

# Developing an Ethical Framework to Guide Students in Using Chatbots in Scientific Research

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**ABSTRACT:** This study examines how university students use chatbots in scientific research, taking undergraduate thesis projects as the principal empirical context. Through in-depth interviews with 26 final-year students, the study explores the practical benefits, ethical uncertainties, and policy gaps associated with chatbot-supported research work. The findings show that chatbots, especially ChatGPT, are widely used for topic exploration, literature mapping, paraphrasing, methodological clarification, language editing, and preliminary interpretation of findings. However, students' use remains ethically inconsistent because many are uncertain about the boundary between legitimate assistance and inappropriate substitution. Key concerns include unattributed reuse of chatbot-generated text, fabricated citations and research gaps, weak verification of outputs, privacy risks, and uneven institutional guidance. In response, the article develops a six-pillar ethical framework consisting of transparency, purpose, integrity, fairness, lawfulness, and accountability. The framework is intended to guide universities, supervisors, and students in using chatbots as research support tools without compromising authorship, accuracy, or academic integrity. The study contributes an empirically grounded model for responsible chatbot use in student scientific research and offers policy recommendations for higher education institutions.

**KEYWORDS** - chatbots, scientific research, research ethics, higher education, academic integrity

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## I. INTRODUCTION

Research on chatbots in higher education has expanded rapidly since conversational systems such as ChatGPT became widely accessible. Within this broader landscape, chatbots have emerged as the interface most frequently used by students because they can respond to natural-language queries, summarise sources, suggest research directions, explain methods, and assist with language revision (Guo & Zaini, 2024; Lin, 2024; Medina et al., 2024; Taylor, 2023). Chatbots such as ChatGPT, Claude, Gemini, and Copilot are now embedded in routine research practices, especially when students need quick assistance with literature exploration, conceptual clarification, outlining, translation, and draft improvement (Chen et al., 2025). In this article, the term “chatbots” refers specifically to conversational chatbots systems used through prompt-based interaction. Although students may also rely on other digital tools, chatbot-mediated assistance constitutes the main focus because it is the most visible and ethically contested form of chatbots support in student scientific research.

The growing use of chatbots in scientific research also raises serious ethical concerns. When students depend on chatbot outputs without critical review, they risk submitting unattributed text, reproducing fabricated references, accepting misleading interpretations, or weakening their own analytical judgment (Da Veiga, 2025; Smith et al., 2025). Chatbots may generate plausible but false citations, simplify complex evidence, or reproduce biases embedded in training data, thereby compromising the accuracy and objectivity of research (Chen et al., 2025). Additional concerns involve privacy and intellectual-property risks when students upload sensitive notes, transcripts, or draft findings to external platforms (Da Veiga, 2025; Smith et al., 2025). The ethical challenge, therefore, is not whether chatbots can support research, but how they can be used without displacing authorship, methodological responsibility, and scholarly integrity.

Despite the growing literature on chatbots in education, operational ethical guidance for students' use of chatbots in scientific research remains underdeveloped. Many existing discussions offer broad principles for responsible chatbots use, yet provide limited direction on what students may or may not do at specific stages of a research project, from topic identification and literature review to analysis, interpretation, and reporting (Holmes et al., 2022). This gap is particularly evident in universities where institutional policies are unclear, fragmented, or absent, leaving students to negotiate ethical boundaries on their own (Chan, 2023; Smith et al., 2025). To address this problem, the present study investigates students' actual practices and ethical perceptions regarding chatbot use in scientific research, using thesis-based undergraduate research as the empirical case. On that basis, the article develops a practical ethical framework that universities and students can use to support transparent, responsible, and academically defensible chatbot use:

**RQ1:** How do students use chatbots across the stages of scientific research, particularly in thesis-based projects?

**RQ2:** What ethical dilemmas do students encounter when using chatbots in scientific research?

The study contributes at two levels. Theoretically, it refines current discussions of chatbots ethics by shifting attention from “chatbots” in general to chatbot-mediated research support as a distinct educational practice. Practically, it proposes a concise ethical framework and accompanying implementation guidance that universities, supervisors, and students can apply to manage disclosure, verification, authorship, and accountability in research settings.

## **II. LITERATURE REVIEW**

### ***2.1. Utilizing Chatbots for undergraduate thesis development***

Student scientific research commonly unfolds through a sequence of interrelated activities: identifying a feasible problem, reviewing prior scholarship, designing a method, generating or analysing data, interpreting findings, and reporting results. In many universities, the undergraduate thesis is the most visible and structured form of this process. For that reason, thesis work offers a useful empirical window into how students conduct scientific research under contemporary technological conditions. Recent studies show that chatbot systems can support several of these stages by helping users brainstorm topics, refine questions, locate themes in the literature, draft outlines, and explain disciplinary concepts in accessible language (Guo & Zaini, 2024; Lin, 2024; Zou et al., 2025a). Their appeal lies in speed, responsiveness, and low barriers to access, all of which make them especially attractive to student researchers working under time pressure.

At the same time, the research value of chatbots depends on the nature of the task and the quality of human oversight. Students can use chatbots to support literature synthesis, language editing, coding suggestions, and preliminary interpretation, but these outputs remain provisional rather than authoritative (Chen et al., 2025; Nguyen et al., 2024). Chatbots may help reduce mechanical workload and free time for interpretation, yet they cannot replace the student’s responsibility for verifying evidence, justifying method, and presenting defensible conclusions (Lin, 2024; Medina et al., 2024). Accordingly, responsible use requires students to treat chatbot assistance as scaffolding for research work, not as a substitute for independent scholarly judgment.

The ethical literature increasingly warns that the convenience of chatbots can blur the boundary between assistance and substitution. Key risks include unattributed borrowing of chatbot-produced text, weak source verification, superficial paraphrasing, fabricated references, and the uncritical adoption of algorithmically produced “research gaps” that lack grounding in the literature (Da Veiga, 2025; Medina et al., 2024; Smith et al., 2025). Concerns also extend to authorship, transparency, and data protection when students use chatbots to process interview material, participant information, or confidential project documents (Smith et al., 2025). Although scholars have proposed broad principles such as transparency, fairness, and responsibility, fewer studies explain how these principles should be operationalised across concrete stages of student research. This unresolved gap justifies the need for a more practice-oriented ethical framework.

### ***2.2. Ethical principles for chatbots use in higher education***

Ethical principles for chatbots use in higher education provide the normative basis for governing chatbot-assisted research. Across the literature, several values recur: transparency in declaring technological assistance, accountability for outputs, fairness in access and treatment, and protection of human judgment in educational processes (Chan, 2023; Holmes et al., 2022). These principles matter because chatbots affect not only efficiency, but also epistemic practices such as evidence selection, interpretation, writing, and attribution. In research settings, ethical governance must therefore address both the technical performance of the system and the educational consequences of student dependence on it. A useful framework is one that helps institutions define acceptable use, identify misconduct, and preserve the learner’s intellectual responsibility throughout the research cycle.

Higher-education scholarship stresses the need for institutional policy, pedagogical alignment, and clear communication of permissible uses (Chan, 2023). In parallel, research-oriented frameworks such as chatbots4Research highlight the importance of managing bias, verifying outputs, and protecting scholarly integrity when chatbots is used in scientific work (Chen et al., 2025). For student researchers, these perspectives suggest that ethical chatbot use requires more than technical skill; it requires rules about disclosure, authorship, verification, and the limits of automation.

Figure 1 is useful because it distinguishes supportive uses of chatbots from uses that intrude upon the core intellectual responsibilities of the researcher. Applied to chatbot use in scientific research, the figure implies that students may legitimately employ chatbots for language polishing, outline generation, exploratory brainstorming, and clarification of concepts, provided that such use is disclosed and subsequently checked by the student. By contrast, chatbots should not be treated as authors, nor should their outputs be accepted uncritically as evidence, interpretation, or final conclusions (Da Veiga, 2025; Smith et al., 2025). The decisive ethical principle is student accountability: regardless of the quality or fluency of chatbot responses, the student remains fully responsible for

accuracy, originality, citation practice, and compliance with institutional rules. Ethical use therefore depends on transparency, verification, and sustained human oversight from both students and supervisors.

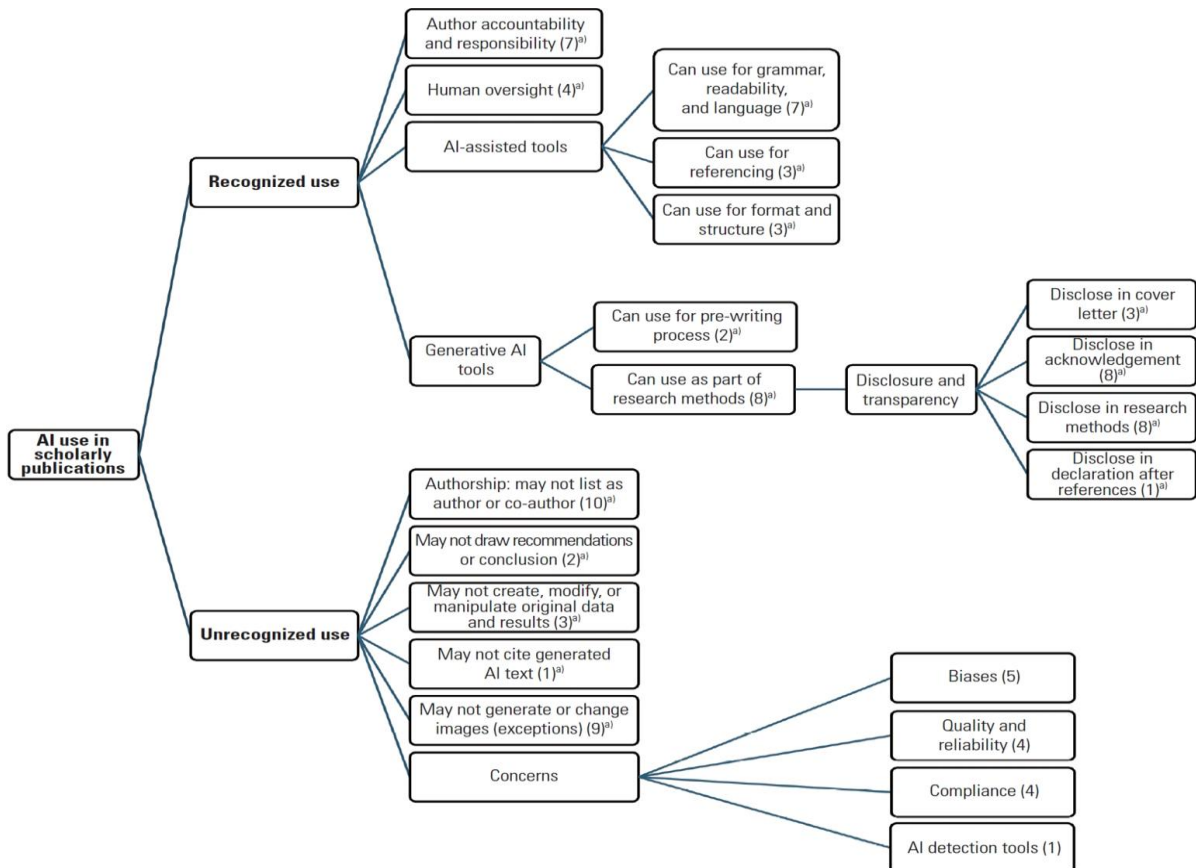


Figure 1. Chatbots use and ethical consideration

Source: (Da Veiga, 2025)

### III. RESEARCH METHODS

#### 3.1. Research design

This study adopted a qualitative research design to examine how students use chatbots in scientific research and how they interpret the ethical boundaries of that use. A qualitative approach was appropriate because the issue is not merely how often chatbots are used, but how students rationalise, justify, and negotiate their use across different stages of research work. Semi-structured interviews were therefore selected to capture both recurrent patterns and unexpected dilemmas in participants’ experiences. The interview guide focused on research activities, perceived benefits, verification practices, disclosure habits, and judgments about acceptable and unacceptable chatbot use, while still allowing sufficient flexibility for participants to elaborate on context-specific situations.

The study was conducted in Vietnam, where the uptake of chatbots in higher education has accelerated more quickly than the development of clear institutional rules for academic research use. In many universities, formal guidance on chatbot use in research writing remains limited, uneven, or insufficiently operationalised. This policy ambiguity makes the context analytically valuable because students must often construct their own working norms in the absence of stable regulatory guidance. As a result, the Vietnamese higher-education setting provides a relevant environment for examining not only patterns of chatbot use, but also the ethical uncertainty that accompanies emerging research technologies.

Participants were selected through purposive sampling to ensure direct and recent experience with the phenomenon under investigation. Two criteria were applied. First, participants had to be final-year undergraduate students engaged in thesis research, because thesis projects represent a structured form of student scientific research. Second, they had to report regular use of chatbot systems such as ChatGPT, Claude, Gemini, or similar prompt-based tools during the research process. These criteria ensured that the data reflected real practices rather than hypothetical opinions, and that the resulting ethical framework would be grounded in actual student research behaviour.

The final sample consisted of 26 students, including 15 females and 11 males, aged 21 to 23. They came from information technology, computer science, English language, business administration, and e-commerce. This disciplinary variation was important because students from different fields often face different conventions regarding evidence, method, writing style, and data handling. Including multiple disciplines therefore strengthened the analytical range of the study and improved the relevance of the findings to comparable higher-education contexts.

### 3.2. Data collection and analysis

Data were collected through semi-structured interviews conducted either face-to-face or via Zoom, depending on participant availability. Each interview lasted approximately 45 to 60 minutes and was conducted in Vietnamese in order to obtain nuanced, context-rich responses. The interview protocol was organised around the major stages of student research, with particular attention to where and why chatbot assistance entered the workflow, how outputs were checked, and what kinds of ethical uncertainty students experienced at each stage.

The interview questions were grouped into two main dimensions. The first addressed behavioural patterns of chatbot use, including the types of tools employed, the purposes for which they were used, the stages of research in which they appeared, and the benefits and difficulties perceived by students. The second addressed ethical evaluation, including disclosure, authorship, attribution, plagiarism, source verification, fairness, and responsibility for errors. Participants were informed about the aims of the study and provided consent before the interviews. All sessions were audio-recorded with permission and transcribed verbatim, in line with accepted principles of transparency and accountability in chatbots-related educational research (Zielinski et al., 2023).

After transcription, the interviews were analysed thematically. The analysis combined systematic coding with interpretive comparison in order to identify recurring patterns in student practice and ethical reasoning. Following established thematic procedures, the researcher first familiarised herself with the data through repeated reading, then generated initial codes, grouped these codes into provisional themes, reviewed and refined the themes, defined the final categories, and finally constructed the analytical narrative. NVivo 12 was used to support data organisation and coding. This procedure made it possible to link concrete student experiences to the broader ethical dimensions that later informed the proposed framework.

## IV. STUDY FINDINGS AND DISCUSSION

### 4.1. Current situation of students' use of Chatbots

Table 1 summarises the empirical workflow through which students integrated digital support into thesis-based research activities. Although the table retains the broader terminology of “Chatbots,” the interview data show that chatbot interaction-especially through ChatGPT-formed the central mode of assistance across most stages. Students used chatbots primarily as dialogic aids for framing topics, clarifying concepts, organising literature, improving language, and shaping preliminary interpretations, rather than as substitutes for authorship. This pattern suggests that chatbot use in student scientific research is best understood as scaffolded assistance: the technology accelerates routine or exploratory tasks, while the student remains responsible for selecting evidence, validating claims, and making final research decisions (Guo & Zaini, 2024; Lin, 2024; Medina et al., 2024).

**Table 1.** Chatbots used in each stage of undergraduate thesis writing

| Stage              | Manual Approach   | Prompt-based Chatbots   | Chatbots  | Expected Outputs   |
|--------------------|---|---|---|--|
| Identifying topics | Consult supervisors, explore unsolved issues in the field (research gaps), review practical problems in professional practice | Request the chatbots to propose intriguing research inquiries pertinent to your area of study, and choose subjects by assessing their originality, practicality, and your own passion for them. | ChatGPT, Claude 2, Semantic Scholar + Perplexity chatbots for survey of recent topics               | List of potential research topics, initial analysis, justification |
| Summary            | Summarize key points of a paper, highlight main ideas and research methods; write summary aligned with the research aims      | Harness chatbots to distill the key elements of a document and encapsulate them in alignment with the research objectives.  | Chain-of-Thought prompt GPT, Grammarly chatbots, Turnitin for text similarity (<15%)                | Structured summary aligned with objectives                         |
| Literature review  | Search academic databases (Scopus, Web of Science), collect relevant sources, synthesize and organize literature.             | Request chatbots to compile, categorize, and analyze pertinent writings; assess the contexts of citations.  | ASReview + ChatGPT for screening; ChatGPT for summarizing, GPT code interpreter for source analysis | Complete and structured literature review                          |
| Methods            | Describe participants, instruments, procedures, data collection and analysis; explain rationale and ethical considerations.   | Request the chatbots to compose the methodology segment in accordance with the research framework; evaluate for coherence and rationale.  | ChatGPT + GPT-4 for method drafts, LimeSurvey for questionnaire design; Jamovi/chatbots for         | Transparent and replicable methodology                             |

|                 |  |   |  |  |
|-----------------|--|---|--|--|
|                 |  |   | EFA/CFA (quantitative studies)   |  |
| Results         | Analyze survey using Likert 5-point scale; calculate Cronbach's alpha (quant); code and theme qualitative interviews (qual). | Request chatbots to analyze descriptive statistics, emphasize significant trends, and compose a story around the results. | Python (Code Interpreter), ChatGPT for draft results; StatsGPTanova, APA style; matplotlib for figures | Tables and figures aligned with narrative            |
| Discussion      | Compare findings with previous research; analyze implications; reflect critically.   | Request chatbots to craft a framework for dialogue, analyze results, propose consequences and contributions.              | ChatGPT, Bard, Claude 3; OpenChatbots for logic checks; Elicit chatbots for literature mapping         | Insightful and coherent discussion                   |
| Recommendations | Suggest policies, implications, or practical improvements based on findings  | Request chatbots to suggest advice that corresponds with empirical findings.  | Claude 2, Gemini, Copilot for content creation   | Specific, actionable, evidence-based recommendations |
| Conclusion      | Reaffirm research aim, summarize key findings, mention limitations   | Request chatbots to reorganize and condense findings with coherent reasoning.   | GPT summary tools; Quillbot for paraphrasing   | Concise and logically structured conclusion          |
| References      | Use manual referencing tools or reference manager (Zotero, EndNote)  | Request chatbots to produce references, style them in APA format, and validate the origins.                               | ChatGPT, Turnitin, BibTeX tools, Zotero, EndNote   | Reference list in correct style                      |

*Source: Compiled by the authors*

The findings also reveal that chatbot use was unevenly distributed across tasks. ChatGPT was the most frequently cited tool, while Claude and similar conversational systems appeared less often and usually for more specific purposes. Non-chatbot applications were present in the wider workflow, but participants repeatedly described the chatbot as their first point of contact when they needed rapid explanation, idea generation, paraphrasing support, or feedback on draft text. In qualitative work, students sometimes used chatbots to think through codes or themes, whereas in quantitative work they more often used them to interpret procedures, explain outputs, or draft descriptions. Across both patterns, the chatbot functioned as an interactive research aide rather than an autonomous research actor.

Students' accounts show that chatbot effectiveness depended strongly on the epistemic demands of the task. Chatbots were perceived as most useful for early-stage exploration, repetitive summarisation, language polishing, and procedural clarification. They were viewed as substantially less reliable for evidence-sensitive tasks such as producing references, interpreting statistical significance, drawing nuanced conclusions, or discussing theoretical implications (Chen et al., 2025; Da Veiga, 2025; Smith et al., 2025). Many students valued the speed of chatbot support, yet distrusted outputs that appeared overly confident, generic, or weakly sourced. These findings indicate that the ethical problem is not only misuse, but misplaced trust. When students fail to verify chatbot responses, convenience can quickly turn into epistemic vulnerability and reduced critical engagement (Chan, 2023; Medina et al., 2024).

#### **4.2. Ethical framework issues in institutional chatbots use**

Figure 2 highlights the main ethical pressures experienced by participants during chatbot-supported research. The most common concern involved unintentional plagiarism: 18 of the 26 students reported anxiety about incorporating chatbot-generated wording or ideas without adequate attribution. One participant expressed this fear directly by noting concern about being seen as copying paragraphs produced by a chatbot. This pattern suggests that students do not necessarily perceive plagiarism only as deliberate cheating; they also experience it as a by-product of blurred boundaries between assistance, paraphrase, and authorship (Medina et al., 2024).

**Table 2.** Ethical violations in student use of chatbots

| <b>Research stage</b> | <b>Ethical issues in student use of chatbots</b>  |
|-----------------------|---|
| Identify topics       | Fabricated research gaps; lack of authenticity  |
| Summary               | Spontaneous plagiarism; missing citations for original ideas                                  |
| Literature review     | Automated exclusion risk; copyright concerns with restricted-access articles                  |
| Methods               | Privacy concerns over audio data; unclear informed consent procedures                         |
| Results               | Data hallucination; bias introduced by auto-coding; discrepancies between output and raw data |
| Discussion            | Risk of overclaiming; misattributed sources; lack of fact-checking                            |
| Recommendations       | Oversimplified messages; disconnected from actual research findings                           |
| Conclusion            | Risk of repetitive content; lack of focus   |
| References            | Copyright issues when citing non-open-access sources; inclusion of non-existent references    |

*Source: Compiled from interview results*

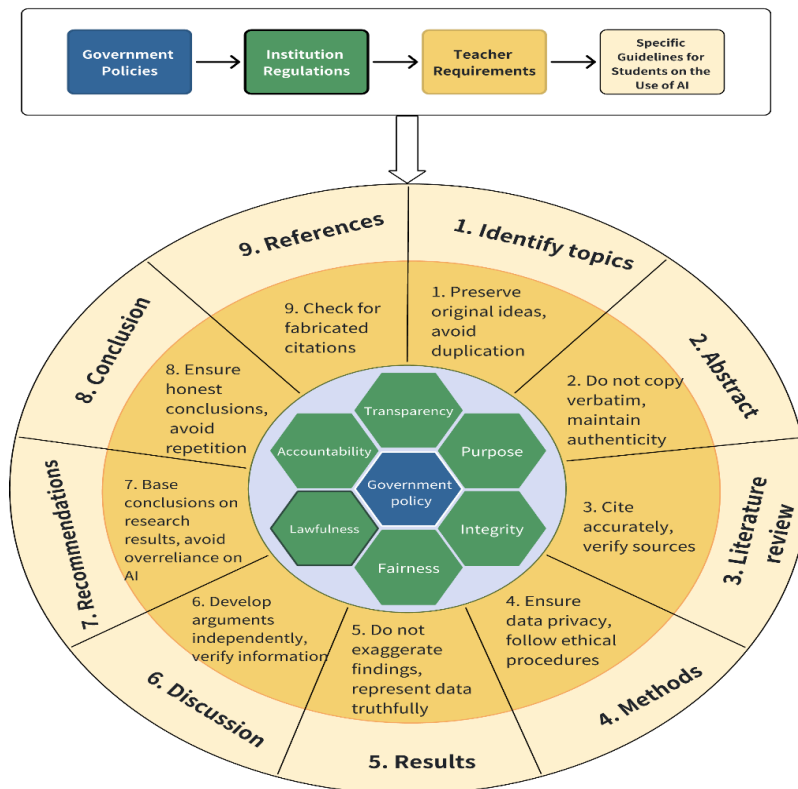
A second important finding was students' concern about epistemic distortion rather than mere textual copying. Several participants described cases in which chatbot responses proposed apparently convincing but weakly grounded "research gaps," simplified prior studies, or generated claims that were not supported by the underlying literature. In scientific research, such distortions are particularly serious because they can misdirect the framing of the study before data collection even begins.

Only three of the 26 participants were able to explain clearly how chatbot-generated assistance should be acknowledged in academic writing. This finding reveals a major gap between technological adoption and ethical literacy. Students are using chatbots in research environments where institutional expectations are often vague, inconsistent, or communicated only informally. As a result, the same practice may be regarded by one supervisor as acceptable support and by another as misconduct. The findings therefore reinforce the need for universities to issue explicit rules on disclosure, citation, permissible and impermissible uses, and responsibility for error correction (Da Veiga, 2025; Smith et al., 2025).

The interviews ultimately confirm that human authorship remains the non-negotiable center of student scientific research. Chatbots can accelerate drafting, explanation, and revision, but they cannot assume responsibility for the truthfulness, originality, or scholarly legitimacy of a research output (Holmes et al., 2022). Students remain the authors of record, and supervisors remain responsible for setting and monitoring acceptable practice. The ethical boundary, therefore, should be drawn not between "use" and "non-use," but between supportive use that strengthens research capacity and substitutive use that displaces student judgment, hides sources, or obscures accountability.

**V. ETHICAL SOLUTIONS AND RECOMMENDATIONS FOR CHATBOTS USE**

Building on the findings in Figure 2, this article proposes an ethical framework to guide students' use of chatbots in scientific research. The framework is designed for higher-education settings in which chatbot adoption is already widespread, but institutional guidance remains incomplete. Its implementation depends on coordinated action among four stakeholder groups: government bodies, universities, supervisors, and students. Governments provide regulatory direction for responsible digital education; universities translate that direction into institutional policy; supervisors operationalise the policy within research training and assessment; and students apply the rules in day-to-day research practice. Effective governance therefore requires not a single prohibition, but an ecosystem of aligned responsibilities that supports ethical, transparent, and pedagogically meaningful chatbot use throughout the research process.



**Figure 2.** Ethical framework for guiding chatbots use

*Source: Proposed by the author*

**5.1. Creating institutional guidelines on the ethical use of chatbots**

Student research requires explicit institutional policy because chatbot assistance now reaches multiple stages of scholarly work. Table 3 provides a six-dimensional ethical framework consisting of transparency, purpose, integrity, fairness, lawfulness, and accountability. These six dimensions should be presented in the text exactly as they appear in the table. Transparency requires full disclosure of chatbot use. Purpose distinguishes legitimate support from academic misconduct. Integrity protects original student contribution. Fairness concerns equitable access and consistent treatment. Lawfulness ensures compliance with institutional rules, data protection, and copyright norms. Accountability requires that students and institutions remain answerable for the consequences of chatbot-assisted research.

**Table 3.** Ethical standards and practical guidelines for chatbots use

| <b>Dimension</b> | <b>Ethical standard</b>  | <b>Practical guidelines</b>  |
|------------------|--|--|
| Transparency     | Clearly disclose the extent of chatbots assistance                 | Declare the tools used, their versions, and the role of chatbots in the process                          |
| Purpose          | Differentiate between legitimate support and academic misconduct   | Use chatbots for idea drafting only; avoid letting chatbots write full sections of the thesis            |
| Integrity        | Preserve individual authorship and intellectual contribution       | Implement direct assessment through presentations or interviews  |
| Fairness         | Ensure equal access opportunities for all students                 | Offer free training programs on ethical chatbots use for students  |
| Lawfulness       | Comply with all existing laws and institutional policies           | Follow official government policies; establish institutional guidelines to govern ethical chatbots usage |
| Accountability   | Maintain clear, transparent, and consistent institutional policies | Create mechanisms to ensure responsibility and accountability for chatbots systems and their outcomes    |

*Source: Compiled by the author*

On the basis of this framework, universities should adopt at least four policy measures. First, they should require a clear declaration of chatbot use in research proposals, draft submissions, and final manuscripts, specifying the tool, purpose, and scope of assistance. Second, they should redesign supervision and assessment so that students must explain their conceptual choices, data decisions, and writing process orally, thereby reducing the risk of hidden substitution. Third, they should provide training for both staff and students on prompt design, source verification, hallucination checking, citation practice, and data-protection risks. Fourth, they should require an audit trail of major chatbot interactions in research work, especially when chatbots are used for literature synthesis, translation, coding support, or draft development. The goal is not to ban chatbots outright, but to regulate them in ways that preserve research integrity and educational value (Chan, 2023; Smith et al., 2025).

**5.2. Students' adherence to institutional chatbots policies**

Students may use chatbots in research only when such use strengthens rather than replaces their intellectual labour. Responsible alignment with institutional policy means that students must retain control over question formulation, source selection, interpretation, argumentation, and final writing decisions. Ethical chatbot use is therefore compatible with scientific research only when the student remains visibly and demonstrably the primary knower, writer, and decision-maker.

At the student level, responsible chatbot use should follow a staged protocol. Before using a chatbot, students should define the research task, check whether chatbot assistance is permitted for that stage, and avoid uploading confidential or personally identifiable data. During use, prompts should be specific, limited, and task-oriented, and all outputs should be checked against credible sources, course guidance, and supervisory feedback. After use, students should document the interaction, note how the output was revised, and identify what was accepted, rejected, or reinterpreted. This audit practice is especially important in scientific research because chatbot responses can appear fluent even when they are incomplete, biased, or factually incorrect. Systematic logging therefore supports both ethical disclosure and methodological transparency.

Every manuscript arising from chatbot-assisted research should contain a short disclosure statement. A suitable model is as follows: "I used [chatbot/tool name] to assist with [specific task, such as brainstorming, language editing, or outline development]. I reviewed all outputs critically, verified factual claims and references independently, revised the wording substantially where necessary, and accept full responsibility for the final manuscript." This disclosure should be accompanied, when required by institutional policy, by a brief appendix or supervision log indicating the stages of use. Such a statement does not legitimise plagiarism or weak scholarship; rather, it makes assistance visible and clarifies that accountability remains with the student author.

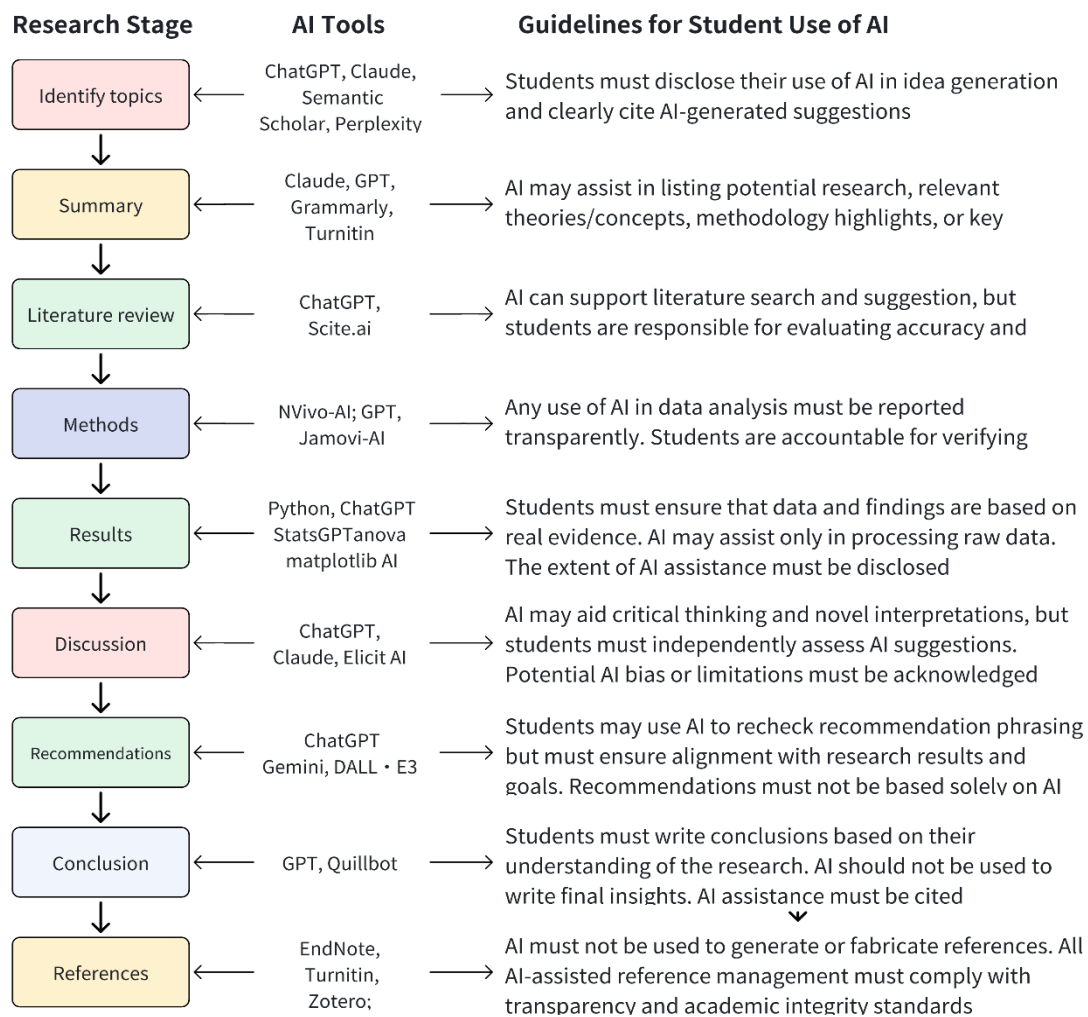


Figure 3. Guidelines for ethical student use of chatbots

Source: Author's proposal

## VI. CONCLUSION

This study examined students' use of chatbots in scientific research through the empirical lens of thesis-based undergraduate research. The findings show that chatbots are already embedded in multiple stages of student research, particularly in topic exploration, literature handling, language support, and early-stage drafting. At the same time, widespread use has not been matched by equally robust ethical understanding. Students remained uncertain about attribution, verification, authorship, data protection, and the limits of acceptable assistance. Three risks were especially salient: unattributed reuse of chatbot-generated content, fabricated or weakly grounded research framing, and overreliance on outputs that were insufficiently checked. These findings justify the need for a clearly articulated ethical framework for chatbot use in research-oriented higher education.

This study also has limitations. The sample was limited to 26 final-year undergraduate students in one national higher-education context, and the empirical setting was primarily thesis-based research. For that reason, the findings should not be generalised mechanically to all student populations, all disciplines, or all forms of scientific research. Future studies could test the framework through larger surveys, comparative institutional studies, or research involving master's and doctoral students, whose research autonomy, data sensitivity, and authorship expectations may differ substantially.

Despite these limitations, the article makes two contributions. First, it offers an empirically grounded account of how students actually integrate chatbots into research practice rather than discussing chatbots ethics only at an abstract level. Second, it develops a six-dimensional framework—transparency, purpose, integrity, fairness, lawfulness, and accountability—that can guide universities and students in governing chatbot use without rejecting the technology outright. In this sense, the study contributes to current debates on chatbots ethics, research education, and the responsible use of new technologies in higher education.

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