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Mobile-Assisted English-Speaking Practice and Speaking Fluency among Malaysian University Students: The Mediating Role of Speaking Anxiety Reduction and the Moderating Role of Trust in AI Feedback

Sathis Reddy A/L Bahureddy¹, Sumaira Zulqarnain², Saralah Devi Mariamdarman Chethiyar^{3,4*},
Rajoo Ramanchandram⁵, Revathi Munirathinam⁶

¹Task Force Balai Polis Pantai Remis 34900 Pantai Remis Manjung Perak, Malaysia

² School of Business Management, Universiti Utara Malaysia, Sintok, Malaysia

³ School of Applied Psychology, Social Work and Policy, College of Arts and Sciences,
Universiti Utara Malaysia, Sintok, Malaysia

⁴Vel Tech Rangarajan Dr. Sagunthala R and D Institute of Science and Technology, Avadi,
Chennai, 600062, India

⁵School of Business Management, Universiti Utara Malaysia, Malaysia.

⁶Engineering Department, Scientific Society Group, Tiruvannamalai, Tamilnadu – 606805. India.

*Corresponding Author: Saralah Devi Mariamdarman Chethiyar; Email: devi@uum.edu.my

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Abstract

Objective: To examine the relationship between mobile-assisted English-speaking practice and self-perceived speaking fluency among Malaysian university students, with speaking anxiety reduction as a mediator and trust in AI feedback as a moderator. **Methods:** A cross-sectional quantitative survey was conducted among 428 undergraduate students from Malaysian higher education institutions who used smartphones or mobile applications to practice English speaking at least once a week during the semester. Partial least squares structural equation modelling was used to assess the measurement model, direct effects, mediation effects, moderation effects, and conditional indirect effects. **Results:** Mobile-assisted English-speaking practice was positively associated with self-perceived speaking fluency and speaking anxiety reduction. Speaking anxiety reduction was also positively related to speaking fluency and partially mediated the relationship between mobile-assisted English-speaking practice and speaking fluency. Trust in AI feedback positively moderated the relationship between mobile-assisted English-speaking practice and speaking anxiety reduction, indicating that the relationship was stronger among students with higher levels of trust in AI feedback. The indirect effect of mobile-assisted English-speaking practice on speaking fluency through speaking anxiety reduction was also stronger at higher levels of trust in AI feedback. **Conclusion:** Mobile-assisted English-speaking practice can improve students perceived speaking fluency partly by reducing speaking anxiety. Trust in AI feedback strengthens this affective mechanism. The study contributes to the technology-assisted language learning literature by explaining how mobile and AI-supported speaking practice can enhance English-speaking outcomes in Malaysian higher education.

Keywords: Mobile-assisted English-speaking practice; Speaking fluency; Speaking anxiety reduction; Trust in AI feedback; Malaysian university students; PLS-SEM

Introduction

The ability to communicate in English fluently is a critical skill necessary for academic achievement and workability for Malaysian university students. Malaysia is a multilingual country with Bahasa Malaysia being the national language, and English being used extensively in higher education, professional communication, international business, tourism, research and international collaboration. While many Malaysian students are taught English throughout their school life, there are some who continue to struggle with the language, especially when they must communicate proficiently in formal presentations, discussions in groups, job interviews, workplace and international settings.

The development of English-speaking fluency is not only a matter of vocabulary and grammar knowledge. Practice opportunities, confidence, managing anxiety, feedback, monitoring pronunciation and willingness to communicate also play a part. There are many dimensions of fluency including smoothness, speed, automaticity, pausing patterns, and the ability to produce speech without excessive hesitation (De Jong & Perfetti, 2011; Segalowitz, 2010; Skehan, 2009; Tavakoli & Skehan, 2005). The students who have limited opportunities to practise their speech may experience hesitation, pauses, fears of mistakes and self-consciousness when speaking English. Students in multilingual classrooms can also make comparisons with more fluent students, thereby causing more speaking anxiety.

Mobile-Assisted English-Speaking Practice Provides New Opportunities for Enhancing Oral Fluency. Students can practice pronunciation, record and replay speech, converse with AI chatbots, perform speaking drills and get immediate speech recognition feedback, and engage in low-pressure speaking practice outside of class on a smartphone and mobile application. Mobile assisted language learning (MALL) is particularly relevant to Malaysia since learners are already

accustomed to using the mobile technology for communication, learning, translation and academic support (Burston, 2015; Chen, 2017; Kukulska-Hulme, 2020; Stockwell & Hubbard, 2013).

The advent of Artificial Intelligence has also transformed Mobile Assisted Speaking Practice. Speaking Apps are applications that use AI technology to give pronunciation feedback, fluency suggestions, grammar correction, simulation of conversations, vocabulary support, and automated scoring. Students may have exposure to repeated and private speaking opportunities with the use of these tools, not possible in large classrooms. One further benefit of AI-powered mobile practice is that it can help to minimise the reliance on teachers by offering instant feedback and self-paced learning opportunities (Godwin-Jones, 2023; Kim et al., 2021; Kohnke et al., 2023).

But speaking practice via mobile does not necessarily enhance speaking fluency. Even though students are using mobile tools often, they can also continue to struggle and not make progress if they do not learn meaningfully, believe in the feedback, or manage their learning. Furthermore, some students' fears of speaking may hinder them from maximizing their speaking experiences. Language anxiety has the potential to impair cognitive processing, oral participation, willingness to communicate and speaking performance (Horwitz, 1986; MacIntyre & Gardner, 1994; Teimouri et al., 2019). While a student can gain access to the mobile speaking tools, it may not improve fluency if the student is still worried about speaking, has not yet developed an appetite for oral production, or is not comfortable with feedback generated by the AI.

This study thus suggests a model that combines mobile-assisted English-speaking practice and reducing speaking anxiety to enhance the level of speaking fluency. The model also suggests that the process of using AI feedback to enhance communication (speaking) practice is enhanced

by trust in AI feedback, which in turn contributes to a reduction in speaking anxiety. That is, students' emotional benefit from MLP will improve if they feel that feedback from AI is credible, useful, fair and reliable (Jian et al., 2000; Lee & See, 2004; Nazaretsky et al., 2025).

The study is based on Social Cognitive Theory and the Affective Filter Hypothesis. Social Cognitive Theory provides the lens on how learning takes place in the interaction between behaviour, personal factors, feedback and environment (Bandura, 1986, 1991). Mobile-assisted speaking practice offers a technology-based learning environment, in which students have the opportunity to practice, review their performance, and receive feedback on speaking repeatedly. The Affective Filter Hypothesis suggests that anxiety could interfere with language performance, and that lower anxiety facilitates language performance (Krashen, 1982). These theories help support the argument that mobile assisted speaking practice can benefit in reducing speaking anxiety which will directly and indirectly improve speaking fluency.

To investigate the relationship between mobile-assisted English speaking practice and speaking fluency in university students in Malaysia; To investigate the relationship between mobile-assisted English speaking practice and reduction of speaking anxiety; To investigate the relationship between reduction of speaking anxiety and speaking fluency; To test the mediation of reduction of speaking anxiety; To investigate the moderating role of trust in AI feedback; and To test the conditional indirect effect of mobile-assisted English speaking practice on speaking fluency through reduction of speaking anxiety at different levels of trust in AI feedback.

Literature Review

Mobile-Assisted English-Speaking Practice

Mobile-assisted English-speaking practice involves using the students' mobile phones and mobile apps to practise oral English in the form of pronunciation exercises, recorded speaking

tasks, dialogue simulation, AI conversation, speech recognition, and feedback-based oral exercises. The flexibility, portability, accessibility and situated and self-paced learning (Burston, 2015; Kukulska-Hulme, 2020; Stockwell & Hubbard, 2013) of mobile-assisted language learning (MALL) have been well-documented. Mobile-assisted speaking practice differs from traditional classroom speaking tasks by enabling students to repeat speaking tasks independently, to self-monitor their own performances, and to practise their speaking skills when and where they wish to.

Mobile-assisted speaking practice can be implemented in Malaysian universities to complement the limited classroom speaking time. Students can record their oral writing outputs, communicate with AI chatbots, practise pronunciation, and rehearse their presentation using mobile applications, and have their spoken output automatically corrected. Such practices can assist the students' autonomy and their SLL as they can plan, monitor their own speaking process, and evaluate their performance independently (Zimmerman, 2002; Oxford, 2017). Previous studies have revealed that when MALL tools are used actively and purposefully, their effects on the motivation, engagement, vocabulary acquisition, pronunciation, and speaking self-confidence are positive (Chen, 2017; Hwang & Fu, 2019; Tai & Chen, 2023).

Speaking Fluency

Speaking fluency is characterized by the ease, continuity and comprehensibility of speech, coupled with few hesitations and pauses. It involves speed, automaticity, continuity, and ideas to be expressed without too much searching for words. In order to develop fluency, students need to have repeated speech production and greater automaticity in the retrieval, encoding, and articulation of their words (De Jong & Perfetti, 2011; Segalowitz, 2010; Skehan, 2009).

The measurement of speaking fluency in this study is based on the procedure of survey

design, which is self-perceived speaking fluency. Self-perceived speaking fluency matters because personal perception can have a positive or negative effect on a student's confidence, desire to communicate and future use of the language in speaking. But self-perceived fluency does not necessarily stand in for objective measures of fluency (e.g., speech rate, pause frequency, pronunciation accuracy, and teacher-rated oral performance). Hence, this study defines fluency in speaking as students' self-efficacy in their ability to speak English easily in an academic and daily communication situation.

Speaking Anxiety Reduction

Speaking anxiety is a most important affective obstacle to the second-language oral communication. It includes nervousness, anxiety, concern, apprehension, self-consciousness and worry about being evaluated negatively in the target language (Horwitz et al., 1986; MacIntyre & Gardner, 1994). Language anxiety has detrimental impacts on cognitive processing, oral participation, willingness to communicate and speaking performance (MacIntyre & Charos, 1996; Teimouri et al., 2019). Anxiety can lead to increased hesitation, pauses, avoidance of interaction and decreased fluency in speaking situations.

Speaking anxiety reduction means reducing students' fear, nervousness and uneasiness in speaking English. In this study, speaking anxiety reduction is viewed as positive and the higher scores represent less anxiety level or more anxiety reduction. Theoretically, the construct is supported by the Affective Filter Hypothesis that was proposed by Krashen (1982), stating that anxiety may inhibit language learning and language performance. Mobile-assisted speaking practice can help to lower speaking anxiety since it offers chances for private speaking, repeated speaking, and low-pressure speaking. Student can practice without immediate feedback from peers, repeat tasks until comfortable, and get feedback in a less threatening environment.

Trust in AI Feedback

Trust in AI feedback is the students' confidence in the accuracy, usefulness, fairness, understandability, and utility of AI generated comments, scores and suggestions. When using AI for speech input training, students can receive feedback on pronunciation, fluency, grammar, vocabulary, intonation, and overall speech performance. But students may not take such feedback for granted. They might wonder if the AI system is able to recognize their accents, variations of English, context of speech, or the purpose of their utterances.

Research on human-AI interaction has demonstrated that users' trust influences their acceptance, dependence, and action on recommendation offered by an automated system (Jian et al., 2000; Lee & See, 2004). Trust in AI is particularly crucial in educational settings, as learners need to evaluate the credibility of AI-provided feedback and determine if it is reliable enough to influence their learning actions (Kohnke et al., 2023; Nazaretsky et al., 2025). If students believe that the AI feedback is accurate, they may feel more confident using mobile speaking tools and this could reduce their anxiety because it's not as threatening as actual feedback.

Theoretical Foundation and Hypotheses Development

Social Cognitive Theory

According to the Social Cognitive Theory, learning is the process that involves personal factors, behaviour, and environment interacting. Bandura (1986, 1991) states that people learn by observing, practicing, receiving feedback, monitoring themselves and regulating their own behavior. In mobile-assisted English-speaking practice students are involved in repeated speaking acts, are provided feedback from mobile or AI technology, self-monitor their performance and modify future speaking acts.

This theory is applicable because the use of mobile assisted speaking practice will provide

an environment conducive to repeated speaking behaviour. Students can practice pronunciation, repeat tasks, track progress and utilize AI feedback to adjust future learning. Schunk and DiBenedetto (2020) also pointed to the importance of motivation and self-regulation in relation to learning, which provides further support for the idea that mobile-assisted practice may help to facilitate speaking fluency if the students are actively involved in using the feedback.

Affective Filter Hypothesis

According to the Affective Filter Hypothesis (Krashen, 1982), emotional state like anxiety, fear or lack of confidence can obstruct language acquisition and performance. Under high anxiety, students might have difficulties to comprehend language input and make language output. A decreased anxiety level may allow the student to be more willing and able to communicate and speak more fluently.

In this study speaking anxiety reduction is suggested as a mediation variable. Spoken practice (using mobile) might create a less intimidating setting for speaking, thus alleviating anxiousness. This will, in turn, help to improve fluency in speech. This theoretical reasoning is especially relevant in Malaysia when students feel uncomfortable when speaking English in public because they fear making mistakes, comparing themselves with others, and not having enough opportunities to practice oral speech.

Hypotheses Formulation

The use of mobile-assisted English-speaking practice is expected to have positive association with speaking fluency as it provides more opportunities for the students to use their voice, repeat, monitor, and provide feedback on the output. Mobile applications can facilitate these processes as students can practise their speaking skills beyond the classroom and have their automatic speech recognition or AI systems provide immediate feedback (Godwin-Jones, 2018;

Kukulska-Hulme, 2020; Tai & Chen, 2023). Thus, it is expected that students who practice mobile-assisted English-speaking practice more often will have more fluent reports.

H1: Mobile-assisted English-speaking practice is positively associated with speaking fluency among Malaysian university students.

Using mobile to assist in English speaking practice is also anticipated to alleviate speaking anxiety. Students may be even more anxious when facing others in the classroom, since they are concerned about making errors, being judged by others, or being negatively evaluated (Horwitz et al., 1986; MacIntyre & Gardner, 1994). Mobile apps offer private and repeated speaking opportunities, enabling students to practice, make mistakes, and get better before it's time to speak in public. Such practice can lead to lowering the affective filter which in turn can reduce nervousness in oral communication (Krashen, 1982; Teimouri et al., 2019).

H2: Mobile-assisted English-speaking practice is positively associated with speaking anxiety reduction among Malaysian university students.

It is predicted that speaking anxiety will have a positive relationship with speaking fluency. It can be predicted that speaking anxiety will be positively correlated to speaking fluency. If students do not have to worry about making errors or being criticized for their mistakes, they can devote more cognitive resources to delivering the message, pronunciation and interaction (MacIntyre & Gardner, 1994; Teimouri et al., 2019). Reduced anxiety can help to promote more fluid speech, less hesitation and increased communication readiness (Dewaele & MacIntyre, 2014; Tavakoli & Skehan, 2005).

H3: Speaking anxiety reduction is positively associated with speaking fluency among Malaysian university students.

The relationship between mobile assisted English-speaking practice and fluency is expected

to be mediated by speaking anxiety reduction. Mobile assisted practice may directly contribute to fluency by providing more practice and indirectly by decreasing anxiety. Practice in a mobile context in low-stress may decrease students' nervousness and they might be more open to speaking, which may in turn improve their perceived fluency. The mediation model is consistent with the Affective Filter Hypothesis and previous studies on language anxiety (Horwitz et al., 1986; Krashen, 1982; MacIntyre & Gardner, 1994; Teimouri et al., 2019).

H4: Speaking anxiety reduction mediates the relationship between mobile-assisted English-speaking practice and speaking fluency among Malaysian university students.

The level of trust in AI feedback is predicted to moderate the link between English speaking practice with mobile technologies and reduction in speaking anxiety. Student acceptance of constructive feedback is likely to be higher if they trust the AI feedback and will follow the suggestions to practice again and again, and feel supported by the AI system. Trust helps to minimize uncertainty and boost learners' trust in automated feedback (Jian et al., 2000; Lee & See, 2004). Low trust can, on the other hand, diminish the emotional and teaching advantages of AI-driven speaking practice.

H5: Trust in AI feedback positively moderates the relationship between mobile-assisted English-speaking practice and speaking anxiety reduction, such that the relationship is stronger when trust in AI feedback is higher.

Finally, the indirect effect of mobile-assisted English-speaking practice on speaking fluency via reducing speaking anxiety is predicted. If the trust is high, students can engage more with AI feedback, feel less anxious, and finally be more satisfied with their progression in fluency. Low trust = lower emotional and fluency benefits from same mobile-assisted practice. It is a conditional indirect logic that aligns with moderated mediation and trust-based human-AI

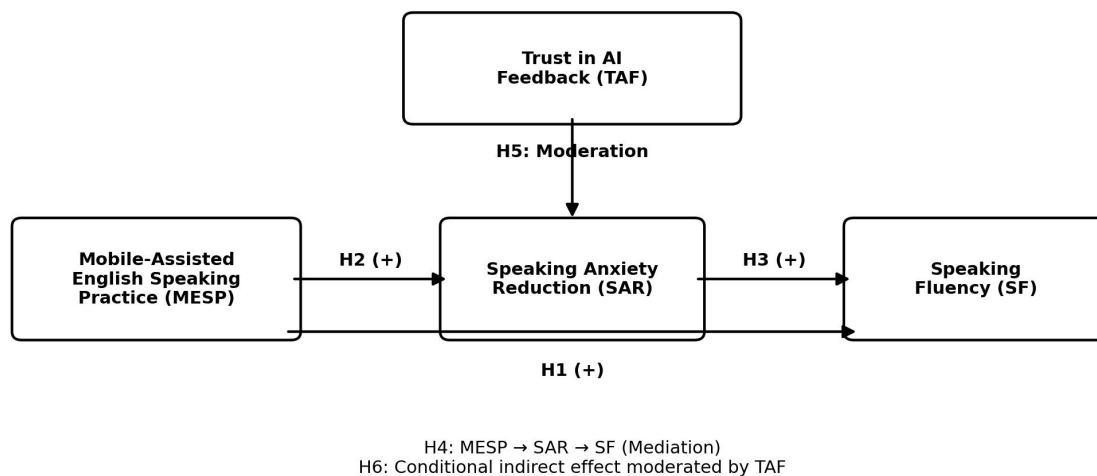
learning interaction (Hayes, 2018; Kohnke et al., 2023; Nazaretsky et al., 2025).

H6: Trust in AI feedback moderates the indirect relationship between mobile-assisted English-speaking practice and speaking fluency through speaking anxiety reduction, such that the indirect relationship is stronger when trust in AI feedback is higher.

Research Model

The moderated-mediation model is shown in Figure 1. Mobile-assisted English-speaking practice is proposed to have a direct and indirect (via reduction of speaking anxiety) effect on the learner's fluency in speaking. According to the proposed conditional indirect effect, trust in AI feedback would moderate the relationship between mobile-assisted English-speaking practice and reduction of speaking anxiety, which would yield a conditional indirect effect.

Figure 1
Research Model



Methodology

Research Design

This study adopted a cross-sectional quantitative survey design. The design was suitable given that the study was designed to examine a moderated mediation model that comprised of three variables: namely, mobile-assisted English-speaking practice, reduction of English-speaking anxiety, trust in AI feedback, and fluency in speaking. Partial least squares structural equation modelling was used because the model comprised of both direct, mediation, moderation, and conditional indirect relationships. The PLS-SEM can be used for prediction-oriented models involving multiple latent constructs with indirect effects (Hair et al., 2022).

Respondents and Study Context

The participants were undergraduate students at the Malaysian higher education institutions. Three inclusion criteria were used to select the respondents. In the first place they were to be undergraduate students. Secondly, they were required to be taking an English related course or an English course that involved oral communication activities. Third, they ought to practice English speaking at least once a week in the current semester by using mobile applications or their smartphones.

Students in Malaysian universities in Kuala Lumpur/Selangor, Penang, Johor and in Sabah/Sarawak were chosen as data subjects. The regions were chosen, so that there is a mix of contextual diversity in the urban, North, South and East Malaysian higher education environment. Students from public universities, private universities and university colleges were included in the sample.

Data Collection Procedure

An online questionnaire was used to gather data. The survey link was sent out via learning platforms, class networks, social media and groups of university students. The respondents were made aware that their responses would be anonymous and confidential and participation was

voluntary. The respondents were screened first to make sure they have been included in the questionnaire according to the inclusion criteria. We received 487 questionnaires. Following the exclusion of incomplete responses, straight-line responses and responses missing screening criteria, 428 valid questionnaires were left for final analysis.

Measurement of Constructs

Adapted multi-item scales were used to measure all constructs. This was answered with a 5-point Likert scale, with 1 = strongly disagree and 5 = strongly agree. Items adapted from the mobile-assisted language learning studies were used to measure mobile-assisted English-speaking practice. Resources related to the number and frequency of using mobile applications for speaking practice, pronunciation exercises, listening and speaking activities, AI conversation and oral feedback. The assessment of speaking anxiety was carried out in terms of reverse coded speaking relevant items from the Foreign Language Classroom Anxiety Scale (Horwitz et al., 1986). Higher scores represented lower speaking anxiety and/or greater reduction of anxiety. Items were adapted from the trust in automation (Jian et al., 2000) and trust in AI feedback scales (Lee & See, 2004) to measure trust in AI feedback. The speaking fluency was assessed with the use of the items of speaking fluency and literature on speaking performance (De Jong & Perfetti, 2011; Segalowitz, 2010; Skehan, 2009).

Data Analysis

The collected data was analysed using SPSS and Smart_PLS 4. Descriptive statistics and demography analysis were carried out using SPSS. For the assessment of the measurement model and the structural model, the Smart_PLS was applied. Cronbach's alpha, rho_A and composite reliability were used to test the reliability. Outer loadings and average variance extracted were used to check the convergent validity. The Fornell-Larcker criterion and

heterotrait-monotrait ratio were used to test for discriminant validity. Bootstrapping with 5,000 resample was used to test the structural relationships.

Results

Sample Characteristics

A total of 487 questionnaires were received from the Malaysian undergraduate students initially. Of the 63 questionnaires that were screened, 59 were excluded due to various reasons such as lack of information, straight-line answers or not meeting the inclusion criteria. Thus, 428 complete responses were used for the final analyses. Since this final sample was sufficient for PLS-SEM as it is the minimum sample size required for testing a moderated mediation model with multiple latent constructs, it was deemed adequate for PLS-SEM.

Table 1
Sample Socio-Demographic Profile (N = 428)

Characteristic	Category	Frequency	Percentage
Region	Kuala Lumpur/Selangor	118	27.6%
	Penang	103	24.1%
	Johor	101	23.6%
	Sabah/Sarawak	106	24.8%
Institution Type	Public university	226	52.8%
	Private university	149	34.8%
	University college	53	12.4%
Gender	Male	187	43.7%
	Female	241	56.3%
Age	18-19 years	79	18.5%
	20-21 years	183	42.8%
	22-23 years	129	30.1%
	24 years or above	37	8.6%
Year of Study	First year	91	21.3%
	Second year	126	29.4%

	Third year	132	30.8%
	Fourth year or above	79	18.5%
Field of Study	Business and social sciences	151	35.3%
	English/language/education	139	32.5%
	STEM and other fields	138	32.2%

Table 1 indicates that the respondents were well-distributed according to the four regions of Malaysia. The highest percentage of respondents was from Kuala Lumpur/Selangor (27.6%), followed by Sabah/Sarawak (24.8%), Penang (24.1%) and Johor (23.6%). This regional distribution indicates that the sample was not highly skewed towards any single region and also reflects wider Malaysian higher education contexts.

From the point of view of the type of institution, 52.8% of the respondents attended public university, 34.8% public private university, and 12.4% university college. That distribution is helpful because students attending institutions may come from a variety of contexts with varying degrees of exposure to English speaking practices, mobile learning, and receiving feedback with the help of AI. There was also a slight female predominance in the sample, as the female students were 56.3% and the male students were 43.7%.

The majority of respondents were in the age range of 20-23 years, the average age of undergraduate students. The respondents were also spread over different years of studies, the highest percentage representing third year students and the second-year students. When it came to field, there were students from business/social science, English/language/education, STEM or other. This means that the study was not conducted on English majors only.

Descriptive Statistics

The researchers analyzed descriptive statistics to gain insights into the overall trends in

respondents' perception of mobile-assisted English-speaking practice, speaking anxiety reduction, trust in AI feedback, and speaking fluency. The values for mean and standard deviation are given in Table 2.

Table 2
Descriptive Statistics

Construct	Mean	Standard Deviation
Mobile-assisted English speaking practice	3.82	0.69
Speaking anxiety reduction	3.64	0.73
Trust in AI feedback	3.71	0.70
Speaking fluency	3.76	0.67

All mean values were above the midpoint value of 3.00, indicating that responses of Malaysian university students were generally positive. The mean value of mobile-assisted English-speaking practice was the highest among all other means, indicating that generally respondents were not disagreeing that they use mobile devices or applications in order to practice English speaking. This means that the respondents were relatively familiar with mobile based speaking activities including pronunciation drills, recorded speaking tasks, AI conversation practice, and mobile feedback.

Students had an average score of 3.76 for speaking fluency with a range of 1–5 indicating moderate positive level of English-speaking fluency. Students' mean score of trust in AI feedback was 3.71, which suggests a positive overall attitude toward AI-generated feedback. This indicates that students were receptive to AI-based feedback, although the level is not particularly high, which indicates that the trust in AI feedback might need to be further reinforced by teacher guidance and training on AI literacy.

Speaking anxiety recorded a mean score of 3.64, the lowest of all the four constructs, but

above the mid-point. This suggests that learners' English-speaking anxiety was reduced when using mobile-assisted speaking tools, although this anxiety might also remain to be a problem for some learners. The range of the standard deviations was between 0.67 and 0.73, which indicated moderate variation of students' responses. This is a normal variation as students from Malaysia have different levels of English proficiency and exposure to digital learning, exposure to AI-supported tools, and level of confidence.

Measurement Model Assessment

The measurement model was examined for reliabilities and validity of the hypotheses before they were tested. As each of the constructs was measured with several items adapted from the earlier studies, it was important to check whether the items were reliable to represent each construct in the higher education context of Malaysia. Cronbach's alpha, rho_A and composite reliability were used to measure reliability. Outer loadings and average variance extracted were used to test the convergent validity.

Table 3
Reliability and Convergent Validity

Construct	Items Retained	Loading Range	Cronbach's Alpha	rho_A	Composite Reliability	AVE
Mobile-assisted English speaking practice	8	0.724-0.851	0.879	0.886	0.908	0.553
Speaking anxiety reduction	7	0.741-0.866	0.898	0.904	0.921	0.625
Trust in AI feedback	6	0.756-0.872	0.861	0.868	0.895	0.588
Speaking fluency	6	0.729-0.859	0.834	0.841	0.881	0.598

Table 3 shows that all outer loadings were above the recommended level of 0.70. The range of the mobile-assisted English-speaking practice items was between 0.724 and 0.851, which meant that all the items were effective in measuring the construct. Anxiety reduction had item loadings between 0.741 and 0.866, and the trust in AI feedback had loadings between 0.756 and 0.872. The loadings for the speaking fluency were also satisfactory, from 0.729 to 0.859. These results indicate that the indicators had satisfactory reliability.

Cronbach's alpha values were between 0.834 and 0.898, which is more than 0.70. This indicates good internal consistency among the items in each construct. Construct reliability was also supported by the rho_A values, which ranged from 0.841 to 0.904 and were all > 0.70 . The internal consistency of the items that measured the constructs ranged from 0.881 to 0.921, suggesting that the items were internally consistent.

The AVE values for all constructs were above 0.50. The AVE values for mobile-assisted English-speaking practice, speaking anxiety reduction, trust in AI feedback, and speaking fluency were 0.553, 0.625, 0.588, and 0.598, respectively. The values show that each construct accounted for over half of the variance in its indicators. Thus, convergent validity was achieved.

The results of the measurement model overall support the reliability and validity of the measurement items adapted to evaluate the mobile-assisted English-speaking practice, speaking anxiety reduction, trust in AI feedback, and speaking fluency among Malaysian university students.

Discriminant Validity

Heterotrait-monotrait ratio was used to assess discriminant validity. The "empirical distinctness" of each construct is assessed through the use of HTMT. Discriminant validity is acceptable if the HTMT values are less than 0.85.

Table 4
HTMT Results

Construct	MESP	SAR	TAF	SF
Mobile-assisted English speaking practice	—			
Speaking anxiety reduction	0.614	—		
Trust in AI feedback	0.537	0.489	—	
Speaking fluency	0.646	0.681	0.512	—

All the HTMT values were below the recommended value of 0.85, and ranged from 0.489 to 0.681. The maximum value obtained from HTMT was 0.681 which was between the scales of Speaking anxiety reduction and Speaking fluency. This is well reasonable as it is theoretically linked to speaking fluency, but the value is still below the threshold, thus affirming that the two constructs are still empirically different.

There was a relatively high correlation between the two constructs, mobile-assisted English-speaking practice and speaking fluency, with a correlation value of HTMT = 0.646. The same applies to the HTMT value for mobile-assisted English-speaking practice and reduction of speaking anxiety which is 0.614, indicating that practice behaviour and affective change are two different constructs. The other constructs had lower HTMT values for trust in AI feedback, indicating that it is a separate evaluation variable related to AI. Thus, discriminant validity was achieved.

Structural Model Results

The reliability and validity of the measurement model were verified, and then the structural model was evaluated to test the hypotheses. The structural model focused on the direct

relationships between the three variables of mobile-assisted English-speaking practice, reduction of speaking anxiety, and speaking fluency.

Table 5
Direct Effects

Hypothesis	Relationship	Beta	t-value	p-value	Decision
H1	MESP → Speaking fluency	0.318	6.214	<0.001	Supported
H2	MESP → Speaking anxiety reduction	0.529	12.476	<0.001	Supported
H3	Speaking anxiety reduction → Speaking fluency	0.401	8.932	<0.001	Supported

Table 5 indicates that there was a significant positive correlation between mobile-assisted English-speaking practice and speaking fluency ($\beta = 0.318$, $t = 6.214$, $p < 0.001$). Hence, H1 is supported. The result indicated that students who showed more active attitude towards their use of mobile applications more frequently for learning English speaking skills had high rates in their self-evaluation of their English-speaking proficiency. Mobile-assisted practice can in practice be used to help students practise pronunciation, repeat oral tasks, practise presentations, interact with AI tools, and get feedback on their speech, which can be beneficial for smoother oral production.

The relationship between mobile-assisted English-speaking practice and reduction of English-speaking anxiety was also significant and positive ($\beta = 0.529$, $t = 12.476$, $p < 0.001$). As a result, H2 got the support. This finding suggests that the more students used the technology to practice their speaking, the more their speaking anxiety decreased. It can be seen that the beta

value of the mobile-assisted practice is relatively high, which indicates that the use of mobile devices in practice has a significant influence on the students' nervousness and discomfort in speaking English. This might be because there is little peer judgement when using mobile tools, students can repeat challenging speech skills, and receive feedback in private.

The findings of this study support H3, which was speaking anxiety reduction positively related to speaking fluency ($\beta = 0.401$, $t = 8.932$, $p < 0.001$). That is, those with less speaking anxiety were more likely to feel they were fluent English speakers. This discovery corroborates the notion of emotional readiness as an important factor in oral fluency development. Students are able to concentrate more on the delivery of the message, on pronunciation, on the links etc. than on making mistakes, if they feel less anxious.

R-square value of speaking anxiety reduction was 0.342. This suggests that the variance in reduction of speaking anxiety can be accounted for by 34.2% of this mobile-assisted English-speaking practice and trust in the AI feedback. In behavioural or educational studies, this amount of explanation is satisfactory because there are so many other factors that could contribute to the anxiousness of students, including their personality, previous English learning experiences, classroom environment, comparison to others, and teacher support.

R-square for the speaking fluency was 0.517. This indicates that 51.7% of the variance in the level of fluency in English as a foreign language was explained by the mobile assisted speaking practice and the reduction of speaking anxiety. This is moderate to substantial level of explanatory power, indicating that the proposed model is able to offer students a meaningful explanation for their perception of fluency in speaking in the context of higher education in Malaysia.

Mediation Analysis

To see if the relationship between mobile-assisted English-speaking practice and speaking fluency is mediated by speaking anxiety reduction, a mediation analysis was performed. The indirect effect was tested significant using "bootstrapping".

Table 6
Mediation Effect

Hypothesis	Indirect Relationship	Beta	t-value	p-value	Decision
H4	MESP → Speaking anxiety reduction → Speaking fluency	0.212	7.384	<0.001	Supported

The result of the mediation revealed that the indirect effect of mobile-assisted English-speaking practice on English speaking fluency via reduction of speaking anxiety was significant ($\beta = 0.212$, $t = 7.384$, $p < 0.001$). Hence, H4 was advocated. The result suggests that speaking anxiety reduction is an important psychological mechanism between the mobile-assisted practice and speaking fluency.

After including the mediator, the direct effect of mobile-assisted English-speaking practice on the speaking fluency was still significant. Thus, the mediation is not complete, it is only partial. Mobile-assisted speaking practice is related to speaking fluency in two ways (Jafar, 2012). Firstly, it directly promotes fluency through opportunities for oral repetition, pronunciation practice, feedback use and self-monitoring. Second, it indirectly contributes to fluency by easing speaking anxiety. Pupils using mobile devices can be more relaxed about making mistakes, less nervous about taking part in speaking activities, and more confident in speaking English.

This finding is significant because it indicates that using mobile as a speaking tool is not just a technical or behavioural practice. In addition, it serves an affective purpose. Mobile-

assisted practice could be used to offer a safer environment for oral development, as in the Malaysian context, some students may not feel confident speaking in English for fear of making mistakes, peers judging them in English, or not having been exposed to English communication enough.

Moderation Analysis

The moderation analysis examined the moderating effect of trust in AI feedback on the relationship between mobile-assisted English-speaking practice and reduction of speaking anxiety. The interaction term of mobile-assisted English-speaking practice and trust in AI feedback was developed and tested with the help of bootstrapping method in Smart_PLS.

Table 7
Moderating Effect of Trust in AI Feedback

Hypothesis	Interaction Effect	Beta	t-value	p-value	Decision
H5	MESP × Trust in AI Feedback → Speaking anxiety reduction	0.146	3.518	<0.001	Supported

The interaction effect was significant and positive ($\beta = 0.146$, $t = 3.518$, $p < 0.001$), supporting H5. This suggests that English speaking confidence increases as the relationship between mobile assisted English speaking and reducing English speaking anxiety strengthens with trust in AI feedback. That is, high trust in the AI-generated feedback is associated with greater effectiveness of mobile-assisted speaking practice in reducing speaking anxiety.

The interaction effect is smaller than the direct effects but this is typical of moderation studies. The interaction effects tend to be small because they are seen as a change in a relationship when conditions are different, not main effects. The interaction between trust in AI

feedback and positive and significant, indicating that it is an important boundary in speaking practice with AI.

A high level of trust in AI feedback might incline students to accept pronunciation scores, fluency comments, grammar corrections, and suggestions for speaking. They feel less threatened and supported during practice since they believe the feedback they receive is credible and useful. Students not so confident with AI feedback, however, may not be convinced of the accuracy or fairness of the feedback, diminishing the anxiety reducing effect.

Conditional Indirect Effect

To investigate the indirect effect of mobile-assisted English-speaking practice on speaking fluency via reduction of the speaking anxiety, the moderated mediation analysis was conducted, in which the interaction between mobile-assisted English-speaking practice and trust in AI feedback was examined.

Table 8
Conditional Indirect Effects at Different Levels of Trust in AI Feedback

Level of Trust in AI Feedback	Indirect Effect	t-value	p-value
Low trust	0.153	4.927	<0.001
Mean trust	0.212	7.384	<0.001
High trust	0.268	8.641	<0.001

As detailed in Table 8, indirect effect was significant at low, mean, and high levels of trust in AI feedback. However, the strength of the indirect effect increased as trust in AI feedback increased. The indirect effect was 0.153 at low trust. The indirect effect grew to 0.212 at the average level of trust. The indirect effect was further increased to 0.268 at high trust.

The results for these are consistent with H6 and also validate the moderated mediation effect. The results show that mobile-assisted English-speaking practice is more strongly related

with speaking fluency when students have high trust in AI feedback in reducing speaking anxiety. This shows that trust in AI feedback has a direct impact on the emotional value of mobile practice, but also enhances the indirect pathway from practice to fluency.

This outcome is significant to education. While AI feedback can be used to aid the growth of English speaking, its usefulness can be partly dependent on students' trust in AI. If students think the AI feedback they've received is accurate, fair, and helpful, they are more likely to practise with confidence, less likely to experience anxiety, and likely to report an improvement in speaking fluency. Hence, the trustworthy feedback from AI is an essential element of effective AI-enhanced speaking practice.

Summary of Hypotheses Testing

Table 9
Summary of Hypotheses

Hypothesis	Statement	Result
H1	MESP positively relates to speaking fluency.	Supported
H2	MESP positively relates to speaking anxiety reduction.	Supported
H3	Speaking anxiety reduction positively relates to speaking fluency.	Supported
H4	Speaking anxiety reduction mediates the MESP-speaking fluency relationship.	Supported
H5	Trust in AI feedback moderates the MESP-speaking anxiety reduction relationship.	Supported
H6	Trust in AI feedback moderates the indirect effect of MESP on speaking fluency through anxiety reduction.	Supported

Table 9 summarizes the results of hypothesis testing. The hypotheses were all accepted. The result verifies the direct relationships between the mobile-assisted English-speaking practice and the reduction in speaking anxiety and the increase in fluency in speaking. Speaking anxiety

reduction is also positively related to speaking fluency and is a partial mediator. Moreover, the relationship between mobile-assisted English-speaking practice and speaking anxiety reduction was positively reinforced by the trust in AI feedback, and the relationship between practicing and speaking anxiety and speaking fluency was also positively mediated by reducing speaking anxiety.

The results overall confirm the proposed moderated mediation model. The results indicate that mobile-assisted English-speaking practice can help improve students' speaking fluency in both behavioral and affective ways. The direct relationship between mobile-assisted practice and speaking fluency reflects the behavioural pathway, and the mediation of the speaking anxiety reduction reflects the affective pathway. Finally, the moderating effect of trust in the AI feedback further demonstrates that AI-assisted learning is more effective when students think that the feedback is reliable, useful, and credible.

Discussion

The results offer empirical evidence in the form of positive relation between mobile-assisted English-speaking practice and English-speaking fluency of university students in Malaysia. This indicates that students who engage with mobile applications for pronunciation practice, recorded speaking, AI conversation, and oral feedback are more inclined to self-perceive as fluent English speakers. The discovery aligns with the concept that mobile-assisted language learning can create additional opportunities for students to speak beyond the classroom, and to provide multiple opportunities for learning, which is crucial for fluency acquisition (Burston, 2015; Kukulska-Hulme, 2020; Stockwell & Hubbard, 2013).

The study also revealed that speaking anxiety reduction is positively related to mobile assisted English-speaking practice. It implies that students who are more active in using mobile

tools might have less nervousness and self-consciousness in using English. Mobile-assisted practice can offer a less threatening context for oral rehearsal for students who speak a non-native language and/or have varying degrees of proficiency in English in Malaysia. This corresponds to the Affective Filter Hypothesis and the oral anxiety research findings by Horwitz et al. (1986), Krashen (1982), and Teimouri et al. (2019) that indicated anxiety had an impact on oral performance.

Speaking anxiety reduction was also found to be positively correlated with speaking fluency. Less nervous students will speak with less hesitation, pauses, and less continuity. Thus, reducing anxiety is a crucial affective process in the development of speaking fluency. The outcome implies that the speaking improvement process is not a cognitive or behavioural process alone, but also an emotional process.

The result of mediation indicates that speaking anxiety reduction partially mediate the relationship between mobile-assisted English-speaking practice and speaking fluency. This indicates that mobile-assisted practice is effective not only in enhancing the opportunities for practice, but also in minimizing anxiety. The mediation is partial however; other mechanisms may account for the relationship. These can include pronunciation, vocabulary recall, speaking confidence, feedback use, self-regulation and willingness to communicate.

The moderation result indicates that the relationship between the use of mobile-assisted English-speaking practice and reduction of speaking anxiety is strengthened by trust in AI feedback. This is particularly significant because having AI feedback doesn't mean it is useful. Students need to believe in the feedback before believing it and applying it. To maintain the confidence of students, reduce their anxiety, and assist them with speaking abilities, mobile speaking practice should be provided with the assistance of AI feedback that is credible,

understandable, and useful, as these factors can boost their confidence and alleviate anxiety (Jian et al., 2000; Lee & See, 2004; Nazaretsky et al., 2025).

Lastly, the moderated mediation result shows that the indirect effect of mobile-assisted English-speaking practice on fluency through a decrease in anxiety is more evident when there is high trust in the feedback provided by the AI. This implies that building trust is a crucial boundary condition for using AI in language learning. It is essential that in the context of Malaysia, lecturers and institutions give students insights into how AI feedback is generated so that they can confidently and responsibly use AI feedback.

Theoretical Implications

The study has a number of implications for theory. Firstly, it continues the research of mobile assisted language learning in that it explores the direct relationship between mobile assisted speaking practice and fluency of speaking as well as the affective pathway on which the reduction of speaking anxiety took place. The following gives a more comprehensive account of the role of mobile tools in oral development.

Second, the study extends to the field of Social Cognitive Theory by showing that mobile-assisted speaking practice offers a technology-supported environment in which repeated speaking practice, feedback, self-monitoring and behavioural regulation take place. These conditions are related to students' perceived fluency. Thirdly, the study is related to the Affective Filter Hypothesis in which speaking anxiety reduction is considered as the mediator. The findings indicated that one possible factor for the correlation between mobile assisted speaking practice and speaking fluency is the fact that the practice reduces the anxiety that students experience in their speaking activities.

First, it is a new study that adds trust in AI feedback to the Human-AI interaction research

field in education. This underscores that AI-powered learning relies on a combination of technology availability and students' faith in the suggestions given. Lastly, the Malaysian context contributes in providing insight of how mobile-assisted speaking practice can be applicable in the context of a multilingual higher education setting.

Practical Implications

This study provides implications for the implementation in Malaysian HEIs. To begin with, universities should adopt tasks in language courses which are suitable to be taught through the use of mobile devices. Additional speaking opportunities can be given through weekly mobile speaking activities, recorded oral summaries, AI dialogue practice and pronunciation drills.

Second, the lecturer should adopt mobile assisted practice to alleviate students' anxiety in speaking. Speaking tasks that have low stakes can be used to help students practise their performance before class. It can be particularly beneficial for learners who are shy, anxious or less confident. Third, universities must enhance the students' ability to read feedback in the form of AI. Pupils should be made aware of the process for creating AI feedback, what it can and can't assess, and how to interpret pronunciation scores or fluency ratings. This can help build trust in AI feedback and foster responsible AI use.

Fourth, AI feedback needs to be supplemented by human feedback. While useful for immediate feedback, teachers play an essential role in clarifying errors, interpreting feedback, and assisting students in making meaningful use of suggestions in a meaningful conversation. Lastly, universities must be able to provide access to mobile-assisted speaking tools that is inclusive. Students of diverse socio-economic statuses should be provided with an equal opportunity to utilize digital speaking resources.

Limitations and Future Research

There are some limitations to this study. First of all, the cross-sectional design is not suitable for causal interpretation. Longitudinal and/or experimental designs are needed to investigate the development of speaking anxiety and fluency over time in future studies. Second, fluency was assessed by the self-perception. The teacher ratings, oral performance tasks, speech recordings and acoustic measures (speech rate, number of pauses, mean length of run) should be included in future studies. Thirdly, the study was limited to the Malaysian undergraduate students. Future studies could be conducted to compare undergraduates and postgraduates, or to look at differences between the public and private universities. Fourth, trust in AI feedback was tested as a moderator, which could be investigated in future studies with other moderators like digital competence, English language proficiency, willingness to communicate with AI, lecturer support, or previous experience with AI tools.

Conclusion

The present study is an empirical study that focuses on the impact of mobile-assisted English-speaking practice on the speaking fluency of the Malaysia University students. Results indicate that mobile-assisted speaking practice is positively related to speaking fluency and speaking anxiety reduction. Speaking anxiety reduction partially mediates the relationship between mobile-assisted speaking practice and speaking fluency. The relationship between mobile-assisted speaking practice and anxiety reduction is enhanced by the trust in AI feedback, as is the indirect relationship with speaking fluency. The findings in the study identify that active use of mobile and AI mediated speaking practice could be useful for promoting English speaking fluency if students have low levels of speaking anxiety and high levels of trust in speaking feedback. Mobile assisted speaking practice can be a valuable means of boosting oral confidence and fluency in English in the multilingual higher education environment in Malaysia.

Declarations

Ethical Considerations

Informed consent was obtained from all respondents before participation. Respondents were informed that participation was voluntary, responses would remain anonymous and confidential, and they could withdraw from the study at any stage without penalty.

Use of Artificial Intelligence

The authors declare that generative AI tools may be used only for language editing and grammatical improvement. The use of AI does not influence the study design, data analysis, interpretation, results, or conclusions. The authors remain fully responsible for the manuscript content.

Conflict of Interest

The authors declare no conflict of interest.

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