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INTELLIGENT PERSONAL ASSISTANTS: A STUDY OF IMPACTS ON SAUDI EFL LEARNERS' LISTENING AND SPEAKING SKILLS

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ABSTRACT

Intelligent Personal Assistants (IPAs) have become ubiquitous computer-assisted Artificial Intelligence (AI) systems, which are capable of simulating natural conversation and providing language learners with unlimited access to speaking practice, unlike the conventional classroom environment. The purpose of the research was to investigate how contact with an English-speaking IPA affects the acquisition of listening comprehension and spoken communication by Saudi Arabic learners. Samples of 98 intermediate Saudi learners were randomly divided into an IPA-interaction group or a peer-interaction group. Both groups had pre- and post-tests of the comprehension accuracy, fluency, intelligibility, and lexical performance. The experimental group (EG) performed structured conversational activities during a period of four weeks using an IPA, but the control group (CG) performed the same activities using peer interaction. Learning of the English listening and speaking skills was measured using standardized listening tests and rated speaking tasks using independent raters. Correlation analysis, Analysis of Variance (ANOVA), and independent-sample analyses with support of the effect-size estimates were performed as quantitative procedures using IBM SPSS Statistics 31.0 to represent the intensity of the performance changes. The outcomes showed that the IPA group had much greater improvements, as the quality of listening improved by about (t-5.33) and the speech activities were enhanced by (t-5.45) percent, which was achieved (p <0.001) due to a higher number of interactions turns and more diversified communication strategies. These results reflect the beneficial effect of AI-mediated communication on speaking proficiency, concluding that properly designed IPA utilization can have a significant and positive impact on the acquisition of English skills by Saudi students.

KEYWORDS: Intelligent Personal Assistants (IPA), English Listening Development, Speaking Proficiency Enhancement, AI-Mediated Language Learning, Saudi EFL Learners.

1. INTRODUCTION

The English language is now a necessary skill for academic, professional, and social achievement in Saudi Arabia, where English serves as a central language in higher education, business, and international communications (Alzubi et al., 2025; Abusa'aleek & Alotaibi, 2022; Oteir & Al-Otaibi 2022; Oteir & Al-Otaibi, 2019). Listening and speaking are the most essential of the four important language skills in interactive competence and the most difficult among Saudi Arabian learners (Allehyani et al., 2025; Alotaibi & Alzu'bi, 2025). Speaking skills necessitate exposure to natural speech, possibilities of direct interaction, and regular feedback on pronunciation-aspects not readily available in conventional learning environments. As AI has developed over the past few years, technology-aided language learning has become a potential means to facilitate natural language acquisition (AbuSahyon et al., 2023).

The recent achievements in AI and natural language processing (NLP) have led to the emergence of IPAs such as Siri, Google Assistant, Alexa, and AI-driven conversational agents (Al-

Ahdal, 2020;Othman, 2023). Such systems can understand spoken data, respond in real time, and participate in the natural conversation patterns with students (Al-Ahdal, & Alharbi, 2021; Alenezi & Alenezi, 2025). Educations on the language acquisition process suggest that IPAs can give students constant access to the English language, help correct their pronunciation, and support real-time feedback, as well as enable students to talk as long as they desire with no fear of being evaluated (Al-Ahdal & Shariq, 2019; Makhoulouf , 2021; Alotaibi & Alzu'bi, 2021). Also, IPAs are able to provide listening tasks of different levels of challenge, simulate a real-life conversation, and help students build confidence by being able to practice regularly and individually (Alsadoon 2021; Aljabr & Al-Ahdal, 2024; Muthmainnah et al., 2023). With such developments, the process of learning a language is no longer held in a classroom; instead, it is an open and individualized, and interactive process. Figure 1 illustrates the IPA qualities that assist the Saudi learners to perform better when they speak and listen in English.

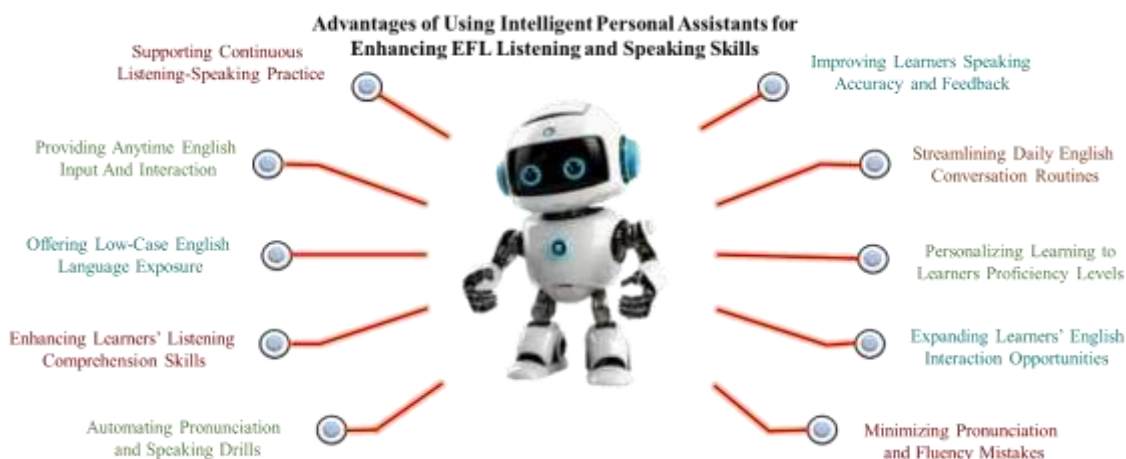


Figure 1: Key IPA-Driven Benefits Enhancing Saudi Learners' English Listening Comprehension and Speaking Proficiency Through Continuous, Personalized Interaction.

Training on speaking and listening in the Saudi English Foreign Language (EFL) environment has traditionally been based on teacher-centered instructions, pre-recorded audio and text, and limited talking in the classroom (Alotaibi, 2022; Alotaibi, 2021; Ahmed 2023). The students are characterized by speaking nervously, fear of errors, and absence of contact with the English language outside the classroom. Pronunciation feedback is not always reliable due to the time constraint and the size of the classes (Alotaibi, 2022; Alkhateeb et al., 2025). The practice in the classroom can be different from the requirements of real-world communication, as

listening resources may be inaccurate regarding depicting real accents and natural speaking rates (Oraif 2025). Consequently, despite years of formal education in English, communicative competence is hardly achievable by many Saudi learners.

This research seeks to explore the effect of IPAs on the acquisition of speaking and listening of the English language by Saudi Arabian learners. Using the IPA-based conversational practice and the traditional peer-interaction tasks, the research aims to determine whether IPA engagement results in increased comprehension, fluency, intelligibility, and lexical performance to a greater extent. This research

will address a gap by offering experimental findings on how structured IPA use can aid in the growth of speaking competency within Saudi EFL students.

Saudi EFL students' feelings about using AI tools to help them listen and write better in English were investigated by Altamimi and Hussein (2025). The results demonstrated that AI technologies were typically helpful for enhancing writing assurance, spelling, and grammar, although students pointed out shortcomings in the contextual authenticity and cultural suitability of the input. Employing a ChatGPT-based software could improve Saudi high school pupils' vocabulary acquisition, were evaluated in Aldowsari and Aljebreen (2024). The research results showed that the EGs' vocabulary acquisition improved significantly when contrasted with the CGs.

To analyze Saudi EFL learners' attitudes, viewpoints, and the prospects for AI-enabled training and instruction in higher education in Saudi Arabia was examined in Jamshed et al. (2024). The findings showed that Saudi English listening students have a very favorable opinion of artificial aided learning. Alotaibi et al. (2025) examined the parameters impacting the use of a well-known AI application, ChatGPT, in English language teaching among Saudi postsecondary students. The data revealed that female participants had more positive attitudes; graduates found it easier to use than diploma learners; and longer career periods were associated with a developed perceived ease of usage.

Metwally and Bin-Hady (2025) investigated the amount of education demanded by Saudi EFL learners to effectively incorporate AI into listening and speaking. The results also demonstrated that instructing EFL learners on incorporating AI in their educational practice contributes to improving students' flexibility, boosting learners with potential for the future, and meeting their needs. Alhamam (2025) analyzed how Saudi college learners studying English as a second language utilize AI techniques, specifically ChatGPT, to promote language acquisition. The results demand teacher preparation, curricular reform, and the creation of culturally sensitive methods for incorporating AI efficiently.

Albaqami (2025) examined the effectiveness of AI-driven technologies on increasing vocabulary acquisition among Saudi EFL students. These results add to the expanding conversation about technology-enhanced education and how it might maximize language development. Althobaiti (2025) investigated how Saudi female EFL students at universities perceive ChatGPT as a tool for enhancing oral comprehension, a problem that

frequently arises in Saudi EFL training. These findings offer useful information for EFL teachers and emphasize the need for a long-term study on AI's impact on readability and technological development in listening contexts.

During the COVID-19 epidemic, Aldayel (2022) investigated to determine how well Saudi university students' intellectual self-efficacy was developed by the use of mobile interactive voice assistant apps, such as Google Assistant and Siri. Based on the findings, it was strongly advised that faculty members take as many training sessions as possible to maximize their digital capabilities in utilizing contemporary technology in the classroom. Hago Elmahdi et al. (2025) examined the legal implications and culture of the use of AI capabilities in teaching EFL in Saudi Arabia. These findings contribute to the growing literature regarding the culturally relevant implementation of AI in the educational context and provide practical guidelines on how the complex nexus of instruction, culture, and innovation could be negotiated by Saudi Arabian institutions.

Aldhilan and Rafiq (2025) have discussed the implementation of AI technologies in early childhood education (ECE) in Saudi Arabia and its profound impacts on emotional identification, speaking English, socio-emotional development, and associated challenges. The findings show that AI could be used to enhance emotional understanding in a significant way with the help of real-time feedback systems and personalized social and emotional learning (SEL) interventions that were differentiated by the needs of particular children. The contribution of the research is presented below.

- Demonstrates the effectiveness of IPAs in enhancing English listening and speaking skills among Saudi Arabic learners.
- A well-structured experimental approach is used, with a sample of 98 intermediate Saudi learners arbitrarily assigned to two groups: IPA interaction (experimental) and peer interaction (control).
- Empirical research suggests that AI-mediated conversational practice outperforms traditional peer interactions in language acquisition.

1.1. Problem Statement

The existing research presents a long-standing challenge despite the accumulating evidence to suggest that AI-based tools such as ChatGPT and smart assistants enhance the vocabulary of Saudi EFL students, their writing accuracy, listening skills, and overall interaction. These are digital ability gaps,

teacher preparation, cultural appropriateness, imbalanced learner preparedness, and low contextual authenticity. Moreover, the absence of systematic, pedagogically facilitated AI integration impairs successful language development. Consequently, all these technological, cultural, and teaching constraints must be conquered to maximize the effectiveness of AI-supported speaking and listening learning among Saudi EFL students.

Section 2 describes the methodology of 98 Saudi learners who completed pre-/post-listening-speaking tests using IPA or peer interaction. Section 3 presents results and discussion; IPA users showed stronger gains. Section 4 concludes that IPA practice effectively improves English listening and speaking acquisition.

2. MATERIALS AND METHODS

This research employed a quasi-experimental

design, which involved 98 intermediate Saudi learners randomized into one of the IPA interaction (experimental) and peer interaction (control) groups. The two groups had pre- and post-tests to determine their listening comprehension and speaking ability. For four weeks, the EG engaged in organized IPA-mediated discussions, but the CG practiced with peers. Variables include Listening Score (LS), Comprehension Accuracy (CA), Reaction Time (RT), Fluency Rating (FR), Pronunciation Accuracy (PA), and Lexical Complexity (LC) were evaluated by pre- and post-tests. IPA Usage Log variables: Usage Frequency (UF), Average Session Duration (ASD), and Task Type Proportion (TTP)-measured engagement. ANOVA, correlation, and independent-sample tests were used in SPSS 31.0 to analyze the data. Figure 2 shows the summary of IPA's impact on Saudi learners' English listening and speaking development.



Figure 2: Overview of Research Design Examining IPA Effectiveness in Enhancing Saudi Learners' English Listening and Speaking Performance.

2.1. Participants

The data on this research were obtained from 98 Saudi Arabian EFL students of different universities.

The participants were separated into two categories, namely EG (n = 49) with the use of IPAs and CG (n = 49) with traditional teaching. Pre-tests were administered to both groups to test their hearing and speaking skills in English. The EG now had four weeks of orderly pronunciation exercises, sound listening tasks, and interactive speaking with IPAs daily. Then, post-tests were conducted by all participants. The tools employed consisted of a standardized Listening Comprehension Test, a

Speaking Performance, and an IPA Interaction Logs catalogue of frequency of use. Moreover, the attitudes and the satisfaction of learners were measured using a 20-item questionnaire that evaluated their satisfaction with IPA-assisted learning and their attitudes. The research on the function of the IPA in the growth of English skills is supported by the demographics of the respondents listed in Table 1.

Table 1: Demographic Characteristics of Participants Examining IPA Effectiveness on Saudi Learners' English Listening and Speaking Development.

	Category	EG (n = 49)	CG (n = 49)	Total (N = 98)
Gender	Male	28 (57.1%)	27 (55.1%)	55 (56.1%)
	Female	21 (42.9%)	22 (44.9%)	43 (43.9%)
Age Group	18-20 years	15 (30.6%)	17 (34.7%)	32 (32.7%)
	21-23 years	25 (51.0%)	23 (46.9%)	48 (49.0%)
	24+ years	9 (18.4%)	9 (18.4%)	18 (18.3%)
English Learning Experience	< 3 years	12 (24.5%)	14 (28.6%)	26 (26.5%)
	3-6 years	25 (51.0%)	23 (46.9%)	48 (49.0%)
	> 6 years	12 (24.5%)	12 (24.5%)	24 (24.5%)
IPA Usage Familiarity	Yes	29 (59.2%)	28 (57.1%)	57 (58.2%)
	No	20 (40.8%)	21 (42.9%)	41 (41.8%)
Educational Level	Undergraduate	36 (73.5%)	34 (69.4%)	70 (71.4%)
	Postgraduate	13 (26.5%)	15 (30.6%)	28 (28.6%)
Primary Device Used	Smartphone	31 (63.3%)	33 (67.3%)	64 (65.3%)
	Tablet/Laptop	18 (36.7%)	16 (32.7%)	34 (34.7%)



Figure 3: Participant Demographic Distribution Supporting Analysis of How IPA Interaction Influences Saudi Learners' English Listening and Speaking Development.

Based on the demographic table, there were 98 Saudi Arabian EFL students who took part in the

investigation. They were divided into an equal number of EG (n =49), IPAs, and CG (n = 49), and traditional instruction. As is traditionally with learners at the university level, most of the respondents were male (56.1%), and were between 21 and 23 years (49%). Most of them were ready to

undergo the intervention due to 3-6 years of learning English (49%) and being accustomed to using IPA devices (58.2%). 71.4% of the participants were undergraduates, and 65.3% used smartphones to practice IPA.

Table 2: Percentage Distribution of 5-Point Likert Responses for CG and EGs on English Skills.

Variables	Group	Strongly Disagree (SD)	Disagree (D)	Neutral (N)	Agree (A)	Strongly Agree (SA)
LS	CG	5%	10%	30%	40%	15%
	EG	2%	5%	15%	50%	28%
CA	CG	8%	15%	35%	30%	12%
	EG	1%	4%	20%	45%	30%
RT	CG	10%	20%	30%	25%	15%
	EG	2%	5%	15%	50%	28%
FR	CG	7%	15%	35%	30%	13%
	EG	1%	3%	17%	45%	34%
PA	CG	8%	18%	32%	28%	14%
	EG	1%	3%	15%	50%	31%
LC	CG	10%	20%	35%	25%	10%
	EG	2%	5%	18%	45%	30%
UF	CG	12%	28%	30%	20%	10%
	EG	1%	4%	15%	50%	30%
ASD	CG	15%	30%	25%	20%	10%
	EG	2%	5%	15%	48%	30%
TTP	CG	12%	25%	30%	23%	10%
	EG	1%	4%	16%	50%	29%

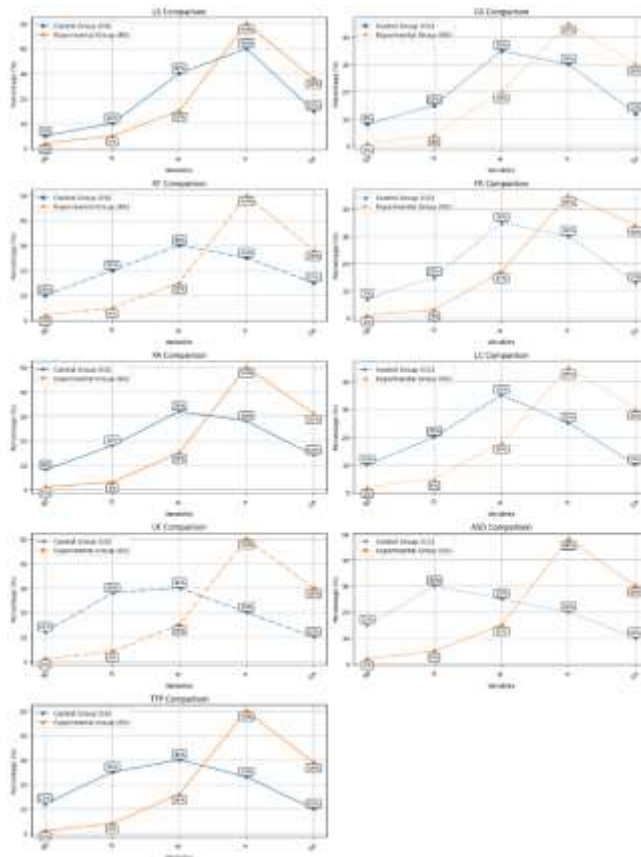


Figure 4: 5-Point Likert-Scale Comparison Showing IPA-Enhanced Improvements in Saudi Learners' Listening and Speaking Performance Across Variables.

Figure 3 shows the suitability of the demographic sample in assessing the effects of IPA on speaking

and listening abilities. The questionnaire was composed of five Likert-scale items dealing with motivation, confidence, and ease of use, and assisted quantitative research.

Table 2 and Figure 4 employed an online questionnaire to receive feedback from the subjects and included 9 sample items of 20 questionnaires on a 5-point Likert scale, i.e., strongly disagree to strongly agree. The table is a comparison between the CGs and EGs in English listening and speaking. The experimental learners who use IPA demonstrate elevated levels of confidence, comprehension, fluency, pronunciation, and lexical diversity, suggesting that IPA is useful in improving the acquisition of the language by Saudi learners.

2.2. Variables

This investigation employs three major measures Listening Test, the Speaking Performance Test, IPA Usage Log to evaluate the improvement of listening and speaking in the English language by Saudi learners Listening Test (LS, CA, RT), the Speaking Performance Test (FR, PA, LC), and the IPA Usage Log (UF, ASD, TTP). These variables assert sound statistical analysis.

Listening Test Variables

LS (Total): Evaluates general progress in the capacity of learners to understand audio in the English language based on IPA efficiency in promoting listening skills.

CA (%): It represents an accurate interpretation of the spoken words, the skill of learners to process and decode the input in English using IPA.

RT (sec): Measures speed of processing in listening and cognitive responsiveness, showing the speed of IPA practice in enabling understanding and comprehending a given message.

Speaking Performance Variables

FR: Tests the fluency and rhythm of spoken English, proving the impact of IPA on the natural speech skills and lower hesitation.

PA (percent): Tests the correctness of sounds and stress patterns, and demonstrates IPA influences on quality articulation and intelligibility.

LC (Type-Token Ratio): It is a measure of the diversity of vocabulary during speech, which implies the ability of IPA to facilitate more language-rich speech.

IPA Usage Log Variables

UF (sessions/week): Records the degree of engagement with IPA, where the frequency is associated with the improvement of listening and speaking.

ASD (minutes): Reflects the severity of IPA

practice, which demonstrates the connection between the amount of time spent in exposure and skill acquisition.

TTP (pronunciation/listening/conversation): The measures are aimed at various IPA activities, which show what type of task is most effective in learning.

2.3. Research Design

Quasi-experimental design was employed and involved 98 EFL Saudi Arabian learners divided into two groups, EG (IPA-assisted) and CG (traditional). Listening and speaking ability were evaluated using pre- and post-tests. IBM SPSS Statistics v.31.0 was used to analyze the data. The impact of the IPA was assessed using an Independent Sample t-test, depending on the post-test results of different groups. ANOVA compared the performance differences in terms of age, experience, or education level. The Correlation Analysis was used to evaluate the correlations between IPA usage frequency, session time, and listening and speaking increases, and was used to provide information on how IPA engagement predicts language acquisition.

3. RESULTS AND DISCUSSION

Using the investigation variables and collected data, examine the impact of IPA interaction on Saudi learners' English listening and speaking proficiency through correlation analysis, evaluate differences between EG and CGs using ANOVA, and assess group-specific performance changes with independent-sample tests.

3.1. Independent-sample Tests

The independent-sample t-test contrasts the average of two unconnected categories (IPA vs. peer) to determine if the difference in listening and speaking scores is statistically significant. It tests whether IPA interaction improves English acquisition, t represents the t-statistic, expressed as Equation (1).

$$= \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}} \quad (1)$$

Where:

\bar{X}_1, \bar{X}_2 = group means

S_1^2, S_2^2 = variances

n_1, n_2 = sample sizes

Mean \pm SD shows the average score and variability. The independent samples t-test, which contrasts the averages of two groups, yields the t-value. The total quantity of independent information samples utilized in the test, less the amount of predicted variables, is known as the degree of

freedom (df). The p-value tells us the probability that the observed difference between groups occurred by chance.

Table 3: Independent Samples t-Test Results Showing IPA Impact on Saudi Learners' English Listening and Speaking Skills.

Variables	Group	N	Mean ± SD	t-value	df	p-value
Listening Test	LS (0-100)	EG	78.35 ± 6.12	5.82	96	<0.001
		CG	69.21 ± 5.89			
	CA (%)	EG	80.42 ± 7.05	5.33	96	<0.001
		CG	71.18 ± 6.73			
	RT (sec)	EG	12.54 ± 2.11	-4.87	96	<0.001
		CG	15.76 ± 2.45			
Speaking Test	FR (1-9)	EG	7.85 ± 0.92	6.14	96	<0.001
		CG	6.42 ± 1.05			
	PA (%)	EG	82.17 ± 7.25	5.45	96	<0.001
		CG	72.63 ± 6.78			
	LC (Type-Token Ratio)	EG	0.63 ± 0.08	4.92	96	<0.001
		CG	0.55 ± 0.09			
IPA Usage Log	UF (sessions/week)	EG	4.82 ± 1.12	9.21	96	<0.001
		CG	1.21 ± 0.64			
	ASD (min)	EG	18.35 ± 3.45	8.14	96	<0.001
		Control	5.87 ± 2.21			
	TTP (%)	EG	55.2 ± 12.5	6.03	96	<0.001
		CG	28.4 ± 10.8			

Table 3 and Figure 5 show that the EG was better than the CG in all post-test measures with the use of IPAs. They were also better at listening in RT (12.54s vs. 15.76s) and LS (78.35 vs. 69.21), and CA (80.42% vs. 71.18), and all these were statistically significant (p < 0.001). The EG had more speaking fluency (7.85

vs. 6.42), PA (82.17% vs. 72.63%), and LC (0.63 vs. 0.55). Also, the learners were found to have more Perceived Usefulness, Confidence, and Satisfaction, IPA UF, ASD, and TTP. These results indicate that the IPA-assisted instruction significantly enhances the hearing and speaking of English by Saudi learners.

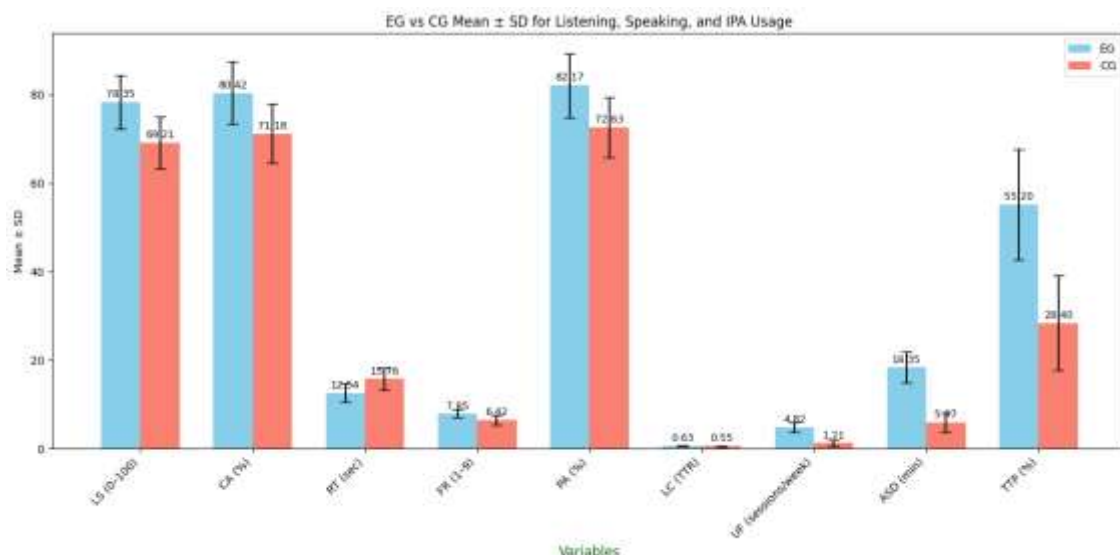


Figure 5: Bar Chart Comparing IPA Learners' Superior Listening, Speaking, and Usage Outcomes Against Control Group Performance Across Variables.

3.2. ANOVA

ANOVA compares the mean differences between two or more groups to determine if IPA interaction significantly improves Saudi learners' English

listening and speaking skills. It F tests the group effect on performance variation shown in Equation (2).

$$F = \frac{MS_{between}}{MS_{within}} = \frac{SS_{between}/df_{between}}{SS_{within}/df_{within}} \quad (2)$$

Where:

SS= Sum of Squares

MS= Mean Square

df= Degrees of Freedom

$SS_{between}$ variation due to differences between groups (IPA vs. peer). $SS_{within/}$ variation due to

differences within each group (individual learner differences). $MS_{between}$ measures the average variation between the group means. MS_{within} measures the average variation among participants within each group.

Table 4: ANOVA Results Showing Differences Between IPA-Assisted and CGs in English Listening and Speaking Abilities.

Variables	Experimental Mean ± SD	Control Mean ± SD	F-value	df	p-value	Effect Size (η^2)
LS	68.5 ± 5.9	57.9 ± 5.8	54.32	1, 96	<0.001	0.36
CA (%)	86.2 ± 6.1	74.5 ± 5.7	47.18	1, 96	<0.001	0.33
RT (sec)	12.3 ± 2.1	15.8 ± 2.5	32.44	1, 96	<0.001	0.25
FR	9.1 ± 0.8	5.6 ± 0.9	72.45	1, 96	<0.001	0.43
PA (%)	78.4 ± 6.5	65.5 ± 7.0	61.18	1, 96	<0.001	0.39
LC	7.8 ± 0.1	1.7 ± 0.1	38.21	1, 96	<0.001	0.28
UF (sessions/week)	5.8 ± 1.2	1.1 ± 0.5	212.6	1, 96	<0.001	0.69
ASD (minutes)	23.5 ± 4.1	10.3 ± 2.8	165.4	1, 96	<0.001	0.63
TTP (%)	60.2 ± 10.3	0 ± 0	180.7	1, 96	<0.001	0.65

Table 4 and Figure 6 depict ANOVA outcomes between the EG (IPA-assisted) and CG (conventional training), indicating a comparison of nine significant factors in determining the English speaking and listening proficiency. Regarding the listening skills, the EG scored higher than the CG (57.9 + 5.8, 74.5 + 5.7, respectively) in LS (68.5 + 5.9) and CA (86.2 + 6.1). The speaking-related variables, including fluency

(9.1 ± 0.8), PA (78.4 ± 6.5), and LC (7.8 ± 0.1), performed significantly better than the CG. EG also recorded significantly high IPA use records and perceptual measures, such as UF, ASD, and TTP ($p < 0.001$). These findings confirm that IPA integration enhances the speaking and listening English skills of Saudi trainees.

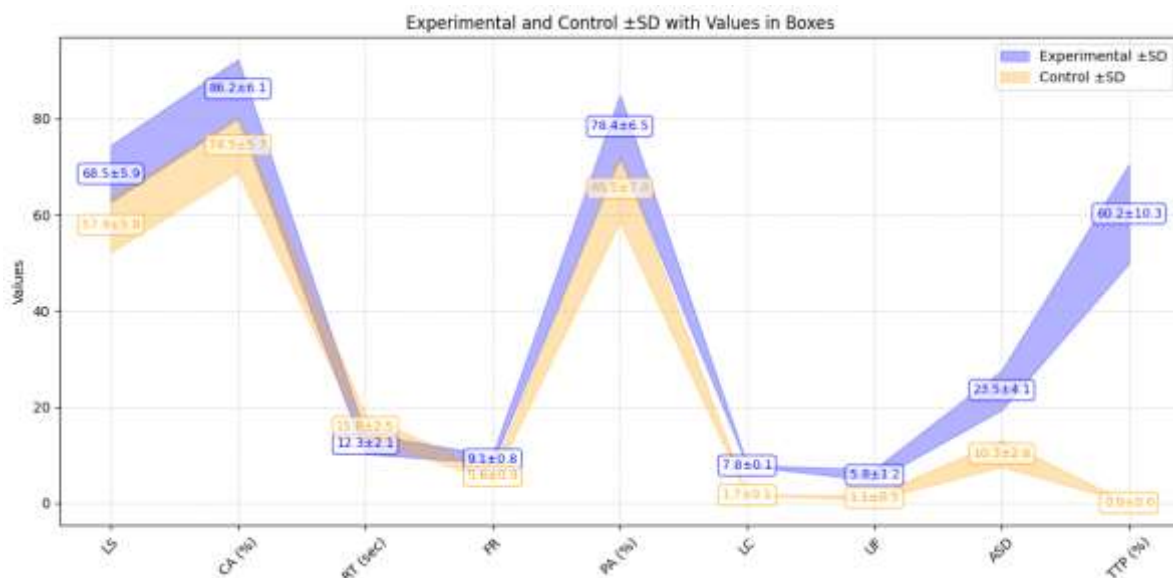


Figure 6: Comparison of IPA Group and CG Showing Stronger Performance and Stability Across All Language Proficiency Measures.

3.3. Correlation Analysis

The intensity and orientation of a connection among two variables, such as IPA interaction and English skill progress, are measured via correlation

analysis. It helps determine if increased IPA use relates to higher listening and speaking performance expressed as Equation (3).

$$r = \frac{\sum(X_i - \bar{X})(Y_i - \bar{Y})}{\sqrt{\sum(X_i - \bar{X})^2 \sum(Y_i - \bar{Y})^2}} \quad (3)$$

Where X_i and Y_i are individual scores, and \bar{X} , \bar{Y} are

means. Here, a positive r indicates that greater IPA interaction improves English listening and speaking outcomes.

Table 5(a): Correlation Analysis of All Variables for EG Participants.

Variables	LS	CA	RT	FR	PA	LC	UF	ASD	TTP
EG									
LS	1	0.72*	0.45*	0.58*	0.63*	0.51*	0.66*	0.54*	0.48*
CA		1	0.38*	0.50*	0.56*	0.47*	0.61*	0.49*	0.44*
RT			1	0.42*	0.40*	0.35*	0.50*	0.46*	0.39*
FR				1	0.70*	0.65*	0.68*	0.56*	0.52*
PA					1	0.60*	0.65*	0.57*	0.51*
LC						1	0.58*	0.50*	0.46*
UF							1	0.72*	0.65*
ASD								1	0.60*
TTP									1

Table 5 (a) and Figure 7 (a) show that all the variables of the EG are significantly positively correlated ($p < 0.05$), which depicts the effects of IPA interaction on the English speaking and listening skills. LS and CA had a high correlation ($r = 0.72$). Also, there is a high correlation between PA-UF and LS (0.65, 0.72), ASD (0.57), and TTP (0.51). Such links

enhance the English proficiency of Saudi learners with the help of AI-mediated practice, showing that the increased IPA usage correlates with the enhancement of oral fluency, listening comprehension, and the quality of interaction among learners.

Table 5(b): Correlation Analysis of All Variables for CG Participants.

Variables	LS	CA	RT	FR	PA	LC	UF	ASD	TTP
LS	1	0.61*	0.35*	0.48*	0.50*	0.43*	0.00	0.00	0.00
CA		1	0.28*	0.42*	0.46*	0.40*	0.00	0.00	0.00
RT			1	0.35*	0.33*	0.30*	0.00	0.00	0.00
FR				1	0.63*	0.58*	0.00	0.00	0.00
PA					1	0.52*	0.00	0.00	0.00
LC						1	0.00	0.00	0.00
UF							1	0.00	0.00
ASD								1	0.00
TTP									1

Table 5 (b) and Figure 7 (b) show the relationship between characteristics related to English speaking and listening skills, which are presented in the correlation matrix regarding the CG. LS is moderately associated with (RT, $r = 0.35^{**}$) and (FR, $r = 0.48^{**}$) and largely correlated with (CA, $r = 0.61$). Also, comprehension accuracy is positively correlated with FR (0.42*) and RT (0.28). Increased practice frequency facilitates speaking performance, as the moderate relations between PA and LC and LS and FR (0.50*-0.58) show. In terms of comparing IPA-mediated learning to the conventional peer contact, IPA Use Frequency (IPA-UF) of the CG is 0.00, which represents no exposure.

A cross-sectional survey, conducted by Melweth et al. (2024), to evaluate the perspectives of AI incorporation, technological assurance, and stress concerns of secondary school instructors in the province of Asir. Some optimism about AI's ability to

improve speaking quality and lessen regular burden through automated teaching (72.1% positive), administrative duties (79.2% positive), and assessment (67.3% positive) was prevalent, but human supervision was still respected. This investigation revealed consistently superior listening and speaking outcomes for IPA users, as demonstrated through the strongest t-test, ANOVA, and correlation values. Across all statistical procedures, the EG consistently outperformed the CG, demonstrating the strong impact of IPA-mediated interaction. In the independent-sample t-test, the EG achieved its highest values in LS (78.35 vs CG 69.21), PA (82.17% vs 72.63%), and FR (7.85 vs 6.42), with large t-values (9.21). The ANOVA results reinforced these differences, where the EG again showed superior outcomes in UF (5.8 vs CG 1.1; $F = 212.6$), ASD (23.5 min vs 10.3 min; $F = 165.4$), and TTP (60.2% vs 0%; $F = 180.7$). In the correlation analysis,

the strongest EG relationships were LS–CA ($r = 0.72$), FR–PA ($r = 0.70$), and UF–ASD ($r = 0.72$). In the CG, the top correlations were LS–CA (0.61), FR–PA (0.63), and LS–FR (0.48). Together, the results confirm that

IPA interaction produces stronger performance gains and richer skill relationships than peer-based learning on the improvement of English Speaking and Listening Skills by Saudi Arabian learners.

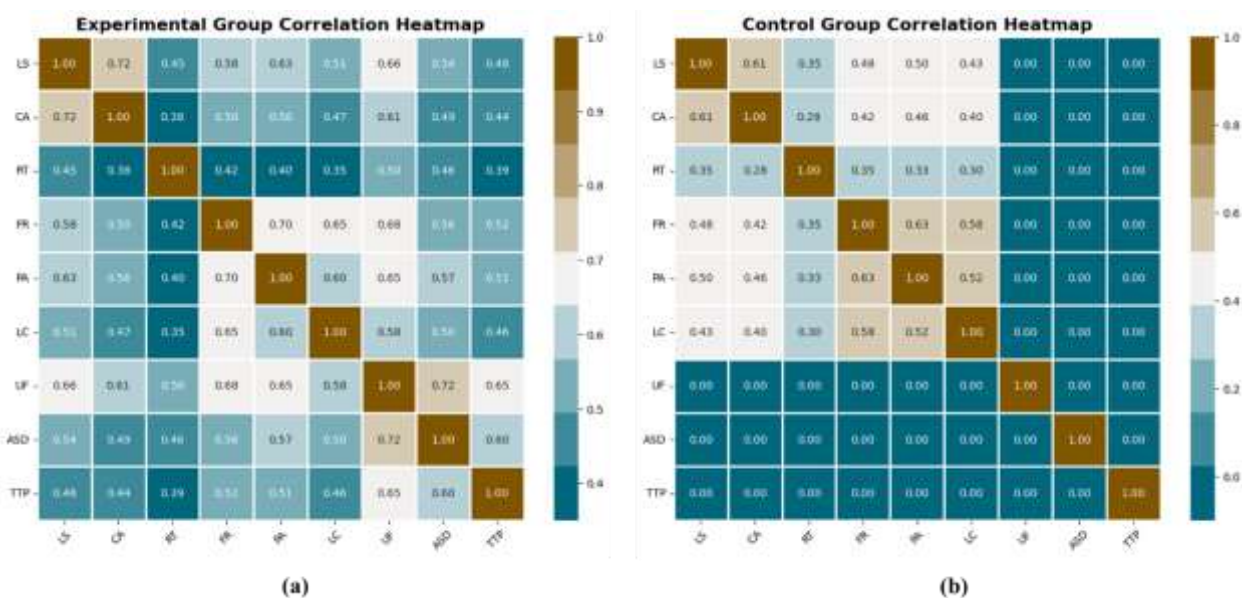


Figure 7: Correlation Patterns Showing (a) EG IPA-Driven Improvements in English Listening-Speaking Skills and (b) Compared to Limited Gains in the CG.

4. CONCLUSION

This research validates that interaction mediated by IPA significantly enhances the English listening and speaking activities of Saudi learners. The analysis was done with independent-sample t-tests, ANOVA, and correlation analysis of effect-size results using log of IBM SPSS 31.0 using a dataset of 98 learners split into EG and CG, standardized listening tests, rated oral performance tasks, and records of IPA in use. Findings indicated that the highest effect was found in FR with the EG of $7.85 + 0.92$, the CGs of $6.42 + 1.05$ ($t = 6.14$, $p < 0.001$). The strongest effect was on LS, with the EG scoring 68.5 ± 5.9 over the CGs 57.9 ± 5.8 , with a strong group effect ($F = 54.32$, $p < 0.001$, $\eta^2 = 0.36$). The best correlation was between LS and CA, where $r = 0.72$ for the EG

contrasts with $r = 0.61$ for the CG. Altogether, the IPA integration turns out to be a data-based method that is effective in enhancing speaking proficiency in EFL settings.

4.1. Limitations and Future Scope

The generalizability is limited by the short time, the small size of the sample, and the fact that the results concern intermediate learners. IPA interaction might fail to capture what happens in the classroom. IPA interaction might not indicate all the classroom dynamics in the real world. The future development might consider long-term outcomes, represent different levels of proficiency, combine various IPA systems, and address cultural and contextual factors on language learning results.

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APPENDIX

Variable	Question (CG)	Question (EG)
Listening Score (Total)	How well do you understand English audio played by your teacher or in class?	How well do you understand English audio when interacting with the IPA?
Comprehension Accuracy (%)	How often can you correctly answer questions based on classroom audio?	How often can you correctly answer questions after listening to IPA exercises?
Reaction Time (sec)	How quickly do you respond to spoken English during classroom activities?	How quickly do you respond to English audio while using the IPA?
Fluency Rating	How smoothly can you speak English during class discussions?	How smoothly can you speak English when practicing with the IPA?
Pronunciation Accuracy (%)	How accurately do you pronounce English words during classroom speaking tasks?	How accurately do you pronounce English words when practicing with IPA feedback?
Lexical Complexity (Type-Token Ratio)	How often do you use new or varied English words in class?	How often do you use new or varied English words when practicing with IPA?
Usage Frequency (sessions/ week)	How many times per week do you practice English outside class (self-study or exercises)?	How many times per week do you interact with IPA for English practice?
Average Session Duration (minutes)	How long is your average English practice session outside class?	How long is your average IPA practice session?
Task Type Proportion (pronunciation/listening/conversation)	Which type of English practice do you spend most of your time on: listening, speaking, or vocabulary?	Which IPA activity do you spend the most time on: listening, speaking, or pronunciation?