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# The Role of Artificial Intelligence in Mitigating English Language Anxiety Among High School Students

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**Abstract:** English Language Anxiety (ELA) remains a significant psychological barrier for learners in Indonesia, particularly in the context of performance-based assessments. This study investigates the potential of Artificial Intelligence (AI) as a tool to mitigate this anxiety, focusing on student perceptions and the relevance of specific AI features. Employing a quantitative survey design, data were collected from 90 high school students in Bandung using a questionnaire that integrated the Foreign Language Classroom Anxiety Scale (FLCAS) and the Technology Acceptance Model (TAM). Descriptive statistical analysis revealed that students experience high levels of *performance anxiety*, especially when speaking without preparation. Results indicate a strong positive perception of AI's ability to create a low-stress environment, primarily by reducing the fear of making mistakes (Mean=3.67). Concerning the most relevant AI features, the capability for L1 scaffolding—explaining concepts in Indonesian—was deemed most crucial (Mean=3.88), highlighting its role in alleviating cognitive anxiety. However, a significant concern regarding the transferability of AI-practiced skills to real human interaction was identified (Mean=3.56), moderating the overall perceived efficacy of AI for anxiety reduction. The study concludes that AI is a highly effective affective tool for safe practice but must be integrated within a hybrid pedagogical model that bridges the gap between AI-assisted learning and authentic social communication to fully address the multifaceted nature of foreign language anxiety.

**Keywords:** English Language Anxiety, Artificial Intelligence, AI in Education, Student Perceptions, Multilingual Learning.

## INTRODUCTION

English language learning anxiety (ELA) continues to be a compelling area of scholarly inquiry within the Indonesian educational landscape, primarily due to the multifaceted and often divergent nature of its underlying causes. Empirical evidence reveals distinct triggers across different age groups. For instance, at the elementary level, anxiety is frequently linked to psychosocial factors such as diminished self-confidence, fear of negative peer evaluation, and social comparison, rather than academic laziness or innate ability (Fitriani, Julia, & Gusrayani,

2022). This pattern extends to junior high school, where Aminullah's (2013) investigation found that anxiety often emanates from students' apprehension of peer rejection attributable to their limited English proficiency. Conversely, research by Beatrix and Hastuti (2022) suggests that for other students, anxiety is more directly correlated with the perceived linguistic complexity of English itself, compounded by insufficient extracurricular exposure and a lack of personal interest.

Amid these persistent challenges, the emergence of artificial intelligence (AI) in educational technology offers innovative potential for creating low-anxiety learning environments. Globally, AI-driven solutions such as personalized adaptive learning systems and intelligent conversational chatbots have demonstrated efficacy in reducing language anxiety by providing safe, patient, and individualized practice opportunities (El Shazly, 2021; Godwin-Jones, 2022). Nonetheless, the implementation and efficacy of such technologies within Indonesia's unique socio-cultural milieu characterized by complex multilingualism and disparities in technological access, not yet well understood. This constitutes a critical research gap. The existing body of work on ELA in Indonesia has traditionally prioritized conventional influences like teaching methodologies (Widiati & Cahyono, 2016), while scholarship on AI-assisted language learning has been predominantly situated in monolingual countries (Alhalangy & AbdAlgane, 2023), thereby neglecting the multilingual realities of contexts like Indonesia.

Bridging this divide, the present study is guided by the following research questions:

1. What are the perceptions of Indonesian high school students regarding the use of AI technology as a medium for English language learning, specifically in fostering a low-stress educational environment?
2. Which AI features or technological applications do these students identify as most pertinent to helping them overcome anxiety associated with learning English?

Foreign language anxiety (FLA) is a well-established factor that can hinder students' language learning. Horwitz and colleagues characterized foreign language classroom anxiety as a situation-specific form of anxiety that combines elements of communication apprehension, test anxiety, and fear of negative evaluation. This construct – often measured by the FLCAS – is distinct from general trait anxiety and is thought to limit learners' willingness to communicate and perform at their best. Early research (e.g. Horwitz et al., 1986; MacIntyre & Gardner, 1991) showed that high FLA correlates with lower achievement and confidence, setting a foundation for later studies on how to reduce FLA in language classrooms.

More recent studies (post-2015) have tested interventions to lower FLA using educational technology and positive psychology. For instance, Hamzaoğlu and Koçoğlu (2016) found that incorporating student-created podcasts into an EFL high school curriculum significantly improved learners' oral performance and reduced their speaking anxiety compared to a control group. Similarly, technology-enhanced tasks like virtual reality and mobile apps have shown promise: Chen (2024) reported that learners receiving AI-generated feedback in a VR speaking task experienced a significant drop in public-speaking anxiety. Such interactive, low-stakes practice likely helps learners feel more confident – consistent with Krashen's idea that lowering the affective filter (anxiety) facilitates learning. In short, tailored, supportive practice (even without AI) has been shown to ease FLA in various settings.

AI-powered language tools build on these ideas by offering personalized, interactive practice. For example, Yuan (2025) developed an AI-enhanced reading platform that used heart-rate and eye-tracking feedback to adjust reading difficulty; participants using this system showed significantly higher comprehension and reduced anxiety compared to a traditional group. In speaking practice, automated feedback has also helped: Chen (2024) found that EFL students who received immediate AI-generated speech evaluation felt less anxious about public

speaking. In an Indonesian study, an AI chatbot called "AI-CiciBot" was used as a conversational partner for high schoolers. After two weeks of AI-chat practice, students' mean speaking scores nearly doubled and their self-reported anxiety halved. Key AI features – such as real-time pronunciation feedback, personalized task levels, and even allowing some use of the first language (L1) as a scaffold – seem to underlie these gains. For example, permitting strategic L1 "code-switching" (native-language support) during practice is known to make learners feel more comfortable and reduce fear of mistakes. Not all results are uniformly positive, however: one study reported that a generic Replika chatbot did not reduce speaking anxiety (students found it frustrating to use). This suggests that AI tools must be well-designed and integrated pedagogically to actually alleviate anxiety.

In the Indonesian and broader multilingual context, these findings are especially relevant. Studies show Indonesian learners often experience high test and speaking anxiety (e.g. learners with fewer years of English study report significantly more anxiety). Local research indicates that culturally sensitive supports can help. For instance, the AI-CiciBot study demonstrates that locally developed AI tools can transform students' attitudes: learners who were initially shy and fearful became confident after practicing with the bot. Likewise, Indonesian EFL classrooms that allow students to check meaning in their L1 (e.g. Bahasa) report that students feel less anxious and more willing to speak. These examples underscore that AI (and CALL more broadly) – when combined with human insight and scaffolding – can mitigate language anxiety. By offering conversational practice, instant corrective feedback, adaptive challenge levels, and optional L1 cues, AI-driven methods have the potential to create a low-pressure learning environment. Ongoing studies suggest this approach is promising for Indonesian high schoolers and other multilingual learners, though further research is needed to refine these tools and confirm their long-term benefits.

## METHOD

### Research Design

This study design is survey which, according to Creswell (2019), is a quantitative method used to collect standardized information from a specific group of respondents. Its primary purpose is description, but it can also be used for explanation and exploration by examining relationships between variables. The instrument used is questionnaire which is constructed with the combination of FLCAS and TAM, and had been tested in terms of its validity and reliability.

### Research Participants and Setting

The data were taken from 90 respondents from senior high school level. The students were from grade 10 to 12 who studied at one SMA in Bandung. The determination of the number of the respondents adopted multivariate technique by Hair et al. (2019) theoretizing that the number of the item in the questionnaire multiplied by 5, representing ration 5:1. They voluntarily filled out the questionnaire with 16 items attributive to FLA and the use of AI. The purposive sampling was employed to recruit heterogenous group.

### Data Analysis Technique

This study employed a quantitative research design utilizing survey data collected from 90 high school student respondents (N=90). The primary research instrument was a questionnaire based on a 5-point Likert Scale. This scale ranged from 1 (Strongly Disagree) to 5 (Strongly Agree), with a mid-point of 3 (Neutral). The raw data collected comprised responses across 16 specific items (Q1 to Q16). Statistical analysis was conducted using descriptive statistics, including the calculation of the Mean ($\bar{X}$), Standard Deviation (SD), and Frequency/Percentage distribution for each item. For the academic interpretation of the mean scores on the 5-point Likert scale, the following score intervals were adopted: 1.00–1.80

(Strongly Disagree); 1.81–2.60 (Disagree); 2.61–3.40 (Neutral/Moderate); 3.41–4.20 (Agree/High); and 4.21–5.00 (Strongly Agree/Very High).

## RESULTS AND DISCUSSION

Foreign language learning anxiety, or FLA, is a significant psychological barrier to language skill acquisition, particularly in the context of speaking skills (Horwitz et al., 1986). Traditionally, FLA stems from the fear of negative evaluation, criticism, or embarrassment when making mistakes in front of teachers or peers (Horwitz et al., 1986). This anxiety tends to trigger practice avoidance behavior, which ultimately hinders progress.

Advances in AI technology, particularly Conversational AI (CAI), have introduced a new paradigm in Computer-Assisted Language Learning (CALL). Academic literature indicates that AI has the potential to create a safe and non-judgmental practice environment (Biju et al., 2024). This environment is designed to reduce anxiety by freeing students from the social pressures inherent in human interaction, allowing them to practice repeatedly without fear of judgment (Zhang, Meng, & Ma, 2024).

Initial descriptive analysis of the items measuring English learning anxiety (Q1--Q7) showed that students experience high levels of anxiety, particularly related to impromptu oral performance.

Item Q3, "I start to panic when I have to speak in English without preparation," recorded the highest Mean ($\bar{X}$=3.60, Agree), followed by Q7, "I feel nervous when the English teacher asks a question I haven't prepared for beforehand" ($\bar{X}$=3.44, Agree), and Q4, "I worry about failing in English class" ($\bar{X}$=3.42, Agree). Collectively, these scores indicate that student anxiety is strongly triggered by Performance Anxiety, i.e., the fear of evaluation or failure in situations demanding readiness and high cognitive speed (Horwitz et al., 1986).

However, it is important to note that Q6 ("I feel more tense and nervous in English class than in other classes") received a relatively low score ($\bar{X}$=2.50, Disagree/Approaching Neutral). The discrepancy between high scores on performance anxiety (Q3, Q7) and the low score on general subject anxiety (Q6) suggests that the anxiety experienced by students is not general subject anxiety, but rather anxiety highly specific to oral performance activities and formal assessment. This confirms the need for learning tools that can explicitly address the fear of failure in high-risk performance situations.

**Table 1.** Descriptive Statistics of High School Students' Agreement Level Regarding Anxiety and AI Use (N=90)

| Item | Question Description (Brief) | Domain | Mean ($\bar{X}$) | SD | Interpretation |
|---|---|---|---|---|---|
| Q15 | Prefer AI that can explain in Indonesian (L1). | Relevant Features (RQ2) | 3.88 | 1.27 | Agree |
| Q10 | AI reduces worry about making mistakes. | AI Perception (RQ1) | 3.67 | 1.21 | Agree |
| Q3 | Start panicking when speaking without preparation. | Performance FLA | 3.60 | 1.25 | Agree |
| Q12 | Worry that AI doesn't prepare for real conversation. | Transfer Concern | 3.56 | 1.56 | Agree |
| Q7 | Nervous when asked by teacher without preparation. | Performance FLA | 3.44 | 1.35 | Agree |
| Q4 | Worry about failing English class. | Performance FLA | 3.42 | 1.48 | Agree |

| | | | | | |
|---|---|---|---|---|---|
| Q13 | Instant AI feedback reduces nervousness. | Relevant Features (RQ2) | 3.40 | 1.35 | Neutral |
| Q16 | Overall, AI reduces anxiety. | Overall Efficacy (RQ1) | 3.31 | 1.30 | Neutral |
| Q8 | More confident practicing with AI than teacher/peers. | AI Perception (RQ1) | 2.67 | 1.33 | Neutral |
| Q14 | Feel embarrassed talking to a device. | Social Concern | 2.40 | 1.30 | Disagree |

**Results and Interpretation (Answering RQ1): AI as a Low-Pressure Environment Effect of Mitigating the Fear of Making Mistakes**

**RQ1: What are high school students' perceptions of using AI technology as a medium for learning English, specifically in creating a low-pressure learning environment?**

High school students' perceptions show strong acceptance of AI's role as a reducer of social risk in the learning environment. Item Q10 ("Using AI for English reduces my worry about making mistakes") recorded a high Mean ($\bar{X}$=3.67), making it the most positively agreed-upon item regarding AI efficacy. This indicates that the majority of students (61.1% Agree/Strongly Agree) view AI as an effective tool for mitigating the fear of mistakes.

The high agreement on Q10 is directly related to AI's nature as a non-judgmental interlocutor. Since students' greatest anxiety is the fear of judgment and failure (Q3, Q7, Q4), AI offers an environment where oral practice can be conducted without detrimental social consequences or formal evaluation. This analysis is reinforced by the low score obtained by Q14 ("I feel embarrassed when speaking English to a device"), with a Mean of $\bar{X}$=2.40 (Disagree). This score indicates that students do not feel awkward or embarrassed when interacting with the device, effectively eliminating the psychological barrier often experienced during oral interaction with peers or teachers. Thus, the primary function of AI in the students' view is to provide *freedom to experiment* and a safe practice environment.

**Nuance of Relative Confidence**

Although AI is seen as successful in reducing the fear of making mistakes (high Q10), students' perceptions regarding relative confidence compared to human interaction show ambivalence. Item Q8 ("I feel more confident practicing English with AI (like chat GPT) than with a teacher or classmates") yielded a Neutral score ($\bar{X}$=2.67).

The disparity between Q10 (comfort) and Q8 (relative confidence) indicates that students distinguish between practice comfort (i.e., feeling safe to make mistakes) and absolute confidence level (i.e., feeling more competent compared to interacting with humans). AI may provide a comfort zone for mechanical practice, but it is not necessarily considered a superior medium for building the holistic confidence needed for dynamic and complex social interaction. AI serves as an effective *Risk Mitigator*, but human interaction is still considered essential for building genuine confidence in a social context.

**Overall Efficacy and Inhibiting Factors**

The overall efficacy of AI in anxiety mitigation shows a neutral position. Item Q16 ("Overall, using AI technology has reduced my anxiety in learning English") is at a Neutral point ($\bar{X}$=3.31).

The Neutral score on Q16, even though specific AI benefits (Q10) are highly recognized, confirms the existence of counterbalancing factors restraining the full efficacy of this technology. This factor lies not in the fear of the technology itself (low Q9, Q11), but most likely stems from concerns about Transferability to the real world, which will be discussed further in Section IV.

**Table 2.** Frequency Distribution of Student Responses for Key AI Perception Items (RQ1)

| Key Item | 1 (STS) | 2 (TS) | 3 (N) | 4 (S) | 5 (SS) | Total % Agree (4+5) | Mean ($\bar{X}$) |
|---|---|---|---|---|---|---|---|
| Q10: AI reduces worry about mistakes. | 7 (7.8%) | 12 (13.3%) | 16 (17.8%) | 37 (41.1%) | 18 (20.0%) | **61.1%** | 3.67 |
| Q16: Overall anxiety reduction. | 11 (12.2%) | 17 (18.9%) | 21 (23.3%) | 27 (30.0%) | 14 (15.6%) | 45.6% | 3.31 |

**Identification of the Most Relevant AI Features (Answering RQ2): Functional Priorities**
**RQ2: What AI features or technologies are considered most relevant by high school students in helping them overcome English learning anxiety?**

A comparative analysis shows that Mother Tongue support (L1) is the functional feature with the highest psychological relevance for Indonesian students in anxiety mitigation.

**Dominance of** Mother Tongue Support (L1 Scaffolding)

Item Q15 ("I prefer using AI that can explain concepts in Indonesian if I am confused") recorded the highest Mean score of all 16 items in the survey ($\bar{X}$=3.88, Agree). This result highlights that students' primary priority in utilizing AI is to overcome cognitive anxiety—the frustration or confusion arising when trying to understand complex concepts (e.g., grammar or instructions) entirely in English (L2).

The L1 support offered by AI functions as strong and dynamic scaffolding (Puntambekar, 2022). Using AI that provides L1 scaffolding allows students to build strong conceptual understanding in parallel with language acquisition, substantially minimizing initial failure (Puntambekar, 2022). This minimization of failure, in turn, reduces the cognitive anxiety that can hinder learning (Wen et al., 2024). For Indonesian EFL learners, the ability of AI to explain concepts in L1 (Indonesian) holds the highest pedagogical and psychological value.

**Significance of Instant Feedback**

The next most relevant functional feature is instant feedback. Item Q13 ("Getting instant feedback from AI makes me less nervous in learning") is at the Neutral/Agree threshold ($\bar{X}$=3.40).

Although its score is slightly below L1 support, the value of Q13 remains important. AI's advantage in providing immediate feedback (*real-time data analysis*) allows learners to evaluate their progress and identify areas for improvement independently. This *prompt feedback* mechanism is crucial for fostering metacognitive awareness and self-regulatory behavior, which are essential foundations for effective and autonomous language learning (Zimmerman, 2002).

**Table 3.** Comparison of Means for Most Relevant AI Features (RQ2)

| Key Feature | Questionnaire Item | Mean ($\bar{X}$) | SD | Psychological Relevance Ranking |
|---|---|---|---|---|
| L1 Support (Indonesian) | Q15: Prefer AI that explains concepts in Indonesian. | 3.88 | 1.27 | 1 (Most Relevant) |
| Instant Feedback | Q13: Instant AI feedback makes me less nervous. | 3.40 | 1.35 | 2 |

Export to Spreadsheet

### Analysis of Critical Concerns and Adoption Barriers

#### Transferability Concerns and the Real-World Gap

The greatest student concern regarding AI use, which limits the overall efficacy of AI (Neutral Q16), is the concern about transferring skills to actual human interaction.

Item Q12 ("I worry that relying on AI will not prepare me for real conversations with people") received a high score ($\bar{X}$=3.56, Agree). Academically, this is the highest expressed concern by students in the context of AI. This reveals a conflict between the comfort offered by AI (Q10) and the recognition that actual communication demands greater social maturity.

Students realize that the comfort zone created by AI risks producing artificial competence that may not withstand the dynamic environment of human interaction, full of non-verbal cues, and requiring flexibility. The concern about over-reliance on AI, which might hinder the development of critical thinking and creativity skills needed in real communication, is valid (Atkinson & Barker, 2023). This finding emphasizes the need to position AI as a thinking partner and supportive tool, not as a replacement for essential, socially contextualized interactions (Atkinson & Barker, 2023).

#### Technological Anxiety and Accessibility

Analysis of technical concerns shows relatively low barriers.

Item Q9 ("I'm afraid AI won't understand my accent or pronunciation") shows a score approaching Disagree ($\bar{X}$=2.60). This figure indicates that students generally have confidence in the ability of modern Natural Language Processing (NLP) to handle accent variation, reflecting the rapid progress of current CAI technology.

Meanwhile, Q11 ("I feel overwhelmed by the number of AI applications for learning English") is also in the Neutral zone ($\bar{X}$=2.69). Although this is not a significant adoption barrier, this score can be interpreted as the presence of choice paralysis or cognitive overload that can be minimized through structured curriculum guidance and tool recommendations.

## CONCLUSION

This study, conducted among 90 Indonesian high school students, confirms that while learners face significant Foreign Language Anxiety (FLA), particularly rooted in Performance Anxiety (Horwitz et al., 1986), Artificial Intelligence (AI) is highly valued as an affective filter reducer.

In response to the first research question (RQ1), students overwhelmingly perceive AI as a crucial low-pressure learning environment. The highest positive perception regarding AI is its role in mitigating the fear of making mistakes ($\bar{X}$=3.67). This confirms the academic literature on AI as a non-judgmental interlocutor, allowing for repeated, consequence-free practice. However, the moderate score on overall confidence (Q8: $\bar{X}$=2.67) indicates that this comfort does not automatically translate into superior self-efficacy compared to human interaction.

For the second research question (RQ2), the most relevant AI feature identified by students is L1 Scaffolding, with the highest mean score overall ($\bar{X}$=3.88). This preference highlights that for Indonesian EFL learners, the primary psychological barrier is often cognitive anxiety—the frustration of not understanding complex concepts—which L1 support effectively minimizes. Instant feedback ($\bar{X}$=3.40) is the second priority, supporting metacognitive awareness (Zimmerman, 2002).

The central tension identified is the high Transferability Concern ($\bar{X}$=3.56). Students fear that relying on AI creates artificial competence and fails to prepare them for the dynamic, non-verbal, and socially complex demands of real human interaction.

Therefore, the study strongly advocates for a Hybrid Pedagogical Model. AI should be strategically utilized to address performance anxiety through safe practice and to reduce cognitive anxiety through L1 scaffolding. Simultaneously, teacher intervention remains critical to facilitate the transfer of competence from the non-threatening virtual environment to authentic, high-stakes social interactions, ensuring that technological efficiency is complemented by essential human empathy and adaptability.

**Pedagogical Implications and Action Recommendations**

Based on statistical analysis showing high oral performance anxiety among students, and student recognition of AI as an error mitigation tool (Q10) accompanied by transferability concerns (Q12), this report presents pedagogical implications and practical recommendations.

**Strategies for Integrating AI in High School English Classes**

AI integration should focus on leveraging its strengths as a *risk mitigator* and *scaffolding tool* while proactively addressing the transferability gap.

1. **Prioritize *L1 Scaffolding*:** Teachers should encourage the use of AI (like LLMs or *chatbots*) to utilize L1 support features (Q15, $\bar{X}$=3.88). AI can be used as an "L1 bridge" to explain instructions, complex grammar concepts, or specific vocabulary. This strategy directly reduces *cognitive load* and cognitive anxiety, allowing students to focus on practice without being hindered by conceptual confusion (Biju et al., 2024).
2. **Implement a Hybrid *Practice-to-Performance* Model:** To address Transferability Concerns (Q12), it is recommended to design a structured learning sequence. These stages should start with Risk-Free Practice using AI (leveraging the comfort of Q10), followed by Receiving Instant Feedback (Q13), and ending with Application in Social Contexts, such as Human-to-Human Role Simulations. This model ensures students internalize skills in a non-threatening environment before facing social pressure.
3. **Promote AI as a *Thought Partner*:** Teachers need to exemplify how to use AI as a tool to deepen cognitive processing, not just as a correction tool or shortcut (Atkinson & Barker, 2023). Learning should emphasize dialogic interactions, where students question and challenge the AI, which has been shown to enhance long-term memory retention and critical thinking.

**Recommendations for EdTech Developers**

1. **Focus on Critical Features:** Developers should prioritize refining multilingual *scaffolding* features (Indonesian L1 support) and *instant feedback* mechanisms (Q15, Q13), given these features are proven to be the most psychologically relevant for Indonesian learners.
2. **Address the Social Gap:** AI tools should be developed to explicitly highlight the differences between bot and human interaction, for example through modules that train non-verbal cues and contextual flexibility missing from textual interaction, to reduce the risk of *illusion of competence* (Q12).

**Directions for Future Research**

Although this descriptive analysis provides an in-depth understanding of student perceptions, future research should shift to inferential analysis. Future studies should use more advanced statistical methods (such as *Structural Equation Modeling* or Regression) to test causal hypotheses: whether the extent to which AI reduces error anxiety (Q10) significantly mediates (explains) the level of overall learning anxiety reduction (Q16). Furthermore, in-depth qualitative studies are needed to explore the social needs and interpersonal communication dynamics that students feel are missing in AI-based interactions.

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