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EXPLORING EFL STUDENTS' PERCEPTIONS OF AI INTEGRATIONS THROUGH THE BRAIN-TO-BRAINWARE LENS

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Abstract: Artificial intelligence (AI) has become increasingly integrated into English language learning. However, students' perceptions particularly in Islamic university on the AI's pedagogical and ethical implications need further elaboration. This study addresses EFL students' perceptions of the use of artificial intelligence in a state Islamic university in Manado, Indonesia through the conceptual lens of brain-to-brainware, which refers to the shift from independent human cognition to AI-supported learning processes. Using a convergent mixed-methods design, data were collected through an online questionnaire containing closed and open-ended items. Quantitative data were

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analyzed using descriptive statistics, while qualitative responses were identified thematically. The findings indicate that students perceived AI as a practical and flexible learning support, particularly for understanding difficult material, writing and editing, translation, vocabulary development, and speaking practice. However, their acceptance was conditional because the students also reported concerns about inaccurate outputs, shallow explanations, technical barriers, overdependence, reduced critical engagement, and ethical misuse. The ethical and pedagogical dimension received the strongest endorsement, indicating students' perceived need for responsible use, output verification, lecturer guidance, and clear institutional policies. Thus, this study extends current discussion on AI in English learning context by interpreting students' perceptions as a shift toward AI-assisted learning within the brain-to-brainware framework.

Keywords: *artificial intelligence, brainware, EFL learning, Islamic university, student perceptions*

INTRODUCTION

The integration of artificial intelligence (AI) in English as a Foreign Language (EFL) learning has expanded students' access to immediate feedback and flexible support beyond classroom instruction (Butarbutar, 2024; Zaim et al., 2024). AI tools can support tasks such as text revision and comprehension (Dewi, 2022; Godwin-Jones, 2022; Suhono, 2023). However, the pedagogical value of such support is contingent: it depends on whether learners critically evaluate and meaningfully engage with AI-generated output rather than passively accept it. This conditionality creates a pedagogical tension between expanded technological support and potential risks of diminished critical engagement, overdependence, and academic dishonesty (Kasneci et al., 2023; Liando et al., 2025). This tension is especially relevant in Islamic higher education, where institutions are expected to develop academic competence alongside moral integrity and

responsible learning practices (Faizin et al., 2025; Megawati et al., 2025). As AI may blur the boundary between legitimate learning assistance and academically dishonest substitution, its use needs to remain aligned with institutional and educational values (Syukur et al., 2024).

Research on AI in language learning has documented practical benefits alongside concerns about reliability, dependence, and academic integrity. The present study examines how these considerations coexist in students' accounts within one Islamic university, rather than assuming that either usefulness or risk alone explains their views. It uses brain-to-brainware as an author-defined interpretive metaphor for the relationship between human judgment and AI-supported learning. Thus, brain refers to learners' reasoning and responsibility, while brainware refers to the arrangement in which learners draw on AI feedback, language support, and information while retaining responsibility for evaluating them. This educational metaphor is distinct from Huh and Hossain's (2021) technical use of Brainware Computing for a cloud-supported robotics architecture. It is not an established scale or a validated model of cognitive development.

Using this interpretive lens, the study asks how students position AI assistance in relation to their own learning effort, ethical responsibility, and need for lecturer guidance. Specifically, it examines perceptions of AI usefulness, self-reported patterns of use, perceived benefits and challenges, and ethical and pedagogical considerations. Integrating quantitative response patterns with written accounts allows the study to examine how perceived efficiency and learning support coexist with concerns about accuracy, dependence, and academic integrity. Because the evidence consists of self-reported perceptions and experiences, the lens is used only to interpret students' perceived relationship with AI-supported learning; it does not measure a cognitive transition or changes in cognitive processes.

METHOD

Research Design

This study employed a convergent mixed-methods design to investigate EFL students' perceptions of AI integration into English

language learning. Quantitative and qualitative data were collected concurrently through an online questionnaire, analyzed separately, and brought into the finding interpretations (Creswell & Plano Clark, 2018). Quantitative data was considered a way to show the general levels of agreement and the frequencies of the use of AI, whilst qualitative data were about exploring opinions about various features of AI of the participants. It is also very relevant how putting the different results and the participant narratives that reveal their interpretations and situations (context) can capture the idea of both types of data suggested by Fetters et al. (2013). As both types of data come to the same point of questionnaire and participants, their agreement is a form of acquiring a dual view from the same kind of self-reporting source, the participants themselves, i.e. they agree but they also explain their reasons for agreeing.

Participants and Sampling

The study was conducted in the English Education Study Program at one of state Islamic universities in Manado, Indonesia. The 24 subjects consisted of six male and eighteen female students, from aged 20 to 24, studying in the third and fifth semesters. Their reported English proficiency varied from A1 to B1 level. The table below summarizes their demographic information and frequency of AI use as reported. Never, sometimes, often and very often were the options given. Consequently, all participants did not indicate their AI use history. The characteristics mentioned are only to give a background to the study results and no analyses were performed based on proficiency level, semester, gender or usage history. The first-semester students were ruled out since the paper was concentrating on students with more extensive campus English language education experience. This research used the selection method of criterion-based total sampling, meaning that all eligible students, those who matched the criteria, were included. This explanation refers only to the population of the study site and does not mean that the sample is representative of EFL students generally.

Table 1.
Participant characteristics and self-reported AI use

ID	AI use frequency	Gender	Age	Self-reported CEFR level
P01	Often	F	21	A2 elementary
P02	Often	F	21	B1 intermediate
P03	Very Often	M	22	B1 intermediate
P04	Often	M	21	A2 elementary
P05	Often	M	21	B1 intermediate
P06	Often	F	21	A2 elementary
P07	Very Often	F	21	A2 elementary
P08	Sometimes	M	20	B1 intermediate
P09	Sometimes	F	20	B1 intermediate
P10	Sometimes	F	20	B1 intermediate
P11	Sometimes	F	20	B1 intermediate
P12	Never	F	20	A2 elementary
P13	Sometimes	F	24	B1 intermediate
P14	Often	F	21	A2 elementary
P15	Often	F	20	A2 elementary
P16	Very Often	F	20	A2 elementary
P17	Often	F	20	B1 intermediate
P18	Often	M	20	A2 elementary
P19	Often	F	20	A2 elementary
P20	Sometimes	F	20	A1 beginner
P21	Sometimes	F	20	A2 elementary
P22	Often	F	21	A2 elementary
P23	Often	F	20	A1 beginner
P24	Very Often	M	21	A2 elementary

Data Collection Instruments

The questionnaire was adapted from previous studies and reviewed by two experts for content relevance, clarity, and contextual

appropriateness. One expert specialized in English language education and the other in educational technology. Their review addressed four questionnaire domains including perceptions of AI in English learning, frequency and type of AI use, perceived benefits and challenges, and ethical and pedagogical implications. The source studies and item groupings are summarized in Table 2. Expert review supports the assessment of item content but does not, by itself, establish the questionnaire's dimensional structure.

Table 2
Dimensions, response formats, and sources of the questionnaire instrument

Dimension	Operational definition	Items	Sources	Measurement
AI views	Perceived usefulness, engagement, trust in feedback, language support, and motivation.	Q1–Q6	(Karolina et al., 2025; Laili et al., 2025; Slamet, 2024)	Q1–Q5: four-point agreement; Q6: open-ended
Use and support	Reported task uses, perceived lecturer encouragement, and overall use frequency.	Q7–Q12	(Karolina et al., 2025; Laili et al., 2025; Slamet, 2024)	Q7–Q11: four-point agreement; Q12: five frequency categories
Benefits and challenges	Perceived comprehension, flexibility, confidence, dependence, and access difficulties.	Q13–Q18	(Faizin et al., 2025; Laili et al., 2025; Slamet, 2024)	Q13–Q17: four-point agreement; Q18: open-ended
Ethics and guidance	Views on copying, responsible use, cognitive risks, guidance received, and policy needs.	Q19–Q24	(Chan, 2025; Faizin et al., 2025; Slamet, 2024)	Q19–Q23: four-point agreement; Q24: open-ended

The questionnaire comprised 20 closed-ended agreement statements, one frequency item, and three open-ended questions. The statements used a four-point response scale from 1 = strongly disagree to 4 = strongly agree. The frequency item used five categories: never, rarely, sometimes, often, and very often. The open-ended questions asked what students liked or disliked about AI, what benefits and challenges they perceived, and how AI could be used

ethically and effectively in English learning. Cronbach's alpha for the 20 agreement items was reported as .88. The frequency item and open-ended questions were excluded from this calculation because they were not part of the four-point agreement-item set. The items were labeled Q1–Q24 for analysis. Because the agreement items address heterogeneous topics, the overall alpha is not evidence that the four domains measure a single construct or that each domain is independently reliable.

Data Collection Procedures

The questionnaire was created in Google Forms, and its link was distributed to participants through WhatsApp. Before completing it, students were informed that the study concerned their perceptions and experiences of using AI tools in English learning. They were told that there were no correct or incorrect answers, that responses should reflect their own experiences and views, and that identifying information would not be disclosed in reporting the findings. Students were not required to answer the open-ended questions in English, allowing them to use a language in which they could express their views more fully.

Data Analysis

Quantitative data were analyzed descriptively in SPSS version 26 to characterize this participant group (Loeb et al., 2017). Frequencies, percentages, minima, maxima, means, and standard deviations were calculated for the closed-ended items; means and standard deviations were also reported for the questionnaire domains. The original analysis used equal-width descriptive bands for four-point means (Alkharusi, 2022): 1.00–1.75, 1.76–2.50, 2.51–3.25, and 3.26–4.00. These bands describe levels of agreement and are not validated thresholds of learning benefit, ethical conduct, or statistical significance. Interpretation must follow each item's wording: agreement with a benefit and agreement with a risk have different meanings. Q12 was analyzed separately using category counts and percentages. All comparisons are descriptive; no inferential tests of differences between items or domains are reported.

Written responses to Q6, Q18, and Q24 were examined using thematic analysis, with reference to Clarke and Braun (2017). Two analysts, the researcher and a peer colleague, read the responses repeatedly and independently generated initial codes from participants' accounts. They organized codes into candidate themes and refined them through comparison with the extracts and the wider dataset. Coding differences were discussed until consensus was reached. Peer debriefing and member checking were reported as measures to support trustworthiness. Participant quotations were presented alongside themes to make the relationship between the responses and interpretations visible. The resulting themes addressed perceived learning support, benefits and challenges, and ethical and pedagogical considerations.

The strands were integrated by merging item-level quantitative findings with related qualitative themes (Moseholm & Fetters, 2017). Written responses were used primarily to elaborate the numerical patterns, rather than to estimate the prevalence of a theme. Interpretation considered where accounts supported, qualified, or extended the agreement-item results. This explanatory use of concurrent qualitative data should be distinguished from a sequential design in which interviews are collected after a survey (Fetters et al., 2013). Agreement between the two strands does not independently verify the reported behavior or establish a causal explanation.

Ethical considerations

Students were informed about the study's purpose, the voluntary nature of participation, and the confidentiality of their responses. They were assured that there were no right or wrong answers and that responses would be used for academic purposes. Participant codes were used in reporting quotations and characteristics, and direct identifiers were not disclosed in the findings.

FINDINGS

Dimension 1: Perceptions of AI in English Learning

The first domain addressed perceived learning effectiveness, engagement, trust in feedback, language support, and motivation presented in Table 3.

Table 3.

Item	Statement	N	Mean	SD	Min	Max
Q1	I believe AI helps me learn English more effectively.	24	2.92	0.78	1	4
Q2	AI applications make English learning more interesting and engaging.	24	3.12	0.74	1	4
Q3	I trust AI-generated feedback on my English writing or speaking tasks.	24	2.88	0.68	2	4
Q4	I think AI tools can improve my English accuracy and vocabulary.	24	3	0.78	2	4
Q5	I feel motivated when using AI-based learning tools.	24	2.83	0.82	1	4

Table 3 reveals that the mean was 2.95 (SD = 0.60). Item means ranged from 2.83 to 3.12, indicating generally favorable responses without uniform strong agreement. Engagement received the highest item mean (Q2, M = 3.12), while motivation received the lowest (Q5, M = 2.83). These results describe perceived value rather than demonstrated learning gains. The result of Table 3 is supported by the result of qualitative data presented in Table 4.

Table 4.
Themes from students' perceptions of what they liked or disliked about using AI in learning English (Q6)

Theme	Description	Codes	Example extract
Practical study support	Students perceived AI as helpful because it made English learning easier, faster, and more manageable in daily study activities.	helpful, practical, fast, flexible, easy to use	"What I like about AI is that it's instant and flexible."(P05)
Language support	Students valued AI for supporting vocabulary building, grammar explanation,	vocabulary support, grammar explanation, translation help,	"With AI, I can explore a lot more interrelated vocabulary very quickly." (P03)

	translation, writing, and speaking practice.	writing support, speaking practice	
Output limitations	Students disliked AI when its outputs were inaccurate, too rigid, incomplete, or not fully aligned with what they needed.	inaccurate answers, rigid explanation, incomplete summary, unclear response	"One thing I don't like is the incomplete summary and the long-winded language." (P11)
Dependence and interaction	Some students expressed concern that excessive use of AI could reduce critical thinking and could not replace the emotional and pedagogical value of direct teacher interaction.	overdependence, lazy thinking, reduced critical thinking, lack of human connection	"AI can do that, but it doesn't have the same emotional chemistry as direct interaction with a professional teacher." (P04)

The item results and written responses suggest conditional appreciation of AI support. Within this domain, engagement (Q2, M = 3.12) and perceived accuracy and vocabulary support (Q4, M = 3.00) were accompanied by accounts of convenience and vocabulary exploration. P05 described AI as "instant and flexible," while P03 valued rapid access to related vocabulary. Trust in AI feedback was less strongly endorsed (Q3, M = 2.88), and P11 described incomplete summaries and long-winded language. P04 emphasized the emotional value of direct interaction with a professional teacher. These accounts qualify the generally favorable item means by identifying limits to output quality and interpersonal support. They do not establish that every participant consistently evaluated outputs or maintained the same boundaries in practice.

Dimension 2: Frequency and Type of AI Use

The second domain addressed self-reported AI use for particular tasks and perceived lecturer encouragement. This domain shows the various types of AI, the AI functions for supporting their language skills, different activities of the EFL students in using AI and how the support of the teachers in using the tool. The mean was reported in Table 5 and Table 6.

Table 5.
Item statistics for Dimension 2

Item	Statement	N	Mean	SD	Min	Max
Q7	I often use AI applications such as ChatGPT, Grammarly, QuillBot, or Google Translate to learn English.	24	3.5	0.59	2	4
Q8	I use AI mainly to help me write or edit my English assignments.	24	3.25	0.61	2	4
Q9	I use AI to practice speaking and pronunciation.	24	3	0.88	1	4
Q10	I use AI to translate English texts or articles.	24	3.17	0.82	1	4
Q11	My lecturer encourages me to use AI tools for English learning.	24	2.92	0.65	2	4

Table 5 presents that the mean was 3.17 (SD = 0.44). Because these items combine use-related statements with an item about lecturer encouragement, this average is a descriptive summary of the item set rather than a direct measure of usage frequency or habit. The result of Table 5 is supported by the result of frequency distribution presented in Table 6.

Table 6.
Frequency distribution for Q12

Category	Frequency	Percentage
Never	1	4.2%
Rarely	0	0.0%
Sometimes	9	37.5%
Often	11	45.8%
Very often	3	12.5%

Based on the statistical result, agreement was highest for general AI use (Q7, M = 3.50), followed by writing or editing (Q8, M = 3.25), translation (Q10, M = 3.17), and speaking or pronunciation practice (Q9, M = 3.00). Lecturer encouragement had a lower mean (Q11, M = 2.92), but remained above the numerical midpoint of the four-point scale. The 0.58-point difference between Q7 and Q11 is descriptive; it does not establish a statistically significant gap or

identify whether adoption was student-initiated. Frequency responses ranged from never to very often (Table 6). The questionnaire provides no observation-based measure of use.

Dimension 3: Perceived Benefits and Challenges

The third domain addressed perceived benefits alongside dependence and access problems. Table 7 reports that domain mean was 2.90 (SD = 0.35), but this average combines positively framed benefits (Q13–Q15) with challenges (Q16–Q17). Therefore, it cannot, without a justified scoring model, be interpreted as a single favorable or unfavorable attitude.

Table 7.
Item statistics for Dimension 3

Item	Statement	N	Mean	SD	Min	Max
Q13	AI helps me understand difficult E nglish topics more easily.	24	3.38	0.58	2	4
Q14	AI makes learning English faster an d more flexible.	24	3.25	0.68	2	4
Q15	Using AI increases my confidence in writing or speaking in English.	24	2.88	0.74	1	4
Q16	I sometimes depend too much on AI instead of thinking critically.	24	2.46	0.51	2	3
Q17	I face technical problems when using AI (internet, access, or device issues).	24	2.54	0.83	1	4

Table 7 indicates that the perceived comprehension support (Q13, M = 3.38) and flexibility (Q14, M = 3.25) were more strongly endorsed than confidence in writing or speaking (Q15, M = 2.88). These results are supported with data in Table 8. The extracted data elaborated these perceptions. P03 described support for preparing materials, P11 emphasized accessibility, and P08 described using AI as a speaking partner. P03 also mentioned that AI can enlarge the student's understanding on how to create course materials or do assignment.

Table 8.
Themes from students' views on the benefits and challenges of using AI in English learning

Theme	Description	Codes	Example extract
Task support	Students described AI as useful for understanding difficult material, clarifying concepts, and assisting with academic tasks.	easier understanding, task support, clearer explanation, material assistance	"AI in English language learning makes it easier for me to enrich my perspective when preparing/creating course materials or assignments."(P03)
Efficiency and access	AI was perceived as saving time, being easily accessible, and enabling more flexible learning across settings.	time-saving, flexible access, practical, always available, accessible	"It's easy to use, and there are some free AIs so it's very accessible for students like me to learn English." (P11)
Language practice	Students described AI as supporting particular language-learning activities.	speaking practice, grammar correction, vocabulary learning, pronunciation, confidence	"Benefits of using AI is that I can have a chat partner too test my speaking skills." (P08)
Output limitations	Students reported that AI sometimes produced unreliable, less specific, or overly simplified responses.	inaccurate output, less specific summary, shallow explanation, wrong answer	"The challenge is that there are fewer specific summaries that have been generated by the AI." (P11)
Dependence and thinking	Responses raised concern that reliance on AI could reduce independent thinking.	dependency, lazy thinking, reduced critical thinking, passive learning	"AI use possible to make students lazy to think because they think it's easier with AI." (P01)
Access barriers	Responses identified obstacles involving internet access and premium-use limits.	internet problem, quota issue, access issue, premium limit	"And what I don't like is when its usage has reached the limit (requiring an upgrade to premium)." (P07)

These extracts in Table 8 explain that perceived assistance did not measure improvements in proficiency or confidence. Responses also identified limitations. P11 criticized insufficiently specific

summaries, P01 raised the possibility of reduced thinking effort, and P07 described premium-access restrictions. Agreement with self-reported overdependence (Q16, M = 2.46) was lower than agreement with technical problems (Q17, M = 2.54), although no significance test was conducted. General warnings in the written responses may concern a possible risk without amounting to an admission of personal dependence. Therefore, the two forms of evidence should be interpreted together without assuming exact equivalence.

Dimension 4: Ethical and Pedagogical Implications

The fourth dimension evaluates the ethical and pedagogical implications of AI use in English learning as presented in Table 9.

Table 9
Item statistics for Dimension 4

Item	Statement	N	Mean	SD	Min	Max
Q19	I understand that copying AI-generated answers without modification is a form of plagiarism.	24	3.25	0.79	2	4
Q20	I believe AI should be used responsibly and ethically in learning.	24	3.62	0.65	2	4
Q21	I think AI can reduce my critical thinking if used carelessly.	24	3.42	0.72	2	4
Q22	My lecturer has explained the ethical use of AI in academic work.	24	3.17	0.70	2	4

As illustrated in Table 9, responsible use (Q20, M = 3.62) and the need for institutional guidelines (Q23, M = 3.62) received the highest means in this domain. Written responses likewise emphasized assistance, checking answers, and maintaining learning effort. Producing the highest overall mean among all constructs at 3.42 (SD = 0.46), this dimension reveals a significantly strong baseline of academic integrity and critical awareness among the respondents. This quantitative result shows how students practically negotiate responsible technology use and establish boundaries for academic

honesty. This data on the ethical and pedagogical implications is supported by the extracts presented in Table 10.

Table 10
Themes from students' views on ethical and effective AI use in English learning

Theme	Description	Codes	Example extract
Assistance with learning	Students emphasized that AI should function as a learning aid rather than replace students' effort or teachers' roles.	support tool, not replacement, helper, complementary role	"In my opinion, AI can be used ethically and effectively... if we use AI as a tool to assist, not as a replacement." (P07)
Critical use and checking outputs	Ethical use was associated with checking AI responses, cross-checking information, and maintaining independent judgment.	cross-checking, verifying answers, critical evaluation, careful use	"Use AI wisely and carefully review the answers it generates." (P06)
Learning-oriented uses	Students considered AI ethical when it was used for learning-oriented purposes such as speaking practice, grammar support, idea generation, and text comprehension.	speaking practice, grammar support, idea generation, understanding texts	"For example, for speaking practice, correcting grammar, or helping to understand a text." (P07)
Academic integrity and originality	Some students explicitly linked ethical AI use with avoiding direct copying and preserving originality in academic work.	no copy-paste, originality, plagiarism awareness, understanding before using	"Not for direct copying when doing assignments, but rather used as part of the process of mastering English language material." (P17)
Guidance and AI literacy	Responses requested training, prompting skills, and educational guidance.	training, seminar, prompting skill, teacher guidance	"By attending seminars or AI training sessions... and learning proper prompting techniques." (P03)

As presented in Table 10, P07 described AI as a tool to assist learning, P06 advised reviewing generated answers, and P17 opposed direct copying. Concern about careless use reducing critical thinking (Q21, M = 3.42) is consistent with these cautions, but it does not

establish a decline in participants' critical-thinking skills. Lecturer explanations of ethical use received a mean of 3.17 (Q22), alongside P03's call for training and prompting support. These findings support an expressed preference for guidance; they neither prove compliance with ethical practices nor establish a cognitive transition toward brainware.

DISCUSSION

The findings suggest that these EFL students perceived AI as useful while recognizing limits to its outputs and appropriate role in learning. Accounts of vocabulary exploration, explanations, translation, and writing support are consistent with discussions of AI-assisted language learning (Butarbutar, 2024; Godwin-Jones, 2022; Yang & Li, 2024). They also connect with work on students' perceptions of automated writing support and its classroom use (Dewi, 2022; Karatay & Karatay, 2024). The present study adds a contextual account of how perceived convenience coexists with requests for verification and guidance. It does not assess whether the reported uses improved language performance. Through the brain-to-brainware lens, the relevant finding is students' expressed preference for combining technological assistance with human judgment, rather than evidence of a change in cognition.

The comparison between general use (Q7, M = 3.50) and lecturer encouragement (Q11, M = 2.92) raises a question about the relationship between students' use of AI and the guidance they perceive. It does not establish that institutional support is absent or that adoption originated outside teaching. The broader literature addresses AI applications in higher education and language pedagogy (Crompton & Burke, 2023; Kohnke et al., 2023), while this study offers a small-scale account from one English education program. Its contribution is the coexistence of reported use, qualified trust, and demand for guidance in this setting. The Islamic university context locates the study but does not, on its own, explain these perceptions: the reported items and extracts do not directly identify religious reasoning as their source.

Students' reservations about output quality and access are consistent with concerns discussed by Al-khresheh (2024) and Kasneci et al. (2023). Comparisons with empirical studies require attention to differences in evidence. Van Horn (2024) reported largely positive perceptions alongside some skepticism in a university EFL setting; Chen et al. (2026) examined reasons for rejecting specific AI-generated feedback. Neither study represents uniform resistance to AI. The present questionnaire similarly records favorable perceptions alongside reservations, but it does not trace acceptance or rejection of individual outputs. Accordingly, students' stated preferences for selective use should not be presented as demonstrated self-regulation or as a distinct adoption trajectory.

The endorsement of responsible use and warnings against copying connect with academic-integrity concerns in AI-assisted education (Cotton et al., 2024; Li et al., 2024) and with discussion of digital ethics and learning autonomy (Rahman et al., 2025). However, agreement with Q19 records a belief about copying AI-generated answers; it does not independently establish a complete understanding of plagiarism or compliance with course rules. Editing an AI-generated answer is not, by itself, a sufficient criterion for ethical use. In an Islamic university, these questions may be discussed alongside institutional values and the literature on educational technology in Islamic higher education (Faizin et al., 2025; Megawati et al., 2025; Syukur et al., 2024). The present data do not show that religious commitments caused students' ethical judgments. Establishing that relationship would require direct questions and supporting participant accounts.

Students' calls for output checking, training, and clear guidelines suggest a role for explicit pedagogical support. This implication is consistent with discussions of AI integration and writing support in Indonesian EFL settings (Hamid et al., 2025; Suhono, 2023; Suryani et al., 2025; Zaim et al., 2024). Lecturers could connect AI use to learning goals by asking students to explain why they accepted, revised, or rejected an output and to check claims against appropriate sources. Such activities would make students' reasoning visible and provide opportunities for feedback. These are pedagogical proposals

arising from the reported concerns, not interventions evaluated by this study. The brain-to-brainware metaphor helps organize the relationship between assistance and responsibility, but its usefulness as an explanatory framework requires further investigation.

CONCLUSION

This study examined 24 EFL students' perceptions of AI-supported English learning at one of state Islamic universities in Manado, Indonesia. Students generally described AI as useful for comprehension, writing, editing, translation, vocabulary development, and speaking practice. Their accounts also identified unreliable or incomplete outputs, access barriers, possible overdependence, and concerns about academic integrity. The combined findings support a qualified view of AI assistance within this participant group.

Responsible use and the need for institutional guidelines were strongly endorsed. Written responses emphasized checking outputs and preserving students' own learning effort. The descriptive difference between reported use and lecturer encouragement suggests a topic for further investigation, rather than proof that student practice has outpaced formal teaching. Practical responses could include instruction in purposeful prompting, verification against reliable sources, and explanation of permitted uses and disclosure requirements for each assignment. Process-based work and brief reflections on AI-assisted revisions could help lecturers examine students' reasoning. These proposals should be evaluated in classroom research before their effectiveness is assumed.

The findings are limited by the small, single-institution sample, reliance on self-report, and the short-written responses collected alongside the agreement items. Different AI applications were grouped, and no language-performance measures, usage logs, or observations are reported. Socially desirable responses may have influenced accounts of ethical use, while agreement between questionnaire strands cannot independently establish actual conduct. The heterogeneous item groupings also require caution when interpreting domain averages. Future studies could combine task-level

records, interviews, and performance measures to examine how students evaluate AI outputs and whether stated ethical views guide their actions. The brain-to-brainware lens should therefore remain an interpretive metaphor, with any claims about cognitive change reserved for research designed to test them.

DECLARATION OF AI AND AI-ASSISTED TECHNOLOGIES

During preparation of this work, the authors used Perplexity AI for literature exploration, source identification, and early-stage drafting assistance, and Grammarly for language revision. The authors are responsible for verifying all sources, data, interpretations, and final wording before submission.

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