- ☐ Chatsonic
- ☐ Claude
- ☐ Consensus
- ☐ Deep Seek
- ☐ Elicit
- ☐ Grammarly Editor
- ☐ Google Gemini
- ☐ Jasper AI
- ☐ Khanmigo
- ☐ Jenni AI
- ☐ Meta AI
- ☐ Microsoft Copilot
- ☐ Perplexity
- ☐ Personal AI
- ☐ You.com
- ☐ Another/Others

8. If you chose "Another/Others" for item 7, please give the name(s) below.

0/32,000 characters

9. What do you use the AI tools you selected above for? (Choose as many options as appropriate.) *

- ☐ Generating ideas
- ☐ Planning your academic work
- ☐ Facilitating writing tasks
- ☐ Designing presentations
- ☐ Practising presentations
- ☐ Finding sources
- ☐ Translating sources
- ☐ Producing written texts
- ☐ Generating scripts for presentations
- ☐ Receiving feedback on your academic work
- ☐ Another

10. If you chose "Another" for item 9, please specify below.

0/32,000 characters

11. **Do you use different tools for different academic activities?** Please match each activity with the AI tools you use for it. *

[illegible]

11. Do you use different tools for different academic activities? Please match each activity with the AI tools you use for it. *

[illegible]

12. After you get feedback or a response from an AI tool, do you... (Choose as many options as appropriate.) *

- ☐ Review or assess the feedback/response you receive?
- ☐ Slightly modify the feedback/response you receive?
- ☐ Modify the feedback/response to reflect your own ideas?
- ☐ Explore the topic(s) provided in the feedback/response in more depth?
- ☐ Evaluate the sources provided in the feedback/response?
- ☐ Accept the feedback/response as it is?
- ☐ None of the above

13. If you chose "None of the above" for item 12, please specify below.

0/32,000 characters

14. How frequently do you use AI tools? *

- ☐ Several times a day
- ☐ Every day
- ☐ Several days a week
- ☐ Once a week
- ☐ Once a month
- ☐ Only when working on assignments

15. At which point of your academic activities do you use an AI tool? (Choose as many options as appropriate.) *

- ☐ During brainstorming
- ☐ During the research phase
- ☐ When I start thinking about the activity
- ☐ When I don't have clear ideas about the topic
- ☐ When I need to read sources about the topic
- ☐ When I'm reading sources
- ☐ After I have written some initial ideas
- ☐ After I have written some paragraphs
- ☐ After I have designed a few slides (for presentations)
- ☐ After I have finished the first draft (for written work)
- ☐ After I have finished the presentation
- ☐ All along (before, during and after) the design process
- ☐ Another

16. If you chose "Another" for item 15, please specify below.

0/32,000 characters

17. How confident do you feel using AI tools? *

- ☐ Not sure
- ☐ Not very confident
- ☐ Not confident
- ☐ Neutral
- ☐ Confident
- ☐ Very confident

18. Briefly explain the reasons for choosing your option for Question 17 (Your confidence using AI tools) *

0/32,000 characters

19. How satisfied are you with the feedback/responses you receive from the AI tools you use? *

- ☐ Not sure
- ☐ Not at all satisfied
- ☐ Slightly satisfied
- ☐ Moderately satisfied
- ☐ Very satisfied
- ☐ Extremely satisfied

20. Briefly explain the reasons for choosing your option for Question 19 (Your satisfaction with the feedback/responses you receive from AI tools you use) *

0/32,000 characters

21. Has your perception of AI tools for academic work changed since you started using them? *

- ☐ Not at all (stayed the same)
- ☐ Slightly
- ☐ Moderately
- ☐ Very
- ☐ Extremely

22. Briefly explain the reasons for choosing your option for Question 21 (Change in your perception of using AI tools for academic work) *

0/32,000 characters