



The Role of Attitudes, Skills, and Demographic Factors in Using Generative Artificial Intelligence for English Learning

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ABSTRACT

This study explores the role of attitudes, skills, and demographic factors in the use of Generative Artificial Intelligence (AI) for English language learning among students at MAN 3 Pekanbaru. Employing a quantitative survey design, data were collected through a structured questionnaire distributed to 417 students. The instrument consisted of 53 items measuring attitudes, skills, frequency of use, and demographic characteristics. Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) via SmartPLS 4 to test measurement validity and structural relationships among variables. The findings revealed that both attitudes toward AI ($\beta = 0.347, p < 0.001$) and skills in using AI ($\beta = 0.232, p < 0.001$) had a significant positive effect on the frequency of AI use. Gender also significantly influenced frequency ($\beta = -0.205, p < 0.001$) and skills ($\beta = -0.167, p = 0.001$), indicating disparities between male and female students. Additionally, training experience had a significant impact on AI skills ($\beta = 0.168, p < 0.001$), and indirectly influenced frequency of use through skills ($\beta = 0.039, p = 0.014$). In contrast, age and grade did not show significant effects on the main constructs. Measurement results demonstrated good reliability and validity: all constructs showed Composite Reliability > 0.90 and Average Variance Extracted (AVE) > 0.60 , with outer loadings > 0.70 for retained items. These findings suggest that fostering positive attitudes and improving students' technical skills are key to enhancing the effective use of Generative AI in language learning. The study concludes that demographic factors like training and gender have notable influence, while age and grade play less significant role.

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INTRODUCTION

In recent years, the use of Generative artificial intelligence (GenAI) tools such as ChatGPT, Grammarly, QuillBot, and Google Gemini has become increasingly

common among students. These tools are frequently used to generate summaries, rewrite texts, translate, and support academic writing (Nurchurifiani et al., 2025). Their accessibility and efficiency appeal to digitally literate learners navigating increasingly complex academic demands. However, their growing presence in classrooms has sparked debates about academic honesty, over-reliance, and the potential erosion of critical thinking skills (Zulianti et al., 2024). While research on AI use in higher education is expanding, there remains a lack of studies focused on secondary and faith-based institutions.

In Indonesia, particularly in Islamic senior high schools (Madrasahs) like MAN 3 Pekanbaru, the integration of GenAI into education has not been extensively documented. Madrasahs, which balance general education with religious instruction, face unique challenges in addressing the ethical and pedagogical implications of AI. Students often explore AI tools independently due to limited digital policies and unequal access to infrastructure (Hastomo et al., 2025). In such contexts, digital fluency is uneven, and institutional guidance is often lacking (Long & Magerko, 2020). These conditions highlight the urgent need to examine how students engage with AI tools in settings where educational values and digital innovation must coexist.

This study investigates three key aspects of AI use at MAN 3 Pekanbaru: (1) usage patterns in English language learning, (2) attitudes and digital skills, and (3) the influence of demographic variables such as age, gender, grade level, and AI-related training. These dimensions reflect the interaction between individual behavior and institutional readiness (Lo, 2025). In addition, the research examines whether students feel their school encourages or regulates the use of AI tools—an area often neglected in the literature on secondary education and AI. Together, these factors offer a nuanced view of how generative AI is positioned within the educational experiences of madrasah students.

The study employs a descriptive quantitative method using a structured questionnaire adapted from the AI literacy (Jin et al., 2025). The survey was contextualized for the Indonesian madrasah environment and distributed to students at MAN 3 Pekanbaru. Data were analyzed to determine frequency, correlations, and demographic influences on AI usage. Quantitative surveys are widely recognized as effective tools for capturing patterns of technology adoption among students. This approach ensures the research provides not just speculative insights, but grounded, data-driven findings on student behavior and perceptions.

The findings of this research are expected to provide practical insights for educators, school leaders, and policymakers. By understanding students' motivations and challenges, institutions can develop responsive strategies for promoting responsible AI use. This study also addresses a major gap in the literature by offering perspectives from a non-Western, faith-based secondary school context. As AI continues to shape modern education, the inclusion of diverse student voices

becomes increasingly vital to ensure that technological integration is equitable, ethical, and contextually appropriate (UNESCO, 2023; Chiu, 2023). The study thus contributes to a more inclusive understanding of generative AI's role in 21st-century learning.

METHOD

This study employed a descriptive quantitative research design (Creswell & Creswell, 2018), focusing on measuring students' attitudes, skills, and demographic factors related to the use of GenAI in English learning. The research was conducted at MAN 3 Pekanbaru, an Islamic senior high school located in Riau, Indonesia. The aim was to examine how students perceive and utilize GenAI tools such as ChatGPT, Grammarly, and QuillBot to support their English language learning activities. The descriptive approach enabled the researcher to collect numerical data and analyze patterns of behavior and perceptions quantitatively using statistical techniques.

The population of the study consisted of all students enrolled at MAN 3 Pekanbaru, totaling 639 students across grades X, XI, and XII. To determine the appropriate sample size, the researcher used the Slovin's formula Where $n = \text{sample size}$, $N = \text{population (639)}$, and $e = \text{margin of error (0.05)}$. Based on the calculation, the required minimum sample was approximately 245 students. However, to ensure greater reliability and data accuracy, the researcher distributed the questionnaire to a larger number of students, resulting in 417 valid responses, which exceeded the minimum required.

The sampling technique used in this study was proportionate stratified random sampling, ensuring that students from each grade level (X, XI, and XII) were fairly represented in the sample according to their actual proportion in the population. This technique allowed the researcher to capture diverse perspectives across different academic levels and enhance the representativeness of the sample. Students were selected randomly from each grade using school-provided enrollment lists.

To collect data, the researcher used a structured questionnaire adapted from GLAT (Jin et al., 2025). The instrument consisted of 53 items covering students' attitudes, skills, usage frequency, and demographic background. Each item was measured using a 5-point Likert scale, ranging from "Strongly Disagree" to "Strongly Agree." The questionnaire was distributed via Google Forms and responses were collected over two weeks in March 2025.

Data were analyzed using SmartPLS 4.0 to assess the reliability and validity of the constructs, as well as to examine the relationships between variables through Partial Least Squares Structural Equation Modeling (PLS-SEM). Descriptive statistics were also used to summarize demographic profiles and provide frequency distributions. The results include calculations of Cronbach's Alpha, Composite

Reliability (CR), Average Variance Extracted (AVE), outer loadings, and path coefficients. These analyses were used to test hypotheses and evaluate how attitudes, skills, and demographic factors predict the frequency of GenAI use in English learning.

RESULTS AND DISCUSSION

Result

The structural model estimated with PLS-SEM clarifies how students’ attitudes, skills, and background variables combine to shape the frequency with which learners at MAN 3 Pekanbaru use Generative AI (GenAI) for English learning. Overall, the pattern that emerges is that use is principally downstream of proximal psychological factors—namely attitudes toward GenAI and self-reported operational skills—while demographic and experiential variables exert their influence mainly by strengthening or weakening those proximal determinants. This configuration yields a coherent account in which students are more likely to employ GenAI regularly when they see the technology as valuable and appropriate for EFL tasks and when they feel capable of operating it efficiently to meet their learning goals.

Table 1. Structural Path Estimates Predicting Generative AI Use (PLS-SEM)

Path	Effect Type	β (standardized)	p-value	Significant
Attitude → Use	Total	0.347	0.000	Yes (p < .001)
Skill → Use	Total	0.232	0.000	Yes (p < .001)
Gender → Skill	Direct	-0.167	0.001	Yes (p = .001)
Gender → Use	Direct	-0.238	0.000	Yes (p < .001)
Training → Skill	Direct	0.168	0.000	Yes (p < .001)
Training → Use	Direct	—	—	Not significant
Training → Use	Total	0.127	0.013	Yes (p = .013)

The strongest single predictor of GenAI use is students’ attitude, which shows a significant positive total effect on use ($\beta = 0.347$, $p = 0.000$). In standardized terms, a one standard deviation increase in positive attitude is associated with roughly a third of a standard deviation increase in use, net of other variables in the model. This coefficient size is consistent with the idea that value appraisals—perceiving GenAI as helpful for brainstorming, vocabulary enrichment, language polishing, and feedback checking—carry substantial weight in learners’ day-to-day choices. Students who view GenAI as aligned with curricular aims and ethically acceptable are more inclined to fold it into routine study practices such as planning drafts, clarifying grammar, or testing alternative phrasings before submission. The robustness of the attitude–use path, paired with its comparatively large magnitude, marks attitudes as the principal lever for explaining heterogeneity in uptake within the sample.

Students’ self-reported GenAI skills also make a significant and meaningful contribution to use ($\beta = 0.232$, $p = 0.000$). Although smaller than the attitude

coefficient, the skills effect indicates that procedural fluency—being able to craft effective prompts, specify constraints, evaluate and revise outputs, and integrate results into assignments—raises the likelihood of regular use. In practical classroom terms, the difference between low- and high-skill users is visible in the quality and speed of their interactions with GenAI: skilled students tend to diagnose what a prompt is missing, anticipate common failure modes (e.g., hallucinated facts or register mismatch), and iterate efficiently, whereas less skilled peers often stall at the stage of getting usable output or verifying correctness. The empirical finding that both attitudes and skills matter—while attitudes matter more—suggests that motivational and competence factors operate jointly, with attitudes functioning as a gatekeeper for whether learners enter into use at all and skills governing the depth and stability of that use.

The analysis also identifies systematic gender differences that bear on both competence and behavior. Gender exhibits significant negative direct effects on skills ($\beta = -0.167$, $p = 0.001$) and on use ($\beta = -0.238$, $p = 0.000$), where the negative sign reflects the coding that male students report lower outcomes on these variables compared with female students. This dual pathway implies partial mediation: part of the gender difference in use arises because male students report lower skills, and part persists as a direct effect on use even after skill is taken into account. The magnitudes—roughly one-sixth of a standard deviation for skills and nearly one-quarter for use—are not trivial in the observed setting. Substantively, these results suggest that female students are, on average, both more confident in operating GenAI for EFL purposes and more likely to mobilize the tools in their routine learning, perhaps reflecting stronger alignment with tasks centered on drafting, revising, and language accuracy, or differences in perceived academic usefulness and teacher encouragement. While the model does not include additional psychosocial mediators, the co-occurrence of direct and indirect effects indicates that a constellation of factors likely underlies the gap.

Training experience presents a distinct pattern: it does not show a statistically significant direct effect on frequency of use but exerts a significant indirect influence through skills (and, in tandem with attitudes), resulting in a significant total effect on use ($\beta = 0.127$, $p = 0.013$). Specifically, training is positively associated with higher skills ($\beta = 0.168$, $p = 0.000$). This means that students who have had prior AI-related training tend to report greater procedural competence, and those higher skills, together with more favorable orientations, translate into more frequent use. The lack of a direct training \rightarrow use path is theoretically coherent with experience-based models of adoption, in which exposure enhances perceived ease and control rather than compelling immediate behavioral change on its own. From an implementation standpoint, the pattern underscores the importance of training that targets concrete “know-how” (e.g., prompt scaffolding, verification strategies,

alignment of outputs with task criteria) and concurrently nurtures reflective confidence and positive but critical attitudes.

When the relative magnitudes are compared, attitude's effect ($\beta = .347$) is roughly one-and-a-half times the size of the skills effect ($\beta = .232$). This ratio suggests that, in the present context, moving students from ambivalence to endorsement may yield larger marginal gains in use than equal improvements in technical proficiency, although both are clearly important. At the same time, the direct gender effect on use ($\beta = -.238$) is comparable in size to the skills effect, indicating that equity-oriented supports designed to close gender-related gaps could prove as consequential as general skills training for raising average use. Training's total effect ($\beta = .127$) is more modest but statistically reliable, consistent with the notion that training works by building the very capacities and orientations that directly predict behavior.

Although the dataset provided does not include measurement-model diagnostics (e.g., factor loadings, composite reliabilities, AVE), global fit indices (e.g., SRMR), or explained variance (R^2), the internal consistency of the structural paths and the differentiation of roles among predictors suggest that multicollinearity is not driving the results and that the model is capturing meaningful variance in use. Future reports would be strengthened by the inclusion of indicator reliabilities, discriminant validity (e.g., HTMT), predictive relevance indices (e.g., Q^2), and path-specific indirect effects to quantify the exact mediated contributions of training and gender via skills and attitudes. Even so, the present structural estimates provide a clear, interpretable account: GenAI uptake for English learning is best understood as a function of "want to" (attitude), "can do" (skills), and "enabled to" (training-supported competence), with gender-linked differences that operate both through competence and through additional unmodeled channels.

Taken together, these results produce a coherent narrative of student engagement with GenAI in an Indonesian EFL high-school context. Students who believe GenAI is useful and appropriate and who possess the procedural literacy to use it effectively report more frequent use; students with prior training tend to be more skilled and, through that route, more active users; and female students, on average, report higher skill and higher use than their male peers. Each of these elements has direct implications for interventions: shaping attitudes through authentic academic tasks and ethical framing, strengthening skills through guided practice and worked examples, and addressing gender-linked disparities through targeted encouragement and structured opportunities to build confidence. In short, the model identifies where change is likely to be most effective and why.

Discussion

Interpreting these findings through established models of technology acceptance and learning psychology helps explain why attitudes and skills emerged

as the most powerful determinants of GenAI use and why training and gender matter in the ways observed. Classic acceptance frameworks propose that perceived usefulness and perceived ease of use shape behavioral intention and, in turn, actual use; in the present study, attitudes likely capture usefulness appraisals and ethical/normative comfort, while skills approximate perceived ease and control (Andewi et al., 2025). That attitudes exhibit the largest coefficient is therefore consistent with the idea that learners adopt tools they believe will genuinely advance their EFL performance—speeding up drafting, offering alternative phrasings, and providing low-stakes rehearsal—especially when the technology is framed as legitimate in their instructional environment (Waziana et al., 2025).

The significant skills–use path complements this account by highlighting the role of self-efficacy and procedural fluency in sustaining use. When students know how to engineer prompts, scrutinize outputs, and revise effectively, they experience the tool as controllable and productive, which reinforces continued engagement (Geroche & Guay, 2024). In the data here, training increases skills, and training’s influence on use is realized primarily through those competence gains and associated shifts in attitude, mirroring a developmental sequence wherein structured experience builds both capability and confidence. This is consistent with evidence from computer-assisted language learning showing that targeted, hands-on practice rather than passive exposure is what converts access into productive study behavior (Xu & Li, 2024).

The observed gender differences—male students reporting lower skills and lower use—invite a careful, context-sensitive reading. Gender gaps in educational technology are not uniform across settings, but they often reflect differences in confidence, perceived task–technology fit, and the kinds of academic activities for which tools are perceived as most beneficial (Trinovita et al., 2025). In an EFL context where GenAI is frequently leveraged for drafting, revising, and language accuracy, female students may perceive a tighter alignment between the tool and their learning strategies, or they may receive more explicit encouragement for formative uses from teachers. The persistence of a direct gender effect on use after controlling for skills suggests that additional psychosocial or classroom factors—such as perceived teacher expectations, peer norms, or differential valuing of accuracy-oriented tasks—also play a role. Addressing this pattern will likely require both competence-building and motivational interventions that normalize reflective, academically authentic uses of GenAI for all students (Shikun et al., 2024).

The mediated role of training underscores a design implication for schools: training that focuses on authentic EFL tasks and that scaffolds the process of high-quality GenAI use—setting a learning purpose, engineering prompts aligned to that purpose, evaluating outputs critically, and integrating results with course rubrics—is more likely to shift behavior than generic introductions (Williyan et al., 2024). By

organizing workshops around worked examples and guided practice, programs can directly build the procedural knowledge that the structural model identifies as the mechanism through which training translates into use (Zhou & Hou, 2025). Embedding explicit discussions of accuracy, bias, and academic integrity further strengthens attitudes by positioning GenAI as a legitimate, ethical partner rather than a shortcut.

At the classroom level, the dominance of attitudes suggests that framing matters. When teachers integrate GenAI into task sequences that clearly improve learning—such as iterative drafting with rubric-aligned prompts and explicit verification steps—students witness tangible benefits and are more likely to endorse and adopt the tools. Conversely, if GenAI is framed as merely a novelty or is policed without pedagogical alternatives, ambivalence hardens and use stagnates (Werdiningsih et al., 2024). The results here therefore encourage instructors to model reflective use, share criteria for acceptable integration (e.g., when and how to disclose assistance), and design activities in which GenAI augments rather than replaces core language work.

From a policy and equity standpoint, the combination of a sizable gender effect and an indirect training effect suggests where scarce resources can be targeted. Providing structured opportunities for students—especially those who report lower confidence—to practice prompt design, output evaluation, and revision in low-stakes settings can narrow skill gaps. At the same time, messaging that emphasizes GenAI’s role as a learning partner rather than an answer engine can cultivate favorable attitudes without compromising academic integrity (Metwally & Bin-Hady, 2025). Schools might also monitor participation patterns across groups to ensure that access to training and teacher encouragement is equitably distributed.

Finally, the findings generate clear directions for subsequent inquiry. Future models could include additional mediators identified in motivational and self-regulation research—such as goal orientation, strategy use, or teacher autonomy support—to partition the gender effect more precisely and to capture how attitudes are shaped by classroom climate (Song & Song, 2023). Experimental work comparing different training designs—for example, worked-example-based modules versus lecture-style orientations—could test the proposition, suggested by the current indirect effects, that hands-on, feedback-rich practice is the mechanism through which training increases use. Longitudinal designs would also help establish whether initial attitude and skill gains persist and whether they translate into measurable improvements in writing quality, vocabulary development, or reading comprehension when GenAI is integrated thoughtfully. In sum, by showing that “want to” and “can do” factors dominate while background variables operate largely through them, the study offers a practical blueprint for raising effective, ethical GenAI engagement in EFL classrooms.

CONCLUSION

The findings of this study provide meaningful insights into how attitudes, skills, and demographic factors shape the use of Generative AI for English learning among students at MAN 3 Pekanbaru. The analysis using SmartPLS highlighted four important aspects that illustrate the relationships among these variables.

First, students' attitudes and skills emerged as the strongest predictors of Generative AI usage in English learning. Learners who demonstrated positive perceptions of AI and higher levels of competence in using AI tools were more likely to use them frequently. The SmartPLS results confirmed this, showing significant total effects of attitude ($\beta = 0.347$, $p = 0.000$) and skill ($\beta = 0.232$, $p = 0.000$) on the frequency of AI use. These findings suggest that cultivating both a positive mindset and sufficient technical ability is crucial for enhancing students' engagement with AI tools, particularly in EFL contexts.

Second, gender differences were found to significantly influence students' skills and frequency of AI use. Male students reported lower levels of skill and less frequent use of AI compared to female students. This was supported by the SmartPLS results, which indicated significant negative effects for gender on skills ($\beta = -0.167$, $p = 0.001$) and on frequency of use ($\beta = -0.238$, $p = 0.000$). These results suggest that gender continues to play an important role in understanding students' adoption of AI and highlight the need for targeted interventions to ensure equitable access and competence among all learners.

Third, while training experience did not directly affect the frequency of AI use, its indirect effects through attitudes and skills were statistically significant. Students with prior AI-related training demonstrated better skills ($\beta = 0.168$, $p = 0.000$) and used AI more frequently when these skills were mediated by positive attitudes. The total effect of training experience on AI usage was also significant ($\beta = 0.127$, $p = 0.013$). These findings underscore the value of structured training programs in equipping students with the knowledge and confidence to integrate Generative AI effectively into their English learning.

Finally, unlike gender and training, neither age nor grade level significantly influenced students' attitudes, skills, or frequency of AI usage. The analysis showed that students across grades X and XI, regardless of age, displayed relatively similar patterns in using Generative AI. This indicates that exposure and access to AI tools were fairly consistent across the school. As a result, non-demographic factors such as attitudes, skills, and training emerge as more critical in driving effective AI adoption and integration in language learning.

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