

ISSUES

# A Systematic Needs Analysis for AI Literacy Integration in English for Academic Purposes for University Learners

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The rapid expansion of artificial intelligence (AI) in higher education has transformed the literacy demands placed on university learners, particularly within English for Academic Purposes (EAP). This study investigates the AI literacy needs of EAP learners in Egypt through a systematic needs analysis integrating the EAP Needs Analysis model (Target Situation, Present Situation, and Learning Needs) with a contemporary AI Literacy Framework. Data were collected from 364 undergraduate students across five national universities using a structured survey that examined AI-supported academic English tasks, current AI literacy abilities, attitudes, barriers, and training needs. Results revealed widespread adoption of AI tools, with 92% of participants using AI for academic English activities, especially reading, writing, translation, and grammar support. However, participants demonstrated only fair proficiency in key AI literacy competencies, with notable gaps in prompt writing, evaluating AI-generated content, identifying bias, and tool selection. Ethical use and citation practices were accompanied by significant concerns about academic integrity and unclear institutional policies. Learners expressed moderate but consistent needs for AI literacy training and preferred structured, multimodal instructional formats. The findings highlight a clear mismatch between learners' extensive AI use and their limited critical and ethical AI competencies, underscoring the need to embed AI literacy as a core component of contemporary EAP curriculum design.

## Introduction

The rapid proliferation of artificial intelligence (AI) in higher education has prompted a fundamental rethinking of what constitutes essential literacy for academic success. Where academic literacy demands were once limited to digital or information literacy, contemporary learners now require the capacity to understand, evaluate, and responsibly use AI tools that increasingly mediate academic communication, research, and knowledge production (Atias & Mawasi, 2025; Guan et al., 2025). In language education, the integration of AI, particularly large language models (LLMs), intelligent tutoring systems, and automated text-processing tools, has expanded at unprecedented speed, reshaping how students read academic texts, compose assignments, process lecture content, and prepare presentations (Chandel & Lim, 2025; Kartal, 2023; Lu et al., 2025). As AI becomes embedded in routine academic tasks, English for Academic Purposes

(EAP) programs face a clear imperative to re-examine the competencies required for effective academic English performance in AI-mediated environments.

Recent research indicates that learners are adopting AI tools in ways that both enhance and complicate academic engagement. These tools can support comprehension, scaffold academic writing, facilitate multilingual access, and provide individualized feedback (Hakim, 2025; Ngo & Hastie, 2025). At the same time, concerns related to bias, accuracy, over-reliance, and ethical use remain pressing (Baldassarre et al., 2024; Schneider & Oliveira, 2025). AI literacy has thus emerged as a foundational capability that influences academic reading, writing, critical evaluation, and learner agency (Ghimire, 2025; Liu et al., 2025; Zou et al., 2025). Despite this heightened global focus, empirical investigations into AI literacy within EAP programs remain limited, especially in contexts where digital transformation is progressing rapidly, but curriculum design has not yet adapted to AI-mediated practices. This gap is particularly evident in the Middle East and North Africa (MENA) region, where university learners actively use AI tools for reading, writing, translation, research, and oral presentation preparation, yet EAP courses seldom incorporate explicit instruction on AI literacy or academic integrity in AI use.

Needs analysis has long been central to English for Specific Purposes (ESP), enabling instruction to align with learners' academic and professional communication needs (Hyland, 1996). As AI transforms academic literacy practices, the scope of needs analysis must expand accordingly, accounting for competencies such as prompt construction, critical evaluation of AI-generated content, integration of AI support into academic writing, and ethical decision-making in AI use (Kim & Kim, 2025; Xu et al., 2025). Contemporary frameworks conceptualize AI literacy as a multidimensional construct involving understanding how AI works, using AI tools effectively, evaluating and creating with AI, and engaging with AI ethically and responsibly (Chee et al., 2025). These competencies intersect directly with core EAP skills: reading academic texts now involves verifying AI-generated summaries; writing tasks require balancing AI support with authorial integrity; listening may be mediated by AI transcription; and speaking tasks increasingly draw on AI-assisted content planning. Understanding these intersections is essential for designing EAP instruction that remains pedagogically relevant and epistemically responsible in AI-rich learning environments.

In response to these challenges, the present study adopts a systematic needs analysis approach informed by the ESP tradition and contemporary AI literacy scholarship. The purpose of this study is to identify the AI literacy competencies required for academic English learning, examine university learners' current AI literacy levels and attitudes toward AI integration, and

determine their perceived training needs within EAP contexts. By analyzing these three dimensions of required competencies, existing capabilities, and learners' expectations, the study offers an evidence-based foundation for the development of AI-integrated EAP curricula.

The study contributes to the field in several important ways. Theoretically, it bridges ESP needs analysis with AI literacy research, offering an integrated analytical lens for understanding AI-mediated academic English practices. Empirically, it provides a data-driven examination of EAP learners' AI literacy needs within the MENA region, addressing a significant gap in current literature. Pedagogically, it identifies priority competencies and training needs that can inform curriculum design, instructional strategies, and assessment practices in AI-rich environments. Institutionally, it offers insights that can support universities in developing responsible-use policies, AI integrity guidelines, and professional development initiatives aligned with learners' evolving academic realities. By clarifying what EAP learners need to know, what they can currently do, and where the gaps lie, the study contributes to the development of AI-responsive academic English education that is ethical, equitable, and aligned with the demands of contemporary higher education.

## **Literature review**

The rapid advancement of AI has transformed communication, knowledge production, and learning practices across higher education. In applied linguistics, the integration of AI tools into EAP learning environments has reshaped how students engage with academic texts, construct written arguments, evaluate information, and participate in academic discourse (Chandel & Lim, 2025; Lu et al., 2025). As AI becomes increasingly embedded in academic tasks, the concept of AI literacy has emerged as a critical competence for both language learners and educators. This literature review examines the theoretical and empirical foundations that inform the present study, focusing on four major strands: (a) conceptualizations of AI literacy; (b) AI in language education and academic English tasks; (c) critical and ethical dimensions of AI use; and (d) needs analysis in ESP/EAP as a framework for identifying AI literacy requirements.

### ***Conceptualizations of AI literacy***

AI literacy has evolved from earlier notions of digital and information literacy, reflecting broader shifts toward algorithmic mediation of meaning-making and academic practices. Contemporary frameworks position AI literacy as a multidimensional construct encompassing understanding of how AI works, the ability to use AI tools effectively, critical evaluation of AI-generated outputs, and ethical and responsible engagement with AI systems (Atias & Mawasi, 2025; Chee et al., 2025). Systematic reviews highlight the growing

diversity of AI literacy models, which increasingly integrate technical, cognitive, critical, and socio-cultural dimensions (Krsmanovic & Archan, 2025; Zhang et al., 2025).

Emerging research emphasizes that AI literacy is not a single skill set but a progressive developmental pathway requiring explicit instruction, practice, and reflection. Chee et al. (2025) proposed a competency-based progression for AI literacy, while Traga Philippakos & Rocconi (2025) underscored the role of professional development in shaping educators' AI literacy knowledge and confidence. In language education contexts, scholars argue that AI literacy should be framed as both an analytical competency – understanding what AI can and cannot do – and a communicative competency – enabling learners to participate in AI-mediated academic practices (Ghimire, 2025; Lu et al., 2025). Together, these models offer a comprehensive foundation for examining the competencies required for AI-supported academic English performance.

### ***AI in language education and academic English tasks***

The integration of AI tools has expanded rapidly in English language teaching (ELT), influencing reading, writing, listening, and speaking practices. Numerous studies document the benefits of AI for supporting learners' comprehension, idea generation, vocabulary development, and text revision (Hakim, 2025; Z. Huang et al., 2025). AI-powered writing assistants, such as LLMs and grammar-enhancement tools, enable iterative drafting, provide linguistic feedback, and support genre awareness, although scholars caution that these tools should complement and not replace core writing processes (Ngo & Hastie, 2025).

Research also highlights the role of AI in facilitating academic reading and listening. AI-generated summaries, translation systems, and transcription tools can support multilingual comprehension of complex academic texts and lectures (Chandel & Lim, 2025; Lin et al., 2024). In speaking and presentation contexts, AI tools help learners rehearse, organize ideas, and create visual or multimodal materials, enhancing confidence and clarity (Wang et al., 2025).

Beyond cognitive support, AI influences learners' identities, engagement, and agentic practices. Studies on AI-mediated, informal digital learning indicate that students leverage generative AI to explore content independently, experiment with academic genres, and expand their communicative repertoires (Liu et al., 2025; Zou et al., 2025). This shift underscores the need for EAP pedagogy to address not only language skills but also new modes of AI-augmented academic participation.

### ***Critical and ethical dimensions of AI use***

While AI offers considerable pedagogical benefits, the literature highlights a parallel need for critical AI literacy to address the challenges associated with AI-mediated learning. Scholars emphasize risks such as biased outputs, misinformation, hallucinations, and a lack of transparency in algorithmic decision-making (Baldassarre et al., 2024; Schneider & Oliveira, 2025). These risks carry particular implications for academic integrity, where the potential for plagiarism, authorship ambiguity, and over-reliance on AI-generated content is amplified (Bannister, 2024; Moran & Pyles, 2025).

Critical AI literacy frameworks emphasize the importance of equipping learners with the ability to scrutinize AI outputs, recognize limitations, identify biases, and maintain authorial agency in academic work (Pribble, 2024; Shin & Parde, 2025). Ethical AI use also includes understanding institutional policies, citation expectations, and boundaries of acceptable support (Mohammadi, 2024). As AI tools become commonplace in academic writing, reading, and research, critical-ethical competencies become as essential as linguistic ones, positioning AI literacy as a fundamental dimension of academic literacy.

### ***Needs analysis in ESP/EAP and its relevance to AI literacy***

Needs analysis has long served as the cornerstone of ESP and EAP curriculum development, enabling instructors to identify the linguistic, communicative, and strategic competencies required for success in specific academic contexts (Hyland, 2000; White, 1995). Classic models emphasize three interdependent components: Target Situation Analysis (TSA), Present Situation Analysis (PSA), and Learning Needs Analysis (LNA). These components support the systematic identification of what learners need to do, what they can currently do, and what training is necessary to bridge the gap.

Recent scholarship suggests that needs analysis must evolve to capture emerging literacies associated with digital transformation and AI-mediated learning (Kim & Kim, 2025; Lin et al., 2024). Studies examining AI use in specific academic skills (Wang et al., 2025) or broader digital literacy practices (Nualprasert et al., 2025) indicate strong learner demand for curriculum-integrated AI training. However, existing research tends to focus on narrow skill areas or specific tools rather than comprehensive AI literacy needs across EAP tasks. Moreover, most studies emphasize teacher perspectives or pre-service populations (Tuan et al., 2025; Ye et al., 2025), leaving university learners' needs underexamined.

Given these gaps, a systematic needs analysis that integrates ESP methodologies with contemporary AI literacy frameworks is essential for understanding the competencies required for effective and responsible AI use

in academic English learning. This synthesis provides a robust foundation for designing EAP curricula that are aligned with learners' evolving academic realities and the demands of AI-mediated academic communication.

## **Theoretical framework**

The present study is situated at the intersection of English for Academic Purposes (EAP) and emerging research on AI literacy, drawing on an integrated theoretical framework that connects established principles of EAP needs analysis with contemporary understandings of AI-mediated academic communication. As EAP increasingly incorporates digital and AI-enhanced practices, learners' academic English proficiency can no longer be conceptualized solely in linguistic terms but must also reflect their ability to navigate, evaluate, and ethically apply AI tools in academic contexts. This necessitates a theoretical foundation that captures both the traditional EAP focus on academic communicative demands and the evolving literacies required in AI-rich learning environments.

Although EAP has developed into a distinct field within applied linguistics, its needs analysis tradition is historically grounded in the broader English for Specific Purposes (ESP) paradigm. Classic ESP scholarship positions needs analysis as the cornerstone of course design, structured around three interrelated components: the Target Situation, the Present Situation, and the Learning Needs (Hyland, 1996; White, 1995). In EAP contexts, this tripartite model offers a systematic means of determining what academic tasks learners must perform, what their current abilities and attitudes are, and what forms of instruction are required to bridge the gap. By adopting this model, the present study applies a well-established and empirically validated framework to the contemporary challenge of integrating AI literacy into academic English learning.

Complementing this structural model is the AI Literacy Framework, which provides the conceptual categories necessary for defining the competencies relevant to learners' engagement with AI in academic tasks. Recent research conceptualizes AI literacy as a multidimensional construct encompassing knowledge, skills, critical awareness, and ethical understanding (Atias & Mawasi, 2025; Chee et al., 2025; Zhang et al., 2025). Four components are widely recognized across the literature:

1. Know and understand AI, referring to foundational knowledge about AI systems and their limitations.
2. Use and apply AI, capturing practical proficiency in employing AI tools for learning and problem-solving.
3. Evaluate and create with AI, representing the ability to critically assess AI-generated output and integrate it meaningfully into academic work.

4. AI ethics, which concerns responsible use, transparency, academic integrity, and awareness of issues such as bias and misinformation.

These categories provide a comprehensive conceptual lens for understanding the competencies required for AI-mediated reading, writing, listening, speaking, and research processes in EAP. Accordingly, integrating these two frameworks allows for a holistic examination of EAP learners' AI literacy needs. The EAP Needs Analysis model supplies the structural process, clarifying *how* needs should be examined, while the AI Literacy Framework supplies the content, clarifying *what* those needs consist of. Together, they enable a rigorous inquiry into academic tasks that increasingly involve AI-based summarization, paraphrasing, transcription, feedback generation, literature search support, and multimodal content creation. This integrated approach aligns with emerging scholarship calling for EAP pedagogies that incorporate digital and AI literacies as core academic competencies rather than auxiliary skills (Lu et al., 2025; Ngo & Hastie, 2025).

Within this combined theoretical foundation, the study conceptualizes Target Situation Analysis as the identification of the AI-supported academic English tasks learners are expected to perform; Present Situation Analysis as learners' current AI literacy levels, usage patterns, familiarity, and attitudes; and Learning Needs Analysis as the instructional priorities required to enhance their academic performance in AI-enhanced environments. By linking these components, the framework acknowledges that contemporary academic literacy involves both linguistic proficiency and algorithmic competence, which are skills necessary for participating effectively and ethically in AI-mediated higher education settings. This integrated theoretical framework therefore provides a robust and contemporary foundation for analysing EAP learners' AI literacy needs and guiding the design of academic English curricula that respond to the realities of AI-driven academic communication and learning.

## Methodology

This study employed a quantitative, survey-based research design to systematically investigate university learners' AI literacy needs within English for Academic Purposes (EAP) contexts in Egypt. Guided by the integrated EAP Needs Analysis and AI Literacy Framework, the methodology aimed to capture learners' required competencies (Target Situation), their current AI literacy levels and attitudes (Present Situation), and their perceived training needs (Learning Needs).

## ***Research design***

The study adopted a cross-sectional descriptive research design, commonly used in needs analysis studies in EAP and AI literacy research (Chee et al., 2025; Ngo & Hastie, 2025). This design enabled the collection of data at a single point in time from a large, diverse group of university learners to identify their AI literacy needs for academic English tasks. A survey questionnaire was selected as the primary instrument due to its suitability for examining attitudes, self-reported competencies, usage patterns, and perceived needs across large populations. The design was structured around the three components of the EAP Needs Analysis model: Target Situation Analysis (TSA); Present Situation Analysis (PSA); and Learning Needs Analysis (LNA). These were operationalized through questionnaire sections aligned with the four dimensions of AI literacy: understanding AI, using AI tools, evaluating AI-generated output, and ethical AI use.

## ***Participants and sampling***

Participants were drawn from undergraduate students enrolled in EAP courses across five national universities in Egypt. A convenience sampling strategy was employed, targeting learners who were readily accessible and willing to participate. This sampling approach, while non-probabilistic, is widely accepted in large-scale educational and EAP needs analysis research, especially when institutions and student cohorts vary significantly in size and accessibility (F. Huang & Derakhshan, 2025). Efforts were made to include participants from diverse academic disciplines, including humanities and social sciences, business, engineering, sciences, and health/medical fields, and from different undergraduate years to enhance representation within the constraints of the sampling method. A total of 364 valid responses were included in the analysis, representing an adequate sample size for quantitative needs assessment and descriptive statistical analysis.

## ***Instrumentation***

Data were collected using a structured questionnaire developed specifically for this study. The instrument was informed by:

- the EAP Needs Analysis model (TSA–PSA–LNA),
- contemporary AI literacy frameworks (Atias & Mawasi, 2025; Chee et al., 2025; Li et al., 2026),
- prior AI literacy instruments validated in L2 and academic settings (F. Huang & Derakhshan, 2025; Xu et al., 2025),
- existing empirical research on AI use in English learning and academic communication (Liu et al., 2025; Ngo & Hastie, 2025).

The questionnaire consisted of four main sections:

1. Demographic and background information: Participants' gender, age, academic level, field of study, and self-assessed general academic English proficiency.
2. Target Situation Analysis (TSA): Items measuring the *importance* and *frequency* of AI-supported academic English tasks across reading, writing, listening, speaking, and critical AI literacy competencies. Respondents rated these using a five-point Likert scale.
3. Present Situation Analysis (PSA): Items assessing learners' current AI literacy levels, familiarity with AI tools, frequency of use, types of academic tasks supported by AI, and perceived barriers or challenges.
4. Learning Needs Analysis (LNA): Items evaluating learners' perceived needs for AI literacy training in academic English, including prompt-writing skills, ethical AI use, evaluation of AI-generated content, citation of AI assistance, and integration of AI into research processes.

To strengthen construct validity, items were reviewed by three experts in EAP, educational technology, and AI literacy. Minor revisions were made for clarity, relevance, and alignment with the conceptual framework.

### ***Scoring and measurement***

Likert-scale items were scored numerically (1–5), with higher scores representing greater importance, higher competency, or stronger agreement depending on the section. For categorical items (e.g., AI tools used, training preferences), frequencies and percentages were calculated.

Subscale scores were computed for:

- AI Literacy for Reading
- AI Literacy for Writing
- AI Literacy for Listening
- AI Literacy for Speaking
- Critical AI Literacy Competencies
- AI Literacy Needs

These subscales corresponded to the four dimensions of AI literacy and the core components of academic English tasks.

## ***Data collection procedures***

Data were collected online using a secure survey platform. Participants received a brief explanation of the study purpose, followed by a consent form assuring anonymity, voluntary participation, and confidentiality. No identifying information was collected, and participants could withdraw at any stage without penalty. The survey required approximately 10–12 minutes to complete.

### **1. Data analysis**

Data were analysed using descriptive statistics to align with the purpose of needs analysis and to answer the three research questions. Analysis procedures included:

- frequencies and percentages for categorical variables (e.g., AI tool usage, barriers),
- means and standard deviations for Likert-scale items assessing importance, ability, familiarity, attitudes, and training needs,
- rank-order analysis to identify priority competencies and training needs,
- composite mean scores to evaluate overall AI literacy levels and needs across categories.

These analytic methods are consistent with quantitative needs analysis studies in EAP and emerging AI literacy research, where the primary aim is to identify competency gaps and instructional priorities rather than to test predictive or causal relationships.

## ***Ethical considerations***

The study adhered to ethical guidelines for research involving human participants. Approval was obtained from the relevant institutional review board. Participation was voluntary, informed consent was secured electronically, and data were stored anonymously. The study avoided any form of academic risk, coercion, or data misuse and complied with institutional and national research ethics policies.

## ***Responsible use of AI tools***

This study adhered to principles of responsible and transparent use of artificial intelligence (AI). Generative AI tools were not used in the design of the research instrument, data collection, or statistical data analysis. All questionnaire items were developed by the author based on established EAP needs analysis models and contemporary AI literacy frameworks.

Generative AI tools (e.g., ChatGPT) were used only at a limited and supportive level during manuscript preparation, primarily for language refinement, stylistic consistency, and proofreading of selected sections. All intellectual decisions regarding study design, data interpretation, argumentation, and conclusions were made exclusively by the author, who retains full responsibility for the content of the manuscript.

### ***Data and materials availability***

The full questionnaire instrument (all items and scoring procedures) is provided in Appendix A. The de-identified dataset generated during the current study is not publicly available due to institutional ethical restrictions and the conditions under which participant consent was obtained. Aggregated data supporting the findings are available from the author upon reasonable request. No custom analysis code was used beyond standard descriptive statistical procedures.

### **Results**

This section presents the findings of the study based on descriptive statistical analyses of participants' characteristics, AI use patterns, AI literacy competencies, attitudes toward AI, and perceived training needs in EAP contexts. Eight tables summarize the results, each followed by an interpretive commentary.

#### ***Participant characteristics***

The sample reflected a balanced representation of genders and academic disciplines, with the highest proportion from humanities and social sciences. Most participants rated their EAP proficiency as intermediate or upper-intermediate, suggesting that the majority possess functional but developing academic English skills. This distribution provides a suitable context for examining AI literacy needs across different proficiency levels and fields of study. [Table 1](#) presents the information.

#### ***Target Situation Analysis: AI-supported academic English tasks***

Participants reported frequent engagement with AI-enhanced academic tasks, particularly in reading, writing, and speaking ([Table 2](#)). Critical AI literacy competencies, such as evaluating AI-generated content and ethical use, received the highest importance ratings, reflecting students' recognition that effective academic work increasingly requires the ability to assess and manage AI outputs. Listening tasks showed lower frequency, suggesting that AI-based lecture processing tools are less commonly used or less integrated into academic routines.

Table 1. Participant characteristics (n = 364)

Variable	Category	n	%
Gender	Female	194	53.3
	Male	170	46.7
Age	18–20	159	43.7
	21–23	125	34.3
	24 or above	80	22.0
Academic level	Year 1	128	35.2
	Year 2	108	29.7
	Year 3	73	20.1
	Year 4+	55	15.1
Field of study	Humanities & Social Sciences	115	31.6
	Business/Management	98	26.9
	Health Sciences/Medicine	52	14.3
	Engineering & Technology	45	12.4
	Other	54	14.9
Self-assessed academic English proficiency	Beginner	93	25.5
	Intermediate	167	45.9
	Upper-intermediate	77	21.2
	Advanced	27	7.4

Table 2. Target Situation Analysis (AI-augmented academic English tasks)

Domain	Mean (frequency)	SD	Mean (importance)	SD	Interpretation
AI Literacy for Reading	3.57	1.05	3.53	1.10	Often / Important
AI Literacy for Writing	3.45	0.98	3.46	0.99	Often / Important
AI Literacy for Listening	3.05	1.30	3.31	1.18	Sometimes/ Moderately Important
AI Literacy for Speaking	3.43	1.16	3.43	1.16	Often / Important
Critical AI Literacy Competencies	3.58	1.05	3.65	1.06	Often / Important
Overall	3.42	0.93	3.48	0.97	Often / Important

### *AI use patterns in academic English*

AI use for academic English tasks was nearly universal, with more than 92% of students reporting experience with AI tools. Large language models (LLMs) were the most dominant tool type, followed by translation and grammar-checking applications. The high reliance on AI for grammar correction and reading comprehension indicates that AI is functioning as both a linguistic support mechanism and a cognitive aid. However, nearly half of the participants described themselves as only “neutral” in familiarity, suggesting a gap between high usage frequency and confidence or competence in AI literacy ([Table 3](#)).

Table 3. AI use in academic English tasks

Item	Category	n	%
Used AI tools for academic English	Yes	335	92.03
	No	29	7.97
Frequency of AI use	Never	32	8.79
	Rarely	50	13.74
	Sometimes	134	36.81
	Often	84	23.08
	Very Often	64	17.58
Top academic tasks supported by AI (n = 335)	Grammar checking	218	59.89
	Reading comprehension	201	55.22
	Translation	198	54.40
	Writing assignments	145	39.84
	Research / literature review	139	38.19
	Preparing presentations	118	32.42
	Reviewing lectures	108	29.67
Most used tools	ChatGPT/LLMs	268	73.63
	AI translation tools	137	37.64
	AI grammar checkers	133	36.54
Familiarity with AI	Very familiar	48	13.19
	Familiar	106	29.12
	Neutral	157	43.13
	Unfamiliar	40	10.99
	Very unfamiliar	13	3.57

Table 4. Ability to use AI tools in academic English (n = 364)

Competency Area	Mean	SD	Ability Level	Rank
Ethical use and citation	3.46	1.434	Good	1
Integrating AI with own writing	3.38	1.447	Fair	2
Evaluating AI-generated content	3.37	1.363	Fair	3
Understanding AI limitations	3.27	1.439	Fair	4
Identifying biases	3.25	1.392	Fair	5
Writing effective prompts	3.22	1.430	Fair	6
Choosing appropriate AI tools	3.18	1.509	Fair	7
<b>Overall ability</b>	3.30	0.82	Fair	–

### *Present Situation Analysis: AI literacy abilities*

Overall, AI literacy ability was rated at a **fair** level, indicating substantial room for improvement. Ethical and responsible use received the highest mean score, likely due to growing institutional emphasis on integrity and AI disclosure policies. Conversely, prompt writing, bias detection, and tool selection ranked lowest, showing that students lack deeper AI operational skills. These areas represent priority targets for AI literacy training in EAP courses ([Table 4](#)).

Table 5. Barriers to using AI tools (n = 364)

Barrier	n	%
Academic integrity concerns	158	43.41
Unclear university policies	122	33.52
Language barriers	102	28.02
Lack of knowledge about usage	99	27.20
Difficulty writing prompts	1	0.27
<b>No barriers</b>	76	20.88

Table 6. Attitudes toward AI tools in academic English

Item	Mean	SD	Interpretation	Rank
AI improves writing quality	3.57	1.22	Agree	1
EAP courses should include AI training	3.52	1.15	Agree	2
Concern about over-reliance	3.50	1.21	Agree	3
Ethical concerns about AI	3.41	1.14	Agree	4
Confidence using AI	3.32	1.15	Neutral	5
<b>Overall attitude</b>	3.47	0.91	Agree	–

### *Barriers to using AI tools*

The most significant barriers were concerns about academic integrity and uncertainty surrounding institutional AI policies. These findings suggest that students are willing to use AI tools but lack clarity on acceptable practices. Language-related limitations and lack of knowledge about effective AI use also reflect the need for structured instruction. The extremely low percentage reporting difficulty in prompt writing (0.27%) is likely due to students not recognizing prompt engineering challenges as a barrier, despite low ability scores in this area (see [Table 5](#)).

### *Attitudes toward AI in academic English*

Learners showed overall positive attitudes toward AI-supported academic English learning ([Table 6](#)). They strongly believed that AI enhances writing quality and supported the integration of AI literacy into EAP curricula. However, concerns about over-reliance and ethical implications were also prominent. Neutral levels of confidence suggest that although students use AI frequently, they still feel uncertain about their competence. This is consistent with earlier findings of fair ability levels.

### *Perceived training needs in AI literacy*

Training needs were consistently rated at moderate levels, with the highest demand for instruction on citation of AI use, prompt engineering, integrating AI into research workflow, and evaluating AI output ([Table 7](#)). These areas align closely with the lowest ability scores identified earlier, confirming clear and actionable gaps between current competencies and academic requirements.

Table 7. Perceived training needs (n = 364)

Training area	Mean	SD	Need level	Rank
Proper citation of AI	3.21	1.24	Moderate	1
Writing effective prompts	3.18	1.27	Moderate	2
Integrating AI in research	3.16	1.26	Moderate	3
Critical evaluation of AI output	3.16	1.25	Moderate	4
Ethical AI use	3.09	1.28	Moderate	5
AI for reading/summarizing	3.05	1.22	Moderate	6
AI tools for academic writing	3.02	1.25	Moderate	7
<b>Overall need</b>	3.12	1.12	Moderate	–

Table 8. Preferred training methods (n = 364)

Method	n	%
Online tutorials or video courses	176	48.35
In-class workshops	150	41.21
Guest lectures from experts	119	32.69
Written guides/manuals	116	31.87
Hands-on practice with feedback	105	28.85
Peer learning groups	70	19.23

### *Preferred training formats*

Students expressed a strong preference for online tutorials and in-class workshops, emphasizing the need for flexible but structured learning formats (Table 8). Lower interest in peer learning groups suggests that learners prefer guided, expert-led instruction for AI literacy development. In summary, the results revealed that university EAP learners in Egypt extensively engage with AI tools across a wide range of academic English tasks, particularly in reading, writing, and grammar support. AI use was nearly universal, and large language models, such as ChatGPT emerged as the dominant tools. Students reported high frequency and high perceived importance of AI-supported academic activities, especially those requiring critical evaluation of AI-generated content and ethical decision-making. Despite this widespread use, students assessed their own AI literacy abilities as only fair, with notable weaknesses in prompt writing, identifying bias, and selecting appropriate tools. Barriers such as concerns over academic integrity, unclear institutional policies, and language constraints further complicated learners' engagement with AI in academic contexts. Attitudes toward AI were generally positive, with students recognizing its value for improving academic writing and expressing clear support for integrating AI literacy within EAP instruction.

Across all areas of the needs analysis, students demonstrated moderate but consistent demand for structured AI literacy training. The highest perceived needs centered on properly citing AI use, developing effective prompts, critically evaluating AI-generated content, and integrating AI tools into research processes. Preferences for training formats favored flexible

approaches such as online tutorials alongside guided, instructor-led workshops, indicating learners' desire for both autonomy and expert support. Taken together, the results reveal a clear gap between the frequency and importance of AI-supported academic English tasks and students' current AI literacy skills. This gap underscores an urgent need for EAP curricula that systematically embed AI literacy components, particularly those addressing critical evaluation, ethical use, and academic research applications.

## Discussion

The findings of this study provide a comprehensive picture of the emerging AI literacy landscape among university EAP learners in Egypt. Consistent with global trends in AI-mediated language learning (Chandel & Lim, 2025; Liu et al., 2025), students in this study demonstrated a high degree of engagement with AI tools for a wide range of academic English tasks. The near-universal usage rate, particularly of large language models (LLMs) such as ChatGPT, strongly suggests that AI has already become an integral part of students' academic literacy practices. This aligns with recent studies emphasizing AI's growing role in reading comprehension, writing development, and autonomous learning in higher education (F. Huang & Derakhshan, 2025; Ngo & Hastie, 2025).

Notably, students perceived AI-supported reading and writing processes as highly important, reflecting the centrality of these skills in EAP courses. However, the elevated importance placed on critical AI literacy competencies, such as evaluating AI-generated content, identifying limitations, and ensuring ethical use, signals a shift from viewing AI merely as a linguistic support tool to recognizing its epistemic and evaluative implications in academic work, an orientation increasingly emphasized in contemporary AI literacy research (Atias & Mawasi, 2025).

Despite the high levels of AI engagement, students' self-reported AI literacy abilities remained at a fair level, revealing a considerable gap between the demands of AI-mediated academic tasks and learners' current competencies. Weaknesses in prompt writing, detecting bias, and selecting appropriate tools correspond with patterns observed internationally, where learners often demonstrate extensive AI exposure but limited procedural, critical, and ethical knowledge (Chee et al., 2025; Traga Philippakos & Rocconi, 2025). The comparatively higher competence in ethical use and citation may reflect institutional emphasis on academic integrity yet concerns about plagiarism and unclear university policies were among the most prominent barriers reported. These findings echo Bannister (2024) and Mohammadi (2024), who argue that the rapid adoption of AI in academic settings has outpaced institutional guidance, leaving learners uncertain about acceptable practices. The lack of confidence reported by many participants further highlights a developmental mismatch: students frequently use AI tools but do not feel adequately equipped to use them critically, responsibly, and strategically.

The moderate training needs reported across all dimensions underscore the necessity of integrating explicit AI literacy instruction into EAP curricula. Learners expressed a particular need for training in citing AI tools, writing effective prompts, and evaluating AI-generated content. Such skills are increasingly recognized as foundational to academic work in AI-rich learning environments (Guan et al., 2025; Xu et al., 2025). These needs map directly onto the AI Literacy Framework adopted in this study, showing that learners require support across all four dimensions: understanding AI, applying AI tools, evaluating AI outputs, and using AI ethically. Similarly, the preference for blended training formats, such as online tutorials complemented by in-class workshops, aligns with international best practices that advocate multimodal, iterative approaches to AI literacy development (Ioannou et al., 2025; Tour et al., 2025).

Importantly, the results reinforce the relevance of the EAP Needs Analysis model as a structural foundation for identifying AI literacy requirements in academic contexts. The strong alignment between Target Situation demands, Present Situation gaps, and Learning Needs priorities demonstrates that the TSA–PSA–LNA framework remains effective for navigating emerging literacies in rapidly evolving technological landscapes. At the same time, the integration of the AI Literacy Framework enabled the study to address competencies not traditionally encompassed in EAP needs analysis, such as understanding algorithmic bias, navigating transparency issues, and producing responsible AI-enhanced academic work. These outcomes call for reconceptualizing EAP pedagogies to include critical, ethical, and evaluative AI literacies as core academic competencies (Ghimire, 2025; Schneider & Oliveira, 2025).

Overall, the findings indicate that while AI tools are embedded in students' academic English learning, their effective and ethical use requires purposeful instruction. The study highlights the necessity of redesigning EAP curricula to integrate AI literacy components that address both the linguistic and cognitive dimensions of academic communication in the age of generative AI. Such integration can help bridge the identified gap between practice and proficiency, ensure responsible and informed AI use, and better prepare learners for the academic and professional demands of increasingly AI-mediated knowledge environments.

## **Conclusion**

This study set out to systematically examine the AI literacy needs of university learners in English for Academic Purposes (EAP) courses, drawing on an integrated framework that combined the EAP Needs Analysis model with contemporary AI literacy dimensions. The findings reveal that AI tools have become deeply embedded in students' academic English practices, particularly for reading, writing, translation, and idea generation. Learners not only frequently rely on AI tools but also perceive them as essential

for completing core academic tasks. At the same time, their self-reported competencies indicate only fair levels of AI literacy, with notable gaps in prompt writing, evaluating AI output, identifying bias, and selecting appropriate tools. These gaps suggest that while AI is widely used, it is not yet widely understood in a pedagogically meaningful or ethically informed way.

The results further demonstrate that learners strongly support the integration of AI-related instruction within EAP curricula and perceive moderate but consistent needs for training across all AI literacy dimensions. Their preferred training formats of structured online resources and instructor-led workshops indicate a desire for systematic, guided scaffolding rather than informal exploration. Collectively, the findings underscore an urgent need for EAP programs to move beyond traditional language-focused instruction and adopt a more holistic, AI-aware approach to academic literacy. Embedding AI literacy within EAP courses can help bridge the gap between the demands of AI-mediated academic tasks and learners' current capabilities, ensuring that students develop the skills required to use AI tools critically, responsibly, and effectively in higher education contexts.

By integrating both linguistic and AI-oriented competencies, EAP curricula can better equip learners to navigate academic communication in a rapidly evolving technological landscape. As generative AI continues to reshape reading, writing, knowledge construction, and academic integrity, developing informed and ethically grounded AI users is no longer optional but a fundamental component of contemporary academic literacy. Future research should extend these findings through longitudinal designs, triangulated data sources, and intervention-based approaches to evaluate how AI literacy training influences learners' performance, autonomy, and academic judgment over time.

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### ***Conflict of Interest***

The author declares no conflict of interest.

### ***Ethics approval***

Ethical approval for this study was granted by the Office of the Vice President for Academic Affairs, Alamein International University (New Alamein City, Egypt) on 30 October 2024, Approval Reference No. 5153. The approval covered data collection involving undergraduate students enrolled in EAP courses across Alamein International University and other four national universities in Egypt. Formal notification of the ethical clearance was communicated to the participating institutions prior to data collection. All procedures complied with institutional ethical standards for research involving human participants. Participation was voluntary, informed consent was obtained electronically prior to data collection, and all responses were collected and analyzed anonymously.

### ***Author contributions***

The author solely conceived the study, designed the research instrument, collected and analysed the data, interpreted the findings, and wrote the manuscript.



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