

Generative AI Tools in Libyan Higher Education: A Comparative Analysis of Student Perceptions and Usage Patterns

Entisar Alhadi Al Ghawail*

Information System Department, Alasmarya Islamic University, Libya

أدوات الذكاء الاصطناعي التوليدي في التعليم العالي الليبي: تحليل مقارن لتصورات الطلاب وأنماط استخدامهم

انتصار الهادي الغويل*

قسم نظم المعلومات، الجامعة الأسمرية الإسلامية، ليبيا

*Corresponding author: e.alghawail@asmarya.edu.ly

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Abstract

Generative artificial intelligence (Gen AI) tools are becoming increasingly common in students' academic practices in higher education. However, evidence regarding students' use, perceptions, and concerns about Gen AI tools remains limited. This study investigated the academic usage patterns, perceptions, and reported challenges associated with ChatGPT, Google Gemini, and Claude among undergraduate students at the Faculty of Information Technology, Alasmarya Islamic University (AIU), Zliten, Libya. This study employed a comparative cross-sectional quantitative analysis. Data were collected via an online questionnaire during the spring semester of 2025/2026 from 80 final-year female students enrolled in Computer Science and Internet Technology. Data were analysed using descriptive statistics, Cronbach's alpha, and chi-square goodness-of-fit tests. The results showed that all participants used ChatGPT (100%), followed by Google Gemini (82.5%) and Claude (25.0%). Students reported using Gen AI tools for academic purposes, and the results also indicate challenges related to writing prompts, concerns about academic integrity and plagiarism, language and financial barriers, over-reliance on AI, and a lack of institutional guidance. The comparison results showed that ChatGPT was chosen most frequently for its accessibility and availability, ease of use, and usefulness for specific tasks. Google Gemini and Claude were chosen more frequently for output quality and reliability. Chi-square tests indicated that preferences differed significantly across the three tools on all four evaluation dimensions ($p \leq 0.001$). The results suggest that Gen AI tools are already integrated



into students' academic practices and locally provide evidence to support the development of institutional guidelines and the responsible use of Gen AI tools in Libyan higher education.

Keywords: Generative AI, Ethical Challenges and Concerns, Academic Integrity, Student Perceptions, Libyan Higher Education.

المستخلص

انتشار أدوات الذكاء الاصطناعي التوليدي (Gen AI) بشكل متزايد في الممارسات الأكاديمية للطلاب في التعليم العالي. ولكن تظل الأدلة المتعلقة باستخدام الطلاب وتصوراتهم ومخاوفهم من أدوات Gen AI محدودة. تناولت هذه الدراسة أنماط الاستخدام الأكاديمي والتصورات والتحديات المرتبطة بـ ChatGPT و Google Gemini و Claude بين الطلاب الجامعيين في كلية تقنية المعلومات، جامعة الأسمرية الإسلامية (AIU)، زليتن، ليبيا. اعتمدت هذه الدراسة على منهج تحليلي كمي مقارنة. تم جمع البيانات من خلال استبيان إلكتروني وزع خلال الفصل الدراسي لربيع 2025/2026 على 80 طالبة في السنة النهائية والمسجلات في تخصصي علوم الحاسوب وتقنية الإنترنت واستخدمت الإحصاءات الوصفية واختبار مربع كاي لجودة المطابقة ومعامل ألفا كرونباخ عن طريق SPSS. أظهرت النتائج أن جميع المشاركات استخدمت (100%) ChatGPT ، يليه Google Gemini (82.5%) ثم Claude (25.0%) وأظهرت اختبارات مربع كاي وجود فروق ذات دلالة إحصائية في تفضيلات الطالبات للأدوات الثلاث في جميع الأبعاد الأربعة للمقارنة. أفادت الطالبات باستخدام أدوات Gen AI لأغراض أكاديمية، خاصة في كتابة الكود والبرمجة، عمل مشاريع التخرج. كما تشير النتائج إلى وجود تحديات تتعلق بكتابة بيانات السؤال، ومخاوف بشأن النزاهة الأكاديمية والانتحال، وحواجز لغوية ومالية، وغياب التوجيه المؤسسي، والاعتماد المفرط على الذكاء الاصطناعي، ووجود المراجع غير الدقيقة. أظهرت المقارنة أن ChatGPT كان الخيار الأكثر تكراراً من حيث سهولة الوصول والتوفر وسهولة الاستخدام والفائدة في المهام المحددة، بينما كان اختيار Google Gemini و Claude أكثر شيوعاً فيما يتعلق بجودة المخرجات والموثوقية. كما تشير النتائج إلى أن أدوات Gen AI قد أصبحت تقنيات لها أهمية في الممارسات الأكاديمية للطلاب إن تم استخدامها بشكل أخلاقي مع تطوير إرشادات مؤسسية لتعزيز الاستخدام المسؤول لأدوات Gen AI في التعليم العالي الليبي.

الكلمات المفتاحية: أدوات الذكاء الاصطناعي التوليدي، التعليم العالي الليبي، التحديات الأخلاقية واللغوية، المخاوف والنزاهة الأكاديمية، التوقعات والفائدة الأكاديمية.

1. Introduction

Generative artificial intelligence (Gen AI) has become an increasingly visible aspect of higher education in recent years. Tools such as ChatGPT, Google Gemini, and Claude help students generate ideas, explain concepts, assist with programming, translate text, summarise information, and prepare academic materials, creating new opportunities to complete learning-related tasks more efficiently (Vieriu & Petrea, 2025). The rapid adoption of Gen AI has raised concerns about academic integrity, overreliance on automated outputs, information accuracy, and the development of students' independent academic skills (Stone, 2024). Students may use AI-generated content without sufficiently checking its accuracy, understanding its limitations, or adapting it to their academic work. These concerns make it important to understand not only whether students use Gen AI but also how they use it, what they perceive as useful, and what challenges they experience. Liu (2025) indicated that access to digital technologies, language proficiency, institutional guidance, and technical infrastructure may influence students' experiences with emerging technologies. Previous studies have examined Gen AI use in higher education, including student perceptions, academic applications, productivity, and ethical issues. Much of this research has focused on individual tools, such as ChatGPT, rather than comparing several widely used platforms in the same educational setting (Nelson, 2025; Tbaishat & Elfadel, 2025; Yeung et al., 2025). Comparative evidence concerning ChatGPT, Google Gemini, and Claude in Libyan higher-education institutions is limited.

At Faculty of IT, Alasmarya Islamic University (AIU), students increasingly use AI tools for programming and coding, project work, assignments, concept clarification, translation, writing

support, and preparing digital materials. However, there is limited empirical evidence on how students compare different Gen AI tools and the challenges they experience when using them for academic purposes in Libyan higher education context. The present study examines students' academic use and perceptions of ChatGPT, Google Gemini, and Claude at the Faculty of IT, Alasmarya Islamic University (AIU). This study focuses on students' usage patterns, academic purposes, perceptions of usefulness and ease of use, prompt writing and language-related challenges, and concerns related to academic integrity and other risks. This study contributes to the growing discussion on the responsible integration of Gen AI into higher education by providing evidence from the Libyan higher education context (AL Ghawail et al., 2019).

1.1 Problem Statement

The growing availability of Gen AI tools has created new opportunities for students to obtain academic support. However, their use also presents challenges when students have limited knowledge of effective prompting, limited English proficiency, and insufficient guidance on responsible AI use for learning purposes. The absence of sufficient empirical evidence may make it difficult for educators and university administrators to develop appropriate guidelines for the responsible and effective use of Gen AI. However, concerns related to academic integrity, inaccurate information, language barriers, prompt-writing skills, overreliance on AI, privacy, and access to premium features require further investigation (Mavrych et al., 2025).

At Faculty of Information Technology (IT), Alasmarya Islamic University (AIU), students use tools such as ChatGPT, Google Gemini, and Claude for a range of academic activities, including programming, project work, assignments, concept clarification, translation, and writing tasks; there are limited local results concerning which tools students use, for what purposes, how they perceive these tools, and the challenges they encounter. Accordingly, this study addresses the need for empirical evidence on students' academic use and perceptions of major Gen AI tools within Libyan higher education context.

1.2 Research Gap

Important gaps remain in the comparison of Gen AI platforms and their influence on local educational contexts. Existing studies have commonly examined ChatGPT as an individual tool, while comparatively less attention has been given to students' simultaneous use and evaluation of ChatGPT, Google Gemini, and Claude. This gap is evident in Libyan higher education, where there is limited evidence concerning the academic purposes for which students use these tools and the challenges they experience in areas such as language, prompting, academic integrity, information reliability, and institutional guidance for using these tools.

The present study addresses this gap by providing a comparative descriptive and inferential analysis of ChatGPT, Google Gemini, and Claude among final-year undergraduate students at the Faculty of Information Technology, Alasmarya Islamic University, Libya. This study focused on students' reported usage patterns, perceptions, and challenges.

1.3 Study Objectives

This study aims to:

1. Examine the patterns of students' use of ChatGPT, Google Gemini, and Claude for academic purposes and test whether students' preferences for Gen AI tools.
2. Identify the academic purposes for which students used Gen AI tools and examine their perceptions of the usefulness, accessibility, ease of use, and output quality of ChatGPT, Google Gemini, and Claude.

3. Explore the main challenges and risks students experience when using Gen AI tools and provide evidence to support the responsible integration of Gen AI tools into the Libyan higher education context.

1.4 Research Questions

Based on the research gap and objectives, this study addresses the following questions:

RQ1. What are the patterns of students' use of ChatGPT, Google Gemini, and Claude for academic purposes, and are there significant differences in students' preferences for ChatGPT, Google Gemini, and Claude?

RQ2. What academic purposes do students report for using ChatGPT, Google Gemini, and Claude in terms of access and availability, ease of use, and interaction?

RQ3. What challenges and risks do students face when using Gen AI tools in an academic context?

1.5 Significance of the Study

- Theoretical Significance

This study contributes to the emerging literature on Gen AI in higher education by providing comparative evidence of students' use and perceptions of three widely recognized Gen AI tools: ChatGPT, Google Gemini, and Claude. This study is informed by the Technology Acceptance Model (TAM), which includes the concepts of perceived usefulness and perceived ease of use, providing a useful framework for interpreting students' evaluations of Gen AI technologies. This study also contributes localised evidence from the Libyan higher-education context by examining students' experiences within a specific university, highlighting the importance of language factors, accessibility, technical challenges, and institutional guidance.

- Practical Significance

The study findings may provide useful evidence for university administrators and educators when developing guidelines for students on Gen AI use, particularly in academic integrity, responsible use of AI-generated content, and verifying it in assignment writing and graduation projects. The results may also help educators identify topics where students require additional support, particularly in effective prompt writing, English-language interaction with AI tools, critical evaluation of AI-generated information, and responsible academic use.

1.6 Organization of the Study

The remainder of this paper is organized as follows. Section 2 presents the relevant literature and theoretical background, including the Technology Acceptance Model (TAM) and previous research on Gen AI in higher education. Section 3 describes the research methodology, including the research design, participants, questionnaire, data collection procedures, and statistical analysis. Section 4 presents the results of the descriptive and comparative analyses of data. Section 5 discusses the findings in relation to previous research and the study context. Finally, Section 6 presents the conclusions and recommendations.

2. Literature Review

The integration of Gen AI tools in higher education has spurred extensive research on their adoption, impact, and pedagogical implications. This section reviews the relevant literature, drawing on technology acceptance models and contemporary learning theories to examine the present study of student perceptions and usage patterns of ChatGPT, Google Gemini, and Claude in Libyan higher education.

2.1 Gen AI in Higher Education (HE)

The emergence of generative artificial intelligence as a mainstream technology has fundamentally changed the way students engage in academic learning. Since the release of Generative AI tools in late 2022, universities worldwide have witnessed the rapid and widespread adoption of AI tools

by students (Mavrych et al., 2025). The rapid proliferation of generative AI tools, such as ChatGPT, is transforming the ways in which students learn, create, and engage with knowledge. However, there is a lack of knowledge regarding how students in higher education perceive and use these tools (Nikolic et al., 2024).

Students and undergraduate learners across disciplines are using AI applications such as ChatGPT, Microsoft Copilot, Claude, Google Gemini, Canva, and Snapchat My AI daily for study, life organization, job preparation, and personal support, with academic use evolving to include writing, research, note-taking, revision, and presentation skills (Mavrych et al., 2025).

A study by Mazaherian & Nourbakhsh (2025) highlighted a gap between the pace of student adoption and the pace of institutional response. University students demand the establishment of organized policies and regulations, as well as support and guidance on AI tool use. In addition, providing practical, ethical, and course-related education is a task that universities in developing countries such as Libya are not interested in.

2.2 Gen AI Adoption in Developing Countries

Gen AI adoption in higher education is expanding rapidly; Omar (2026) indicated Gen AI as a tool for improving teaching, research productivity, personalized learning, and administrative efficiency, and that these tools can widen access where institutions have adequate capacity and infrastructure. Omar (2026) and Swidan et al. (2025) confirmed that Gen AI can enhance writing support, literature navigation, research efficiency, and personalized learning, which is especially valuable in resource-constrained environments in developing countries. Sobaih & Elnasr (2025) found in Egyptian higher education that graduate students preferred Google Gemini over ChatGPT, citing its stronger support for Arabic and more up-to-date information retrieval.

Bittle (2025) conducted comparative research involving students in Lebanon and Palestine and found that while students acknowledged the efficiency gains provided by Gen AI, they remained concerned about the ethical implications, academic integrity, and the potential erosion of critical thinking skills (Vieriu & Petrea, 2025). These regional studies indicate that cultural and linguistic factors play a significant role in the adoption and perception of Gen AI tools in Arab academic environments (Bittle, 2025; élez, 2026; Vieriu & Petrea, 2025; Yeung et al., 2025). Gemini and Claude remained comparatively underrepresented as objects of study. This imbalance suggests that the academic value of the less-studied platforms is not yet well understood, as students' focus is on task-specific performance.

In Libya, inconsistent internet access and institutional digital resources across campuses give infrastructure-related barriers particular practical significance for any study of AI tool adoption Omar (2026). Limited faculty training and infrastructure continue to hinder responsible adoption, leaving educators and students without clear guidance on the effective and ethical use of Gen AI (Haroud & Saqri, 2025).

2.3 The Technology Acceptance Model (TAM) and Learning Theories

The Technology Acceptance Model (TAM), originally developed by Davis (1989), provides a theoretical lens through which this study examines students' perceptions of ChatGPT, Google Gemini, and Claude. TAM proposes that perceived usefulness and perceived ease of use jointly determine a user's behavioural intention to adopt a new technology, with perceived ease of use also directly influencing perceived usefulness. TAM and its extensions can be applied to understand how students perceive these tools in terms of their ability to improve academic performance and ease of use (Nikolic et al., 2024; Sergeeva et al., 2025). UTAUT factors, including social influence, ethical concerns, and facilitating conditions, may also affect students'

adoption and use (Venkatesh et al., 2003). This model is relevant to the comparative design because it enables direct comparisons of the three tools (Nelson, 2025; Tbaishat & Elfadel, 2025). Integrated TAM with the Theory of Planned Behaviour and Self-Determination Theory to model Gen AI adoption among university students, highlighting motivational factors alongside cognitive appraisals. Tran et al. (2025) applied UTAUT to explore faculty and student acceptance of Gen AI in academic environments. Integrative frameworks combining TAM with motivational theories, such as Self-Determination Theory and the theory of planned behaviour, further demonstrate that cognitive appraisals and extrinsic drivers significantly shape how students interact with artificial intelligence (Nelson, 2025; Tbaishat & Elfadel, 2025; Yeung et al., 2025).

Constructivism emphasizes that learners actively build knowledge through experience and interaction, which aligns with Gen AI tools that support brainstorming, conceptual understanding, and problem-solving (Omeh et al., 2025; Zerouali et al., 2026). Connectivism views learning as building connections across digital information networks. Gen AI supports this process by providing access to knowledge, encouraging self-directed learning, and linking theory with practical applications (Shang & Bai, 2025; Tran et al., 2025). The present study addresses this gap by conducting a comparative analysis of student perceptions and academic usage patterns of ChatGPT, Google Gemini, and Claude at Alasmarya Islamic University (AIU) using a TAM-based quantitative design.

2.4 Students' Adoption of Gen AI Tools in Higher Education (HE)

Chatzopoulos et al. (2026) showed that students primarily use generative AI tools for brainstorming, summarizing texts, improving academic writing, and searching for scientific sources, considering them effective means of simplifying complex information. This positively impacts their satisfaction and continued use of these tools, despite their reservations about their reliability in providing accurate information and references (Abbas et al., 2024). Similarly, Davis's technology acceptance model (TAM) provides a framework in which perceived utility is a key driver of adoption behavior (Davis, 1989). Al-Emran et al. (2026) indicate that students' perception of the benefits and ethical implications of generative AI is linked to the development of positive attitudes towards it, which in turn translates into better academic performance and broader use of tasks outside the classroom.

Students in Morocco tend to be more open to Gen AI adoption than teachers. Faculty members express concern that overreliance on AI could weaken critical thinking and other soft skills (Haroud & Saqri, 2025). Studies have raised concerns about the potential costs of this use and the decline in the quality of university education when students become overly reliant on Gen AI for their assignments. There are also clear differences in motivations and ethical boundaries between users in the higher education system (Mazaherian & Nourbakhsh, 2025).

2.5 Benefits and Challenges of Gen AI in HE

Students report improvements in learning efficiency, academic support, language development, creativity, self-directed learning, and greater learning flexibility. AI tools also provide immediate feedback and allow students to explore multiple explanations for complex concepts (Liu, 2025). Mavrych et al. (2025) conducted a comparative study of medical students in which AI tools such as Claude, ChatGPT, Copilot, and Gemini varied in accuracy when answering specialized scientific questions, raising questions about the effectiveness of relying on a single tool over others in an educational context. A study by Kasneci et al. (2023) focused on the relationship between students' perceptions of the benefits of AI and academic outcomes and showed that these perceptions influence student behavior (Shang & Bai, 2025). Liu (2025) has emphasized several challenges, including concerns regarding plagiarism, overreliance on AI-generated content,

inaccurate information, the creation of non-existent references, reduced critical thinking, ethical misuse, and unequal access to advanced AI services. Educational environments face specific challenges related to digital infrastructure, cost, and equitable access to these tools (Kasneji et al., 2023). Despite Gen AI technologies offering opportunities to enhance the quality of learning output, they present fundamental challenges such as digital equity and digital institutional readiness (Mhlanga, 2023; Omar, 2026).

2.6 Ethical Challenges and Academic Concerns in AI Tool Adoption

Ethical concerns related to academic integrity are the most consistently reported factors shaping students' attitudes toward the use of generative AI (Omar, 2026). Rudolph et al. (2023) showed a tension between the benefits of Gen AI in teaching and concerns about academic integrity. There are heightened risks of plagiarism and a lack of original thought. Educators' willingness to integrate Gen AI primarily depends on its perceived usefulness, even when ethical and transparency concerns remain significant (Rudolph et al., 2023; Bittle, 2025). In addition, studies reveal algorithmic bias in these tools. This bias can unintentionally reinforce stereotypes or provide skewed information, thus challenging the objectivity of academic research.

3. Methodology

3.1 Study Design

This study adopted a quantitative, comparative, cross-sectional design to examine undergraduate students' perceptions of using Gen AI tools at the Faculty of IT, Alasmarya Islamic University (AIU) during the spring semester of the 2025/2026 academic year. This study focused on three settings.

3.2 Sample of the Study

This study was conducted at Faculty of IT, Alasmarya Islamic University (AIU), Zliten, Libya. The target population consisted of female undergraduate students in the final year of graduation-related academic work for a bachelor's degree in Computer Science and Internet Technology department. The questionnaire was distributed to 100 eligible students, and 80 complete and usable responses were obtained, representing an 80% response rate. Participants were recruited through accessible student communication channels such as WhatsApp. The sample was relatively homogeneous, as the participants were from the same faculty, in the same final academic stage, and shared similar academic and technological backgrounds.

The university operates a gender-segregated educational system, divided into separate sections for male (Section A) and female (Section B) students. Accordingly, the target population for this study consisted of female undergraduate students from Section B. The researcher is a faculty member teaching in this section, which facilitated accessible communication and reliable data collection, and the implications of this restriction for generalizability are discussed in Section 5.9.

3.3 Data Collection Instrument

Data were collected using an electronic questionnaire to examine students' use, perceptions, academic applications, and challenges related to Gen AI tools. The questionnaire was designed in English and translated into Arabic before distribution to facilitate participants' understanding and reduce possible language-related measurement problems. The questionnaire consisted of 6 sections: AI tool use and familiarity, academic purposes of Gen AI use, prompt-writing skills, language- and technical-related challenges, and comparative evaluation of Gen AI tools. The questionnaire included multiple-response questions and Likert scale items. Multiple-response questions allowed the participants to select more than one option. Likert-scale statements were measured using a five-point scale ranging from (1 = Strongly Disagree to 5 = Strongly Agree).

3.4 Questionnaire Validity and Reliability

Experienced faculty members reviewed the questionnaire before distribution to improve content validity and clarity. The items were examined for clarity, relevance, and consistency with the study objectives and the TAM-based conceptual framework. Academic feedback was used to revise unclear wording and remove items not directly relevant to the study's research questions. The English version of the questionnaire was translated into Arabic before data collection because the participants were Arabic-speaking. English-language faculty members at Alasmarya Islamic University reviewed the translated version to ensure the original items' meaning was retained and the questions were understandable to participants.

English-language faculty members at Alasmarya Islamic University reviewed the translated version to ensure the original items' meaning was retained and the questions were understandable to participants. To ensure the internal consistency and reliability of the questionnaire items, Cronbach's alpha coefficient was calculated using SPSS. The overall reliability coefficient for the scale was 0.85, which exceeds the generally accepted threshold of 0.70. This confirms that the questionnaire items were highly reliable and consistently measured the intended constructs (Tavakol & Dennick, 2011). Reliability coefficients were not calculated for the multiple-response and single-choice questions, because these are nominal items for which internal-consistency estimates do not apply.

3.5 Data Collection Procedure

Data were collected during the spring semester of the 2025/2026 academic year using an electronic questionnaire. The survey link was distributed to 100 eligible female students through student communication channels via WhatsApp. Participation was voluntary and anonymous. Participants were informed about the purpose of the study and the general nature of their participation, and they were told that their responses would be treated confidentially and used for research purposes. No personally identifiable information was collected. After data collection, the responses were screened for completeness; 80 valid responses were retained for analysis, while incomplete responses were excluded. The following figure illustrates the research framework. See Figure 1.

3.6 Data Analysis

The data were coded and analysed using descriptive and inferential statistical methods.

Frequencies and percentages were calculated for categorical and multiple-response questions to describe students' use of Gen AI tools for academic purposes, comparative preferences, and reported challenges. For the five-point Likert-scale items, means and standard deviations were calculated to summarise students' responses concerning prompt-writing skills and language-related challenges. For multiple-response questions, each selected option was counted independently, and the frequencies and percentages were calculated for each question. The comparative evaluation of ChatGPT, Google Gemini, and Claude was summarised using the number of students selecting each tool for each of the four comparison dimensions to understand students' Gen AI usage patterns, perceptions, academic applications, and concerns within the study context.

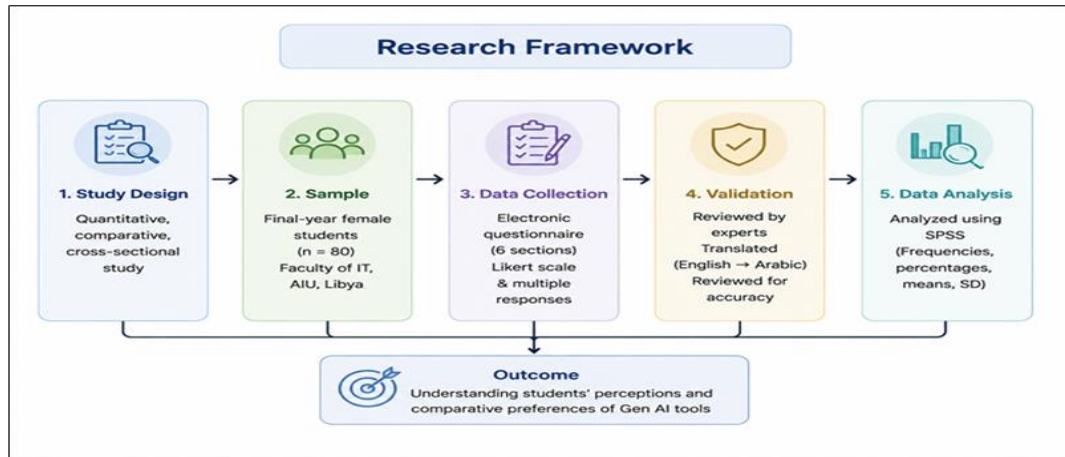


Figure (1): Shows the research framework.

In Inferential analysis, the chi-square goodness-of-fit test was used to examine whether the choices were distributed equally across ChatGPT, Google Gemini, and Claude (per tool, $df = 2$). Effect sizes were reported as Cohen's w (0.10 = small, 0.30 = medium, 0.50 = large). Significant omnibus results were followed by pairwise exact binomial tests with Bonferroni correction for three comparisons per dimension ($\alpha = 0.017$). The significance level was set at 0.05 for all tests (Cohen, 1988). Mean scores on the five-point scale were interpreted as low (1.00-2.33), moderate (2.34-3.67), or high (3.68-5.00), and the same cutoffs were applied to every table. Standard deviations are reported to two decimal places.

3.7 Ethical Considerations

Participation in this study was voluntary. Participants were informed of the study purpose and general conditions of participation before completing the questionnaire. The potential power relationship between the researcher and the student participants was considered when collecting data, and the researcher was a university lecturer at Faculty of IT. Responses were treated confidentially, and no personally identifiable information was collected for analysis. The data were used solely for the study.

4. Results

The collected data were analyzed using descriptive and inferential statistics to examine students' expectations of Gen AI tools, their academic purposes for using these tools, prompt-writing skills, language-related challenges, challenges associated with Gen AI use, and their preferences for ChatGPT, Google Gemini, and Claude. The analysis was based on responses from 80 female undergraduate students in their final academic year in the Computer Science and Internet Technology Department at the Faculty of IT. All participants were engaged in graduation projects at the time of the study.

4.1 Students' Use of Generative AI Tools

The results in Table 1 indicate a high level of use of Gen AI tools by the participants. ChatGPT was reported as the most used by all 80 students (100.0%), making it the most used tool in this sample. Google Gemini was used by 66 students (82.5%) and Claude by 20 students (25.0%). In addition, 31 (38.8 %) students reported using other AI-based tools, including Canva, Manus, Copilot, and Consensus.

4.2 Academic Purposes of Using Generative AI

Table 2 shows the academic purposes of using Generative AI tools; coding and programming were the most frequently reported purposes, selected by all 80 students (100.0%). Project work and

assignment completion were reported by 79 (98.8 %) students. Creating digital multimedia and presentations was reported by 75 (93.8 %) students. Defining concepts was reported by 67 students (83.8%), and 64 students (80.0%) reported generating ideas. Translation and summarisation were reported by 55 students (68.8%) in this study. Rewriting was reported by 51 students (63.8%), and 50 students (62.5 %) reported proofreading. Gen AI tools were integrated into students' academic activities, with high use for programming, graduation project work, assignments, and multimedia-related tasks. Figure 2 illustrates the academic purposes for which students used Gen AI tools.

Table (1): Reported Use of Generative AI Tools.

AI Tool	Frequency (n)	Percentage (%)	Rank
ChatGPT	80	100.0	1
Google Gemini	66	82.5	2
Claude	20	25.0	3
Other AI tools	31	38.8	—

Table (2): Academic Purposes of Using Gen AI Tools.

Academic Purpose	Frequency (n)	Percentage (%)
Coding and programming	80	100.0
Project work	79	98.8
Completing assignments	79	98.8
Creating digital multimedia and presentations	75	93.8
Defining concepts	67	83.8
Generating ideas	64	80.0
Translation	55	68.8
Summarizing	55	68.8
Rewriting	51	63.8
Proofreading	50	62.5

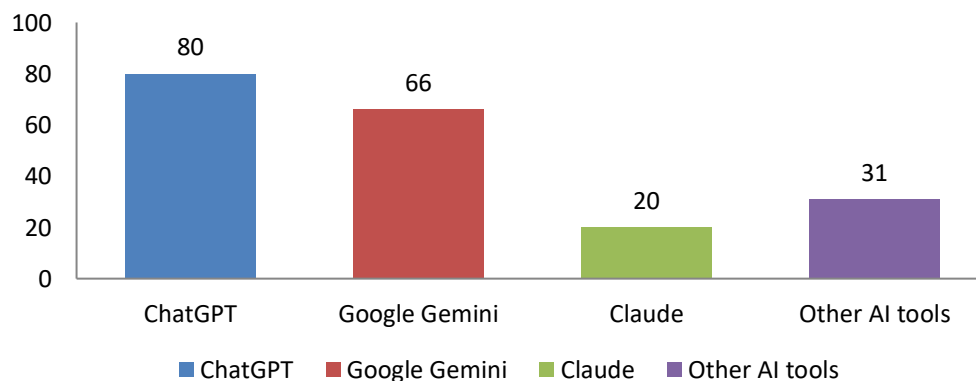


Figure (2): Shows Academic Purposes of Using Gen AI Tools.

4.3 Challenges of using Gen AI tools

As shown in Table 3, the most frequently reported challenge was concerns about plagiarism and academic integrity, and about detection by Turnitin or iThenticate, reported by 74 students

(92.5%). Language barriers, including poor Arabic support, were reported by 72 students (90.0%), and 71 students (88.8%) identified a lack of institutional guidelines for AI use. In addition, over-adoption of AI was reported by 63 students (78.8%), and a lack of knowledge of prompt-writing skills was reported by 62 students (77.5%). Concerns regarding fake or inaccurate references were reported by 44 students (55.0%). Financial barriers related to the cost of premium subscriptions were reported by 39 students (48.8%), and privacy and security concerns were reported by 31 students (38.8%). Students' concerns extended beyond access to Gen AI tools, encompassing academic integrity, language barriers, lack of institutional guidance, prompt writing skills, and the reliability and irresponsible use of AI-generated information. Table 3 displays the most frequently reported challenge.

Table (3): Challenges Reported When Using Generative AI Tools.

Challenge	Frequency (n)	Percentage (%)	Rank
Plagiarism/academic integrity and concerns about detection by Turnitin/iThenticate	74	92.5	1
Language barriers (e.g., poor Arabic support)	72	90.0	2
Lack of institutional guidelines on AI usage	71	88.8	3
Over-adoption of AI	63	78.8	4
Lack of knowledge of prompt-writing skills	62	77.5	5
Fake/inaccurate references	44	55.0	6
Financial barriers (high cost of premium subscriptions)	39	48.8	7
Privacy and security concerns	31	38.8	8

4.4 Language Challenges

"I prefer using Arabic for prompt submission" recorded the highest mean among the three language-related statements ($M = 4.60$, $SD = 0.74$); 77 students (96.3%) agreed. "I rely on AI tools for translation before prompting" recorded a mean of 3.45 ($SD = 1.49$), indicating moderate reliance on translation before submitting prompts, and "Limited English proficiency restricts my effective use of AI tools" recorded a mean of 3.94 ($SD = 1.22$). These results indicate that language is a notable factor affecting students' interaction with Gen AI tools when prompt writing requires English. See Table 4.

4.5 Students' Prompt-Writing Skills

Students' prompt-writing skills were examined using three statements measured on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The statement "I know how to construct/write effective prompts" had the lowest mean (2.46; $SD = 1.47$). "I usually obtain accurate AI responses" recorded a mean of 2.74 ($SD = 1.56$), and "I revise/modify my prompts when necessary" recorded a mean of 2.69 ($SD = 1.55$). All three means fell in the moderate range, the first at its lower end. These results suggest that students' confidence in their prompt writing and interaction skills was not consistently high, and that prompt formulation remains an area requiring further development. As shown in Table 5.

Table (4): Language-Related Challenges When Using Gen AI Tools (N = 80).

Statement	Mean (M)	SD	Interpretation
I prefer using Arabic for prompt submission	4.60	0.74	High
I rely on AI tools for translation before prompting	3.45	1.49	Moderate
Limited English proficiency restricts my effective use of AI tools	3.94	1.22	High

Table (5): Students' Self-Reported Prompt-Writing Skills.

Statement	Mean (M)	SD	Interpretation
I know how to write effective prompts	2.46	1.47	Moderate
I usually obtain accurate responses from AI tools	2.74	1.56	Moderate
I revise my prompts when necessary	2.69	1.55	Moderate

4.6 Students' Preferences: Comparison of Gen AI Tools

Students selected their preferred tool on each of four evaluation dimensions: (1) access and availability, (2) ease of use, accessibility, and interaction, (3) task-specific utility, and (4) output quality and reliability. Table 6 presents the distribution of choices. For access and availability, ChatGPT was clearly preferred, selected by 59 students (73.8%), compared with 21 students (26.3%) who selected Google Gemini; no student selected Claude. For ease of use, accessibility, and interaction, ChatGPT ranked first (51 students, 63.8%), followed by Google Gemini (19 students, 23.8%) and Claude (10 students, 12.5%). For task-specific utility, ChatGPT was again the most frequent choice (37 students, 46.3%), followed closely by Google Gemini (32 students, 40.0%) and Claude (11 students, 13.8%).

Chi-square goodness-of-fit tests (Table 7) showed that choices were not evenly distributed across the three tools on any dimension: access and availability, χ^2 (2, N = 80) = 67.08, $p < 0.001$, $w = 0.92$; ease of use, accessibility, and interaction, χ^2 (2, N = 80) = 34.83, $p < .001$, $w = 0.66$; task-specific utility, χ^2 (2, N = 80) = 14.28, $p < .001$, $w = 0.42$; and output quality and reliability, χ^2 (2, N = 80) = 13.83, $p < 0.001$, $w = 0.42$. The effect sizes were large for the first two dimensions and medium-to-large for the last two. Bonferroni-adjusted pairwise comparisons showed that ChatGPT was selected significantly more often than both Google Gemini and Claude for access and availability (both adjusted $p < .001$) and for ease of use (both adjusted $p < .001$), whereas Google Gemini and Claude did not differ significantly on ease of use (adjusted $p = .408$). For task-specific utility, ChatGPT and Google Gemini did not differ significantly (adjusted $p = 1.00$), and both were selected significantly more often than Claude (adjusted $p < .001$ and $p = .006$, respectively).

The absence of a significant difference between ChatGPT and Gemini for task-specific utility suggests that both tools are perceived as comparably useful for academic activities. A different pattern emerged for output quality and reliability: Google Gemini ranked first, selected by 35 students (43.8%), closely followed by Claude with 34 students (42.5%), while ChatGPT was selected by only 11 students (13.8%). Gemini and Claude were each selected significantly more often than ChatGPT (both adjusted $p = .002$) but did not differ from each other (adjusted $p = 1.00$). Thus, although ChatGPT was the most widely used tool and was preferred for access, ease of use, and task-specific usefulness, Google Gemini and Claude were preferred for output quality and

reliability, with Claude remaining competitive despite its comparatively limited overall use. See Figure 3.

Table (6): Students' Preferred Generative AI Tool Across Evaluation Dimensions

Dimension	ChatGPT n (%)	Google Gemini n (%)	Claude n (%)	Highest
Frequency of access and availability	59 (73.8%)	21 (26.3%)	0 (0.0%)	ChatGPT
Ease of use, accessibility, and interaction	51 (63.8%)	19 (23.8%)	10 (12.5%)	ChatGPT
Task-specific utility - perceived usefulness	37 (46.3%)	32 (40.0%)	11 (13.8%)	ChatGPT
Output quality and reliability	11 (13.8%)	35 (43.8%)	34 (42.5%)	Google Gemini

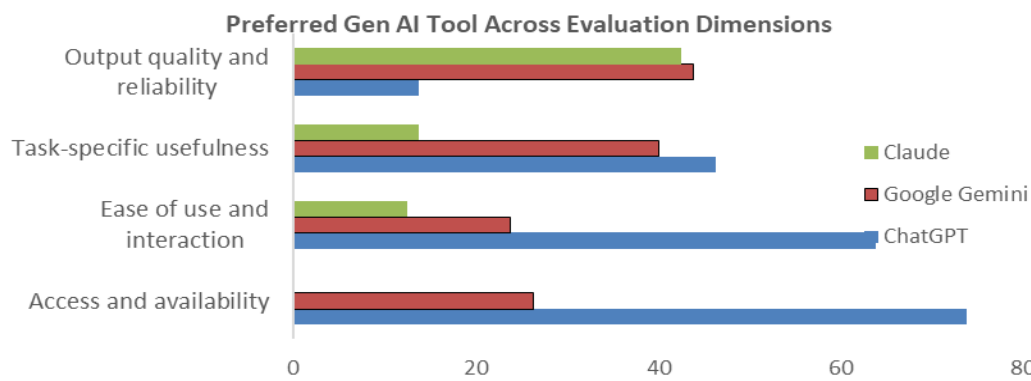


Figure (3): Preferred Gen AI Tools Across Evaluation.

Table (7): Chi-Square Goodness-of-Fit Tests of Tool Preferences Across Evaluation Dimensions.

Dimension	χ^2 (df = 2)	p	Cohen's w	Pairwise differences
Access and availability	67.08	< .001	0.92	ChatGPT > Gemini > Claude
Ease of use, accessibility, and interaction	34.83	< .001	0.66	ChatGPT > Gemini = Claude
Task-specific utility	14.28	< .001	0.42	ChatGPT = Gemini > Claude
Output quality and reliability	13.83	< .001	0.42	Gemini = Claude > ChatGPT

4.7 Students' Awareness of Gen AI Limitations

Table 8 shows six statements assessing students' awareness of the technical and ethical constraints of Gen AI tools, using a five-point Likert scale. Across the six statements, average scores ranged from 2.61 to 2.95, all within the moderate range (grand mean = 2.73, SD = 0.914), and were slightly lower than the scale midpoint of 3.00. This suggests that students' awareness of these limitations was only moderate, notwithstanding their extensive use of the tools.

5. Discussion

This study examined how undergraduate students in Computer Science and Internet Technology at Alasmarya Islamic University use and perceive Gen AI tools. The findings provide evidence of the widespread academic use of ChatGPT, Google Gemini, and Claude, but show that students'

preferences vary according to the purpose and characteristics of each tool. The findings also explore challenges related to language, prompt writing skills, academic integrity, institutional guidance, and the reliability of AI-generated information.

Table (8): Students' Awareness of Gen AI Limitations (N = 80).

Statement	Mean (M)	SD	Interpretation
I understand that generative AI may struggle with complex tasks.	2.95	1.09	Moderate
I understand that generative AI may provide inaccurate information.	2.81	1.10	Moderate
I understand that generative AI may produce irrelevant or inappropriate responses.	2.72	1.11	Moderate
I understand that generative AI may reflect bias and lead to unfair outcomes.	2.67	1.13	Moderate
I understand that reliance on statistical patterns may limit generative AI's usefulness in some contexts.	2.61	1.15	Moderate
I understand that generative AI has limited emotional understanding and empathy.	2.62	1.14	Moderate
Grand Mean	2.73	0.91	Moderate

5.1 Widespread Use of Gen AI for Academic Activities

There was a high level of use of Gen AI tools among the participants. All 80 students reported using ChatGPT, 66 reported using Google Gemini, and 20 reported using Claude. This indicates that ChatGPT has achieved particularly strong adoption among the students in this study, while Gemini has also become an important academic support tool. In contrast, Claude was used by a smaller group of students. This pattern is broadly consistent with the previous literature, showing that ChatGPT has received greater attention and adoption than other Gen AI platforms in higher education, commonly for academic writing, brainstorming, summarizing, research support, programming, and concept clarification in Libyan higher education context. However, the high level of ChatGPT use should not be interpreted as evidence that it is the best tool in all respects. The comparison in this study shows that students selected different tools depending on the evaluation dimension, supporting previous research suggesting that students select particular Gen AI tools according to their academic needs and each tool's perceived strengths (Chatzopoulos et al., 2026).

5.2 Academic Benefits and Perceived Usefulness

The findings show that students use Gen AI for academic activities. All participants reported coding and programming, while 79 students reported graduation project work and assignments. Multimedia and presentation-related activities were also common, followed by concept clarification, idea generation, translation, summarization, rewriting, and proofreading. This broad range of Gen AI use suggests that students do not view Gen AI as a simple question-answering system; instead, they use it at different stages of their academic work. This finding agrees with

Stone (2024) and Zhang et al. (2026), who reported the use of Gen AI for writing support, research assistance, programming, summarization, and personalized academic support.

The extensive use of Gen AI tools in programming and graduation projects is related to the academic disciplines of participants, such as computer science and Internet technology, who are constantly working on programming, solving technical problems, and designing practical projects. From the perspective of the technology acceptance model (TAM), these findings are consistent with the importance of perceived usefulness and perceived ease of use in technology adoption (Davis, 1989), and with Al-Emran et al. (2026), who identified these factors as important in students' adoption of Gen AI tools. On the other hand, perceived usefulness should not be equated with improved learning; Kasneci et al. (2023) have warned that excessive dependence on Gen AI may reduce opportunities for independent analysis and critical thinking. Thus, the educational importance of these tools depends largely on how students use them and evaluate their outputs.

5.3 Differences in Students' Perceptions of ChatGPT, Gemini, and Claude

The study results show that students' preferences for the three tools are linked to specific aspects. ChatGPT appears attractive for regular academic use due to students' familiarity with it, its clear interface, and their perception of its ease of use and usefulness for academic tasks. The preference for Gemini and Claude in terms of output quality and reliability indicates that students are able to differentiate between ease of use and reusability versus perceived output quality. This agrees with Almassaad et al. (2024) and Abbas et al. (2024), who have identified differences among next-generation AI platforms in areas such as pedagogical clarity, technical capability, and integration with broader digital systems, although comparisons between ChatGPT, Gemini, and Claude from the student perspective remain relatively limited in published research. In the current study, ChatGPT remained the dominant tool despite a strong preference for Arabic among the participants, a difference that may reflect the participants' technical specialization and institutional context. This study differs from Swidan et al. (2025) in the UAE context, which suggested a preference for Google Gemini over ChatGPT because of its perceived support for Arabic and access to more up-to-date information.

In the inferential analysis, pairwise comparisons revealed two distinct profiles: ChatGPT was selected significantly more often than both alternatives for access and availability and for ease of use, whereas Gemini and Claude were each selected significantly more often than ChatGPT for output quality and reliability. For task-specific utility, ChatGPT and Gemini did not differ significantly, and both were preferred over Claude.

5.4 Prompt-Writing and AI Literacy

The findings revealed an important gap in constructing effective prompts. This finding suggests that frequent use of Gen AI does not necessarily indicate a high level of AI literacy; students may become users of AI tools without fully developing the skills required to communicate precise instructions, refine queries, evaluate responses, and investigate generated content. This result is compatible with Zhang et al. (2026), who confirmed that AI literacy and institutional support distinguish more meaningful engagement with Gen AI, and with students' concerns about AI-generated content without understanding its limitations and critical evaluation of outputs (Kasneci et al., 2023).

5.5 Academic Integrity and Responsible AI Use

74 students (92.5%) identified plagiarism and academic integrity concerns, including detection by Turnitin or iThenticate, showing that students are aware of the potential conflict between the academic use of Gen AI and academic integrity requirements at Alasmarya Islamic University (AIU). In addition, 71 students (88.8%) indicated a lack of institutional guidelines on AI use as a

challenge, suggesting that students' concerns about academic integrity may relate to responsible and irresponsible AI use. This result is consistent with Bittle (2025) and Rudolph et al. (2023), who indicated plagiarism and academic dishonesty as major concerns surrounding Gen AI adoption in higher education, and it emphasizes the importance of ethical frameworks and developing policies. This finding is important in the Libyan education context; it should help us understand how students address ethical use. The absence of formal AI policies in most Alasmarya Islamic University faculties highlights the need to create university policies that encourage responsible AI use.

5.6 Language Challenge

Most students preferred Arabic when submitting prompts, and many reported relying on AI tools for translation before prompting the model. In addition, a large proportion agreed that limited English proficiency restricted their effective use of AI. English is important for literature reviews and learning to program. The need to translate between Arabic and English may add a layer of difficulty when students write prompts; that language can affect students' perceptions and preferences for Gen AI tools. This is consistent with earlier work on e-learning in Libyan higher education (Al Ghawail et al., 2019) and with Sobaih and Elnasr (2025), who reported a preference for Gemini because of its Arabic support in an Egyptian higher education context.

5.7 Reliability and Over-Adoption

The findings indicate that students reported a lack of institutional guidelines (71 students, 88.8%), over-adoption of AI (63 students, 78.8%), and a lack of knowledge of prompt writing (62 students, 77.5%), and recognized the practical benefits and possible risks of extensive Gen AI use. In addition, 44 students (55.0%) reported concerns about fake references. The finding that 63 students (78.8%) identified over-adoption as a challenge is also consistent with concerns in the literature about over-reliance on Gen AI. Thus, it leads to a weakening of students' independent analytical and critical thinking skills (Kasneci et al., 2023).

5.8 Implications and Contribution of the Study

The findings indicate that Gen AI has become part of students' academic practices in Libyan higher education. Therefore, universities should focus on promoting responsible use through clear policies that define acceptable uses, encourage verification of AI-generated information, and protect academic integrity. Practical AI literacy training is also needed to develop students' skills in prompt construction and source verification. This study contributes to the growing literature by providing a localized comparison of ChatGPT, Google Gemini, and Claude from students' perspective. It extends the literature by examining students' use and perceptions of three Gen AI tools and usefulness, accessibility, language, AI literacy, output quality, independent learning, academic integrity, and institutional support in shaping their use.

5.9 Limitations

This study was conducted at the Faculty of Alasmarya Islamic University, Libya, and focused on final-year IT students. Therefore, the findings may not represent students from other faculties or universities in Libya. This study is limited to female students in Section B of the Faculty of Information Technology; it did not include male students from Section A due to the university's gender-segregation policy and the researcher's academic affiliation with Section B. Consequently, the findings may not reflect the views or usage patterns of the entire university student body, particularly those in other faculties. Furthermore, the study's reliance on a cross-sectional design means that data were collected at a single point in time, whereas student perceptions may evolve alongside advancements in artificial intelligence technologies. Future research should expand the

sample range to include students comprising both genders from different disciplines and faculties in Libya to provide a broader understanding of the adoption of Gen AI in Libyan higher education. Future research should expand the sample range to include students from different disciplines and faculties in Libya to provide a broader understanding of the adoption of Gen AI in Libyan higher education.

6. Conclusion and Recommendations

This study investigated the perceptions, usage patterns, and preferences of final-year female IT students regarding ChatGPT, Google Gemini, and Claude at Alasmarya Islamic University in Libya. The findings show that ChatGPT was the most widely used tool, mainly because of its accessibility, familiarity, and usefulness for programming, literature reviews, and graduation projects. Google Gemini was used as a secondary tool, while Claude had relatively limited use among the participants. This limited use may be partly explained by Claude's limited availability in Libya during the data collection period. The study also identified several challenges related to Gen AI use, including unstable Internet connectivity, power outages, the cost of premium services, limited prompt-writing skills, English proficiency, and insufficient awareness of academic integrity and proper citation practices. The findings suggested that Gen AI can provide valuable academic support, particularly in technical and learning activities. However, its benefits depend on students' ability to evaluate and use AI-generated content responsibly. These findings should be interpreted in light of the study's single-section, female only sample.

This study recommends that Alasmarya Islamic University establish standardized guidelines on the ethical use of Gen AI tools, including permissible academic applications, rigorous citation and attribution protocols, and compliance procedures with plagiarism-detection programs such as Turnitin to safeguard academic integrity. Embedding AI and digital literacy into the curriculum is also recommended, along with students' training modules and workshops on effective prompt engineering and critically evaluating the accuracy and reliability of Gen AI responses. Improving technological infrastructure, stable Internet connectivity, and providing solutions to ongoing power outages address financial and technical barriers to access by providing educational licenses with AI providers and investing in improvements. University administrations should explore subsidized student access to premium AI features or contracting to provide educational licenses with AI providers.

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