International Journal of Social Science and Economic Research

ISSN: 2455-8834

Volume:11, Issue:07 "July 2026"

Comparing AI-Assisted Listening, Podcasts, and Shadowing for Enhancing EFL Listening Comprehension: A Quasi-Experimental Study among Third – year English – Major Students at Vietnam Trade Union University

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DOI: 10.46609/IJSSER.2026.v11i07.007 URL: https://doi.org/10.46609/IJSSER.2026.v11i07.007

Received: 22 June 2026 / Accepted: 5 July 2026 / Published: 12 July 2026

ABSTRACT

Listening comprehension is a fundamental component of second language acquisition and plays a vital role in learners' communicative competence. Recent advances in educational technology have introduced innovative approaches to listening instruction, including artificial intelligence (AI)-assisted learning, podcast-based extensive listening, and the shadowing technique. Although each approach has been widely investigated, comparative evidence examining their relative effectiveness within the same instructional context remains limited, particularly in Vietnamese higher education. This study compared the effectiveness of three technology-enhanced listening approaches in improving English listening comprehension among English-major undergraduates at Trade Union University, Vietnam. A quantitative quasi-experimental design with a pre-test–post-test format was employed. Fifty-eight third-year English-major students participated in the study and were assigned to three experimental groups receiving podcast-based listening (n = 19), AI-assisted listening (n = 20), and shadowing practice (n = 19), respectively, over a four-month intervention period. Data were collected through standardized listening pre-tests and post-tests together with a post-intervention questionnaire measuring students' perceptions of the learning methods. Statistical analyses included paired-samples t-tests, one-way ANOVA, independent-samples t-tests, and descriptive statistics.

The findings revealed that all three instructional approaches significantly improved students' listening comprehension. Among them, the AI-assisted learning group achieved the greatest improvement, with mean listening scores increasing from 7.71 to 8.98, significantly outperforming both the podcast and shadowing groups ($p < .05$). Although podcast-based listening and shadowing also produced statistically significant gains, no significant difference was found between these two approaches. Questionnaire results further indicated that students held highly positive attitudes toward modern listening methods, particularly regarding learning

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flexibility, learner autonomy, vocabulary development, pronunciation improvement, and engagement.

The study contributes empirical evidence to the growing body of research on technology-enhanced language learning by providing a direct comparison of three contemporary listening approaches within a unified instructional setting. The findings suggest that integrating AI-assisted listening activities into university EFL curricula may substantially enhance listening instruction while promoting autonomous and personalized learning.

Keywords: AI-assisted language learning; English listening comprehension; educational technology; extensive listening; podcasts; shadowing technique; Vietnamese EFL learners.

1. INTRODUCTION

Listening comprehension has long been recognized as one of the most challenging yet essential language skills in second language acquisition. Unlike reading, listening requires learners to process spoken language in real time while simultaneously interpreting pronunciation, intonation, vocabulary, grammar, and contextual meaning. For English as a Foreign Language (EFL) learners, effective listening competence serves as the foundation for successful communication, academic achievement, and subsequent development of speaking proficiency.

Despite its importance, listening instruction in many Vietnamese universities continues to rely heavily on traditional classroom practices that emphasize textbook recordings and comprehension exercises. Such approaches often provide limited exposure to authentic spoken English and offer few opportunities for individualized practice or immediate feedback. Consequently, many university students experience persistent difficulties in recognizing natural pronunciation, understanding connected speech, processing different accents, and maintaining comprehension during authentic listening situations.

The rapid development of digital technologies has fundamentally transformed language education over the past decade. Technology-enhanced language learning now provides learners with unprecedented access to authentic language input, interactive practice environments, and personalized learning experiences. Among the numerous technological innovations, three approaches have attracted considerable attention from both researchers and educators.

The first approach is **podcast-based extensive listening**, which enables learners to access authentic spoken materials anytime and anywhere. Podcasts expose learners to a wide range of real-life conversations and academic topics while encouraging autonomous learning beyond classroom settings. Previous studies have suggested that extensive listening through podcasts

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may improve vocabulary acquisition, listening fluency, and overall comprehension by increasing learners' exposure to authentic language input.

The second approach involves **AI-assisted language learning,** which has emerged as one of the fastest-growing areas in educational technology. AI-powered applications such as ELSA Speak and TalkPal provide adaptive learning environments, immediate corrective feedback, pronunciation assessment, and interactive conversational practice. These intelligent systems allow learners to receive individualized instruction tailored to their proficiency levels and learning needs, potentially accelerating listening development through continuous interaction and personalized feedback.

The third approach is the **shadowing technique**, an intensive listening practice in which learners repeat spoken language immediately after hearing it while attempting to imitate pronunciation, rhythm, stress, and intonation. Shadowing has been shown to strengthen phonological processing, improve automatic speech perception, and enhance the integration of listening and speaking skills. Because learners process spoken input while simultaneously producing language, the technique promotes active engagement with authentic speech and facilitates more efficient auditory processing.

Although previous studies have demonstrated the benefits of podcasts, AI-assisted learning, and shadowing individually, relatively few studies have directly compared these three approaches within the same instructional context using equivalent participants, identical intervention periods, and consistent assessment procedures. Existing research has generally focused on evaluating a single instructional approach, making it difficult for educators to determine which method offers the greatest pedagogical value under comparable learning conditions. Furthermore, empirical evidence from Vietnamese higher education remains limited despite the increasing integration of digital technologies into English language teaching.

To address these research gaps, the present study investigates the comparative effectiveness of podcast-based listening, AI-assisted listening, and shadowing in improving English listening comprehension among third-year English-major students at Trade Union University. In addition to measuring students' listening achievement, the study also explores learners' perceptions of these instructional approaches and identifies the extent to which technology-enhanced listening practices promote autonomous learning and listening development.

The findings are expected to contribute to the literature on technology-enhanced language learning by providing empirical evidence regarding the relative effectiveness of three contemporary listening approaches within the Vietnamese EFL context. The study also offers

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practical implications for university lecturers, curriculum designers, and educational institutions seeking to integrate digital technologies into English listening instruction more effectively.

Objectives of the Study

This study aims to compare the effectiveness of three modern listening approaches—podcast-based listening, AI-assisted learning, and the shadowing technique—in improving English listening comprehension among third-year English-major students at Trade Union University.

Specifically, the study seeks to:

1. Examine the impact of each listening approach on students' listening comprehension.
2. Compare the effectiveness of the three approaches in improving listening performance.
3. Determine whether the differences in learning outcomes are statistically significant.
4. Explore students' perceptions of the three listening approaches.

Research Questions

The study addresses the following research questions:

RQ1. To what extent does each listening approach improve students' English listening comprehension?

RQ2. Which of the three listening approaches is the most effective in enhancing listening performance?

RQ3. Are there statistically significant differences in learning gains among the three approaches?

RQ4. How do students perceive the effectiveness and usefulness of podcast-based listening, AI-assisted learning, and the shadowing technique?

2. METHODOLOGY

2.1 Research Design

This study employed a **quantitative quasi-experimental pre-test–post-test design** to compare the effectiveness of three technology-enhanced listening approaches: podcast-based extensive listening, AI-assisted listening, and the shadowing technique. Since the participants belonged to an existing class, random assignment was not feasible. Therefore, students were allocated into

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three experimental groups according to their class roll numbers to maintain the natural classroom setting while minimizing researcher intervention.

The intervention was conducted over a four-month period, from **February to May 2026**. Listening performance was measured before and after the intervention to examine learning gains, while a post-intervention questionnaire was administered to investigate students' perceptions of the three instructional approaches.

2.2 Participants

The participants consisted of 58 third-year English-major students from Trade Union University, Vietnam. They were enrolled in the same academic program and had relatively similar English proficiency levels before the intervention.

The participants were divided into three experimental groups:

- Group 1 (n = 19): Podcast-based extensive listening
- Group 2 (n = 20): AI-assisted listening
- Group 3 (n = 19): Shadowing technique

Prior to the intervention, a one-way ANOVA was conducted to examine the equivalence of the three groups. The analysis indicated no statistically significant difference in the pre-test listening scores ($p > .05$), suggesting that the participants had comparable listening proficiency at the beginning of the study.

2.3 Research Instruments

Three research instruments were employed.

Listening proficiency tests. A standardized B2-level English listening test was administered as both the pre-test and post-test. Each test lasted approximately 45 minutes and included multiple listening tasks designed to assess learners' ability to understand main ideas, identify specific information, infer meaning, and comprehend authentic spoken English.

Questionnaire. A post-intervention questionnaire consisting of five-point Likert-scale items was designed to examine students' perceptions of the learning methods. The questionnaire focused on four dimensions: perceived effectiveness, learning motivation, autonomous learning, and implementation challenges.

Background survey. Before the intervention, participants completed a short survey regarding their previous listening habits, familiarity with modern listening methods, and perceived

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difficulties in English listening comprehension. The survey provided baseline information to support the interpretation of the experimental findings.

2.4 Research Procedures

The study was conducted in four consecutive stages.

Stage 1. Baseline assessment

Participants completed the background survey and took the listening pre-test to establish their initial listening proficiency.

Stage 2. Instructional intervention

During the four-month intervention period, each group received a different listening treatment.

- The Podcast Group practiced extensive listening using authentic English podcasts and audio materials outside regular classroom instruction.
- The AI Group used AI-assisted language learning applications, including ELSA Speak and TalkPal AI, to complete interactive listening activities, pronunciation practice, and simulated conversations with immediate feedback.
- The Shadowing Group practiced the shadowing technique by listening to authentic English recordings and immediately repeating the spoken input while imitating pronunciation, rhythm, stress, and intonation.

All groups completed listening practice over the same intervention period to ensure comparable learning conditions.

Stage 3. Post-test

At the end of the intervention, participants completed the same standardized listening test to measure improvements in listening comprehension.

Stage 4. Questionnaire

Finally, students completed the post-intervention questionnaire to evaluate their learning experiences and perceptions of the instructional methods.

2.5 Data Analysis

The collected data were analyzed using descriptive and inferential statistics.

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First, descriptive statistics (means, percentages, and standard deviations) were calculated to summarize participants' background information and questionnaire responses.

Second, a paired-samples t-test was performed to examine whether each instructional approach produced significant improvements between the pre-test and post-test.

Third, a one-way analysis of variance (ANOVA**)** was conducted to compare listening performance among the three groups and to determine whether statistically significant differences existed after the intervention.

Finally, independent-samples t-tests were employed for pairwise comparisons of the mean gain scores to identify which instructional approach demonstrated the greatest effectiveness.

Statistical significance was determined at the 0.05 significance level ($p < .05$).

2.6 Ethical Considerations

Participation in the study was voluntary. All participants were informed of the purpose of the research before data collection and provided their consent to participate. They were assured that the collected data would be used solely for research purposes, that individual responses would remain confidential, and that participation would not influence their academic assessment or course grades.

3. RESULTS

3.1 Baseline Characteristics of the Participants

Before evaluating the effectiveness of the three listening interventions, participants' initial listening proficiency, previous learning experiences, and familiarity with modern listening methods were examined to ensure the comparability of the experimental groups and to provide contextual information for interpreting the subsequent findings.

3.1.1 Factors Affecting English Listening Comprehension

The preliminary survey revealed several major obstacles affecting students' English listening comprehension (Figure 1). The most frequently reported difficulty was recognizing pronunciation and connected speech, identified by **63.79%** of the participants. This finding indicates that decoding authentic spoken English remains the greatest challenge for English-major students despite their previous language learning experience.

Vocabulary limitation was the second most frequently reported problem **(56.90%),** followed by maintaining concentration during listening tasks (**50.00%)** and processing information at natural

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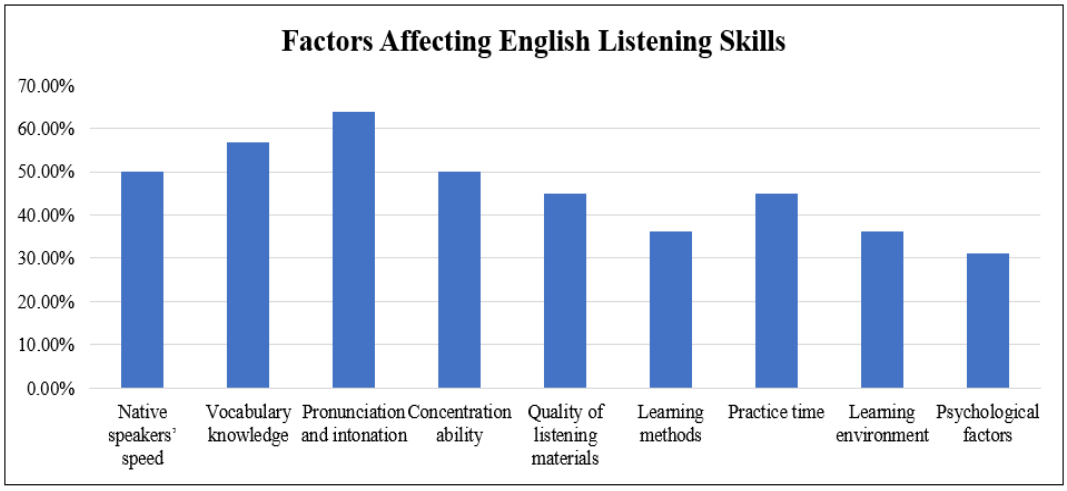
speaking speed **(50.00%).** These findings suggest that students encounter both linguistic and cognitive barriers when listening to authentic English. Such challenges further justify the implementation of technology-enhanced listening approaches that provide repeated exposure to authentic spoken input and individualized learning opportunities.

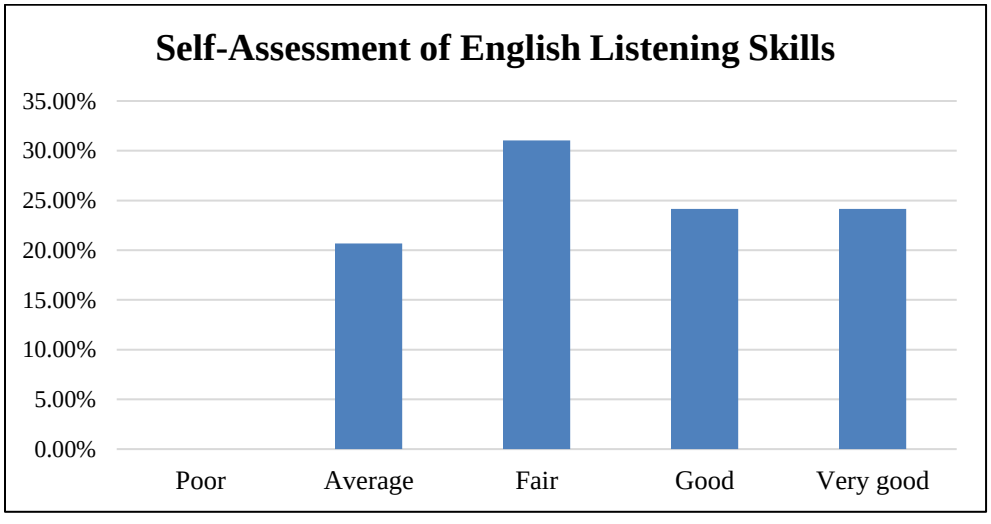
Figure 1. Factors Affecting English Listening Skills



(Source: Research survey results)

3.1.2 Initial Listening Proficiency

Figure 2. Self-Assessment of English Listening Skills



(Source: Research survey results)

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Students' self-assessment indicated that their listening proficiency was generally at an intermediate level (Figure 2). The largest proportion of participants **(31.03%)** rated their listening ability as **Fair**, whereas **24.14%** considered themselves **Good,** and another **24.14%** reported **Very Good** listening proficiency. Meanwhile, **20.69%** assessed their listening ability as **Average**, and none selected the **Poor** category.

Table 1. One-way ANOVA: Differences in Pre-test Scores Between Groups

Podcasts	AI tools	Shadowing	F-statistic	F-critical	Sig.	Remarks
7.69	7.71	7.68	0.005	3.165	> 0.05	Not significant

To verify whether the three experimental groups possessed comparable listening ability before the intervention, a one-way ANOVA was conducted using the pre-test scores (Table 1). The mean scores were highly similar across the three groups, with **7.69** for the Podcast group, **7.71** for the AI-assisted group, and **7.68** for the Shadowing group.

The ANOVA results indicated no statistically significant difference among the three groups (**F = 0.005, p > .05).** Therefore, the participants were considered equivalent in terms of listening proficiency prior to the intervention. This finding supports the internal validity of the study, as any subsequent differences observed in the post-test are more likely to result from the instructional treatments rather than pre-existing differences among the groups.

3.1.3 Previous Experience with Modern Listening Methods

The background survey also examined participants' previous experience with technology-enhanced listening practices.

Watching English movies and YouTube videos was the most frequently used listening activity **(79.31%),** followed by listening to English songs (**56.90%)**. More than half of the participants also reported previous experience with AI-assisted applications **(55.17%),** the shadowing technique **(55.17%),** and podcasts **(53.45%)**. In contrast, only **27.59%** regularly relied on traditional textbook listening exercises.

Regarding familiarity with modern listening methods, **44.83%** of the students indicated that they were familiar with these approaches and used them frequently, while **31.03%** reported

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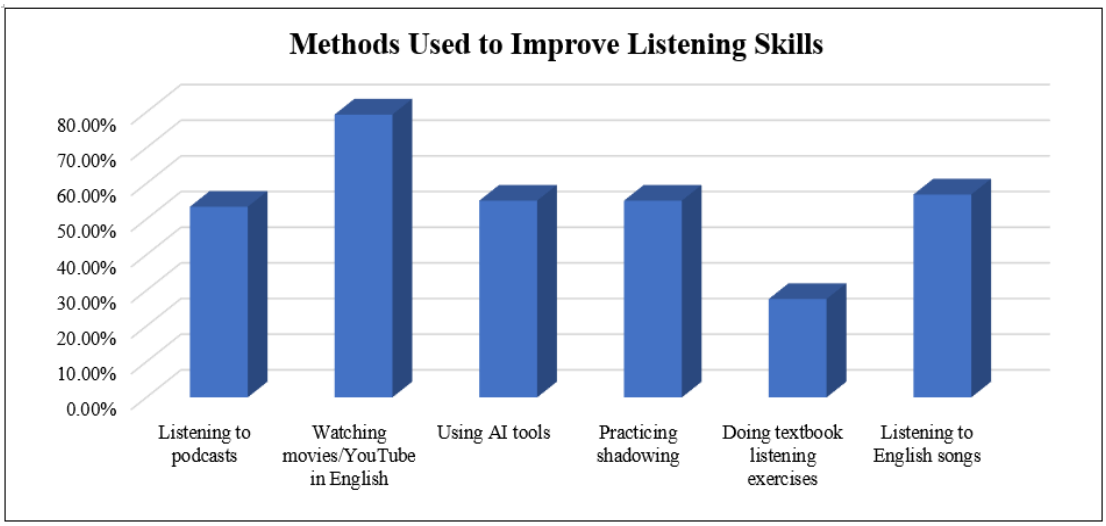
occasional use. Approximately one-fifth **(18.97%)** had heard about these methods but had never applied them in practice, whereas only **5.17%** had no prior knowledge of them.

Figure 3. Methods Used to Improve Listening Skills

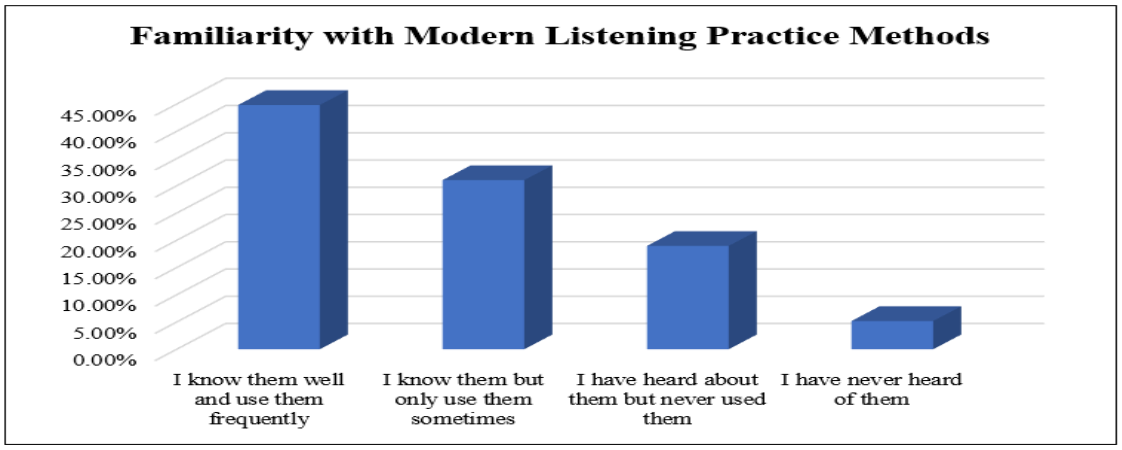


(Source: Research survey results)

These findings demonstrate that although most participants were aware of contemporary listening practices, the frequency and depth of their implementation varied considerably. Consequently, systematic classroom intervention remained necessary to evaluate the educational effectiveness of each listening approach.

3.1.4 . Expectations toward Modern Listening Methods

Figure 4



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Before the intervention, students were asked to identify the listening skills they expected to improve through modern listening approaches (Figure 4).

Vocabulary acquisition received the highest expectation **(60.34%),** followed by listening–speaking reflex **(58.62%)** and understanding main ideas (**56.90%).** Half of the participants **(50.00%)** expected improvement in listening for specific details, while **48.28%** anticipated better pronunciation and intonation recognition.

Lower expectations were observed for concentration **(31.03%)** and communication confidence (**18.97%).** Overall, the responses indicate that students primarily expected modern listening methods to strengthen their linguistic competence rather than broader affective or psychological aspects of language learning.

Taken together, the baseline findings suggest that the participants shared relatively similar listening proficiency while demonstrating considerable interest in technology-enhanced listening instruction. These characteristics provide an appropriate foundation for evaluating the comparative effectiveness of podcast-based listening, AI-assisted learning, and the shadowing technique in the subsequent stages of the study.

3.2 Effects of the Three Listening Methods

To examine the effectiveness of each instructional approach, paired-samples *t*-tests were conducted to compare participants' listening performance before and after the four-month intervention. The results for each experimental group are presented below.

3.2.1 Effect of Podcast-Based Extensive Listening

Table 2. T-Test: Pre-test and Post-test Scores of the Podcasts Group

Pre-test	Post-test	Mean Difference	t-statistic	t-critical	Sig.	Remarks
7.69	8.14	0.45	4.393	2.101	< 0.05	Significant

df=18

(Source: Research survey results)

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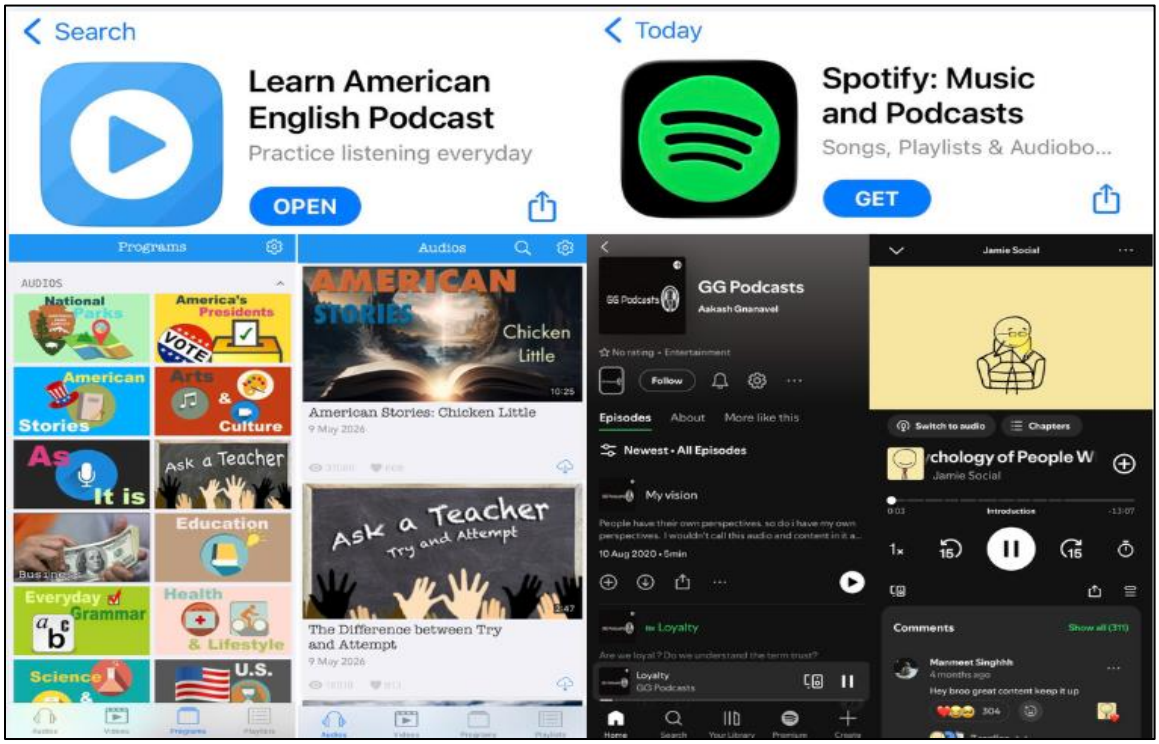
Figure 5. Podcast-Based English Listening Practice



(Source: Screenshots from respective applications)

The paired-samples *t*-test indicated that students in the Podcast Group achieved a statistically significant improvement in listening comprehension after the intervention (Table 2). The mean listening score increased from 7.69 in the pre-test to 8.14 in the post-test, representing a mean gain of 0.45 points. The difference was statistically significant ($t = 4.393$, $p < .05$).

These findings suggest that podcast-based extensive listening contributed positively to students' listening development. Regular exposure to authentic English audio materials enabled learners to become more familiar with natural pronunciation, speaking rate, and discourse patterns, thereby improving their listening comprehension.

However, compared with the other instructional approaches, the magnitude of improvement remained relatively modest. This result may be explained by the passive nature of extensive listening, in which learners primarily receive language input without immediate interaction or corrective feedback. Although podcasts effectively increase learners' exposure to authentic English, they provide limited opportunities for personalized support or guided practice.

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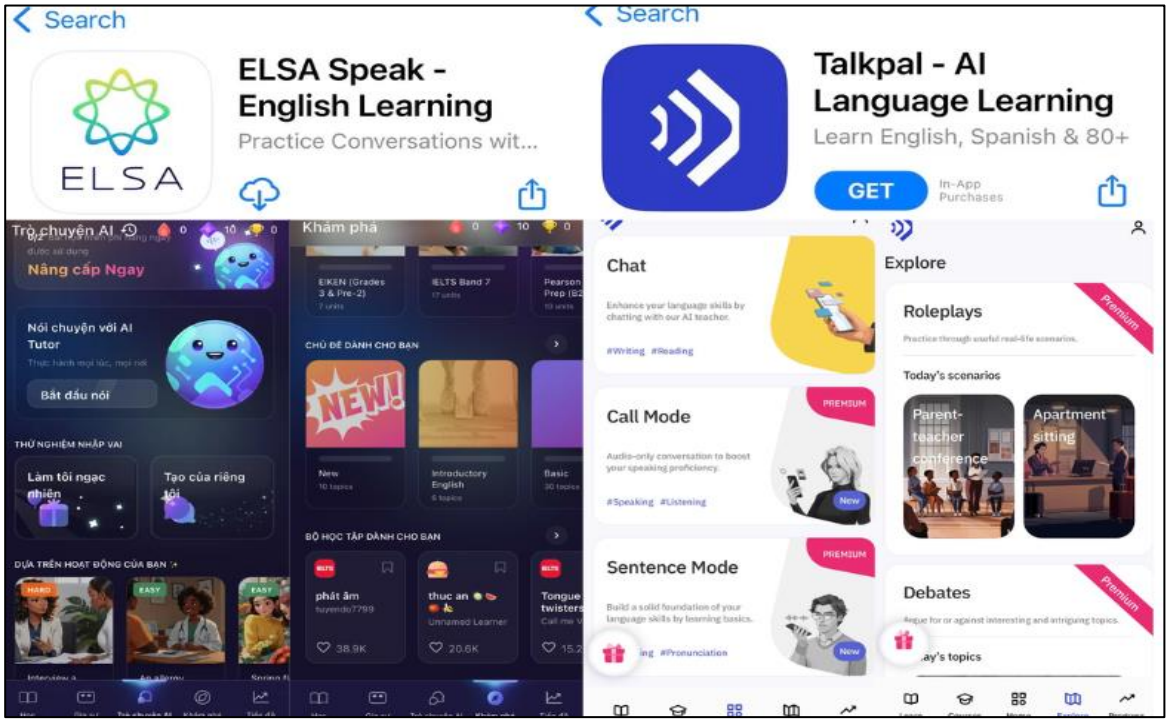
3.2.2 Effect of AI-Assisted Listening

Figure 6. AI-Assisted English Listening Practice



(Source: Screenshots from respective applications).

Among the three instructional approaches, the AI-assisted learning group demonstrated the greatest improvement in listening performance (Table 3). The mean listening score increased substantially from 7.71 before the intervention to 8.98 after the intervention, corresponding to a mean gain of 1.27 points.

The paired-samples *t*-test confirmed that this improvement was highly statistically significant ($t = 13.445$, $p < .05$), indicating that AI-assisted listening had a strong positive effect on students' listening comprehension.

The superior performance of this group can be attributed to the characteristics of AI-supported learning environments. Applications such as ELSA Speak and TalkPal AI provided immediate feedback, adaptive learning tasks, pronunciation evaluation, and interactive listening activities tailored to individual learners. These features encouraged continuous engagement, allowed students to identify and correct errors promptly, and promoted more efficient listening practice throughout the intervention period.

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Overall, the findings indicate that AI-assisted learning was the most effective instructional approach for improving listening comprehension in this study.

3.2.3 Effect of the Shadowing Technique

Figure 7. Shadowing Technique for English Listening Practice

(Source: Screenshots from respective applications).

Students who practiced the shadowing technique also demonstrated significant improvement in listening comprehension (Table 4). Their mean listening score increased from 7.68 in the pre-test to 8.18 in the post-test, yielding a mean gain of 0.50 points. The paired-samples *t*-test revealed that the improvement was statistically significant ($t = 7.167$, $p < .05$).

The findings suggest that shadowing effectively strengthened students' listening ability through intensive practice involving simultaneous listening and repetition. By continuously imitating pronunciation, rhythm, stress, and intonation, learners became more attentive to phonological features of spoken English and developed faster auditory processing skills.

Although the improvement observed in the Shadowing Group was statistically significant, the overall learning gain remained considerably smaller than that achieved by the AI-assisted group. Nevertheless, the shadowing technique proved to be an effective approach for enhancing listening comprehension while simultaneously reinforcing pronunciation and listening–speaking integration.

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Summary of Within-Group Improvements

Table 3. T-Test: Pre-test and Post-test Scores of the AI tools Group

Pre-test	Post-test	Mean Difference	t-statistic	t-critical	Sig.	Remarks
7.71	8.98	1.27	13.445	2.093	< 0.05	Significant

df=19

(Source: Research survey results)

Taken together, the paired-samples *t*-test results demonstrate that all three instructional approaches significantly improved students' English listening comprehension following the four-month intervention ($p < .05$). However, the magnitude of improvement differed across the groups. The AI-assisted learning group achieved the largest learning gain (1.27 points), whereas the Podcast and Shadowing groups recorded more moderate improvements (0.45 and 0.50 points, respectively).

These findings provide preliminary evidence that technology-enhanced listening instruction is beneficial for university EFL learners, while suggesting that AI-assisted learning may offer greater pedagogical advantages than the other two approaches. A direct statistical comparison among the three instructional methods is presented in the following section.

3.3 Comparative Analysis of the Three Listening Approaches

Following the within-group analyses, a series of between-group comparisons were conducted to determine whether the three instructional approaches differed significantly in their effectiveness. A one-way analysis of variance (ANOVA) was first performed to compare the post-test scores and mean gain scores among the three experimental groups. Pairwise independent-samples *t*-tests were subsequently conducted to identify which instructional approach produced the greatest learning gains.

3.3.1 Comparison of Post-Test Performance

Table 4. T-Test: Pre-test and Post-test Scores of the Shadowing Group

Pre-test	Post-test	Mean Difference	t-statistic	t-critical	Sig.	Remarks
7.68	8.18	0.50	7.167	2.101	< 0.05	Significant

df=18 (Source: Research survey results)

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Table 5. One-way ANOVA: Differences in Post-test and Gain Scores Between Groups

Test	Pod-casts	AI tools	Sha-dowing	F-statistic	F-critical	Sig.	Remarks
Pre-test	7.69	7.71	7.68	0.005	3.165	> 0.05	Not significant
Post-test	8.14	8.98	8.18	15.281	3.165	< 0.05	Significant
Mean Gain	0.45	1.28	0.49	27.168	3.165	< 0.05	Significant

The one-way ANOVA revealed no statistically significant difference among the three groups in the pre-test scores (F = 0.005, p > .05), confirming that participants had comparable listening proficiency before the intervention. This result supports the internal validity of the study by demonstrating that the three groups started from an equivalent baseline.

However, significant differences emerged after the intervention. The post-test comparison showed a statistically significant difference among the three instructional approaches (F = 15.281, p < .05). Similarly, the analysis of mean gain scores indicated a significant variation in listening improvement across the three groups (F = 27.168, p < .05).

These findings demonstrate that although all three instructional approaches improved students' listening comprehension, the magnitude of improvement differed significantly depending on the learning method employed.

3.3.2 Pairwise Comparison of Learning Gains

Table 6. Pairwise Comparison of Mean Gain Scores between Groups

Comparison Pair (I vs.J)	Mean Gain (I)	Mean Gain (J)	df	t-statistic	t-critical	Sig.	Remarks
AI tools vs. Podcasts	1.28	0.45	37	5.947	2.026	< 0.05	Significant

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AI tools vs. Shadowing	1.28	0.49	37	6.652	2.032	< 0.05	Significant
Podcasts vs. Shadowing	0.45	0.49	36	0.385	2.037	> 0.05	Not significant

(Source: Research survey results)

To determine which instructional approach contributed most to students' listening development, pairwise independent-samples *t*-tests were conducted using the mean gain scores.

The comparison between the AI-assisted learning group and the Podcast Group revealed a statistically significant difference ($t = 5.947$, $p < .05$). Students who learned through AI-assisted applications achieved substantially greater listening gains than those who practiced podcast-based extensive listening.

Similarly, the comparison between the AI-assisted group and the Shadowing Group also showed a statistically significant difference ($t = 6.652$, $p < .05$). This finding further confirms the superior effectiveness of AI-assisted listening instruction within the present study.

By contrast, no statistically significant difference was found between the Podcast Group and the Shadowing Group ($t = 0.385$, $p > .05$). Although both groups demonstrated significant improvement after the intervention, their learning gains were comparable.

Overall, the pairwise analyses consistently indicate that AI-assisted learning produced significantly greater improvements in listening comprehension than either podcast-based listening or the shadowing technique, whereas the latter two approaches demonstrated similar levels of effectiveness.

3.3.3 Overall Effectiveness of the Three Listening Approaches

Figure 8 illustrates the relative contribution of each instructional approach to the overall learning gains observed in this study. The AI-assisted group accounted for 57.51% of the total improvement, substantially exceeding the gains achieved by the Shadowing Group (22.31%) and the Podcast Group (20.18%).

The markedly higher proportion of learning gains achieved by the AI-assisted group is consistent with the statistical findings reported above and provides additional evidence of its superior instructional effectiveness. Unlike podcast-based listening, which primarily provides authentic language input, or shadowing, which emphasizes pronunciation and speech imitation, AI-assisted

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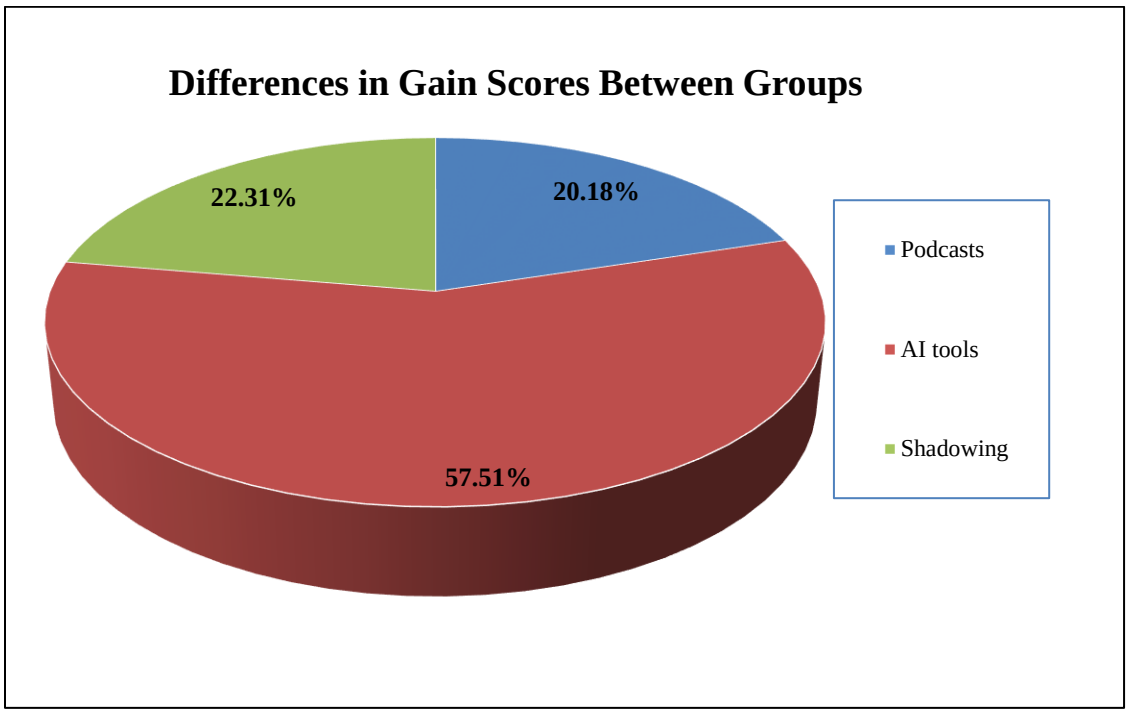
learning integrates multiple pedagogical features within a single learning environment. These include adaptive practice, immediate corrective feedback, personalized learning pathways, interactive communication, and unlimited opportunities for repeated practice. Such characteristics are likely to facilitate more active engagement and more efficient listening development.

Figure 8. Differences in Gain Scores Between Groups



(Source: Research survey results)

In contrast, podcasts and shadowing produced comparable learning gains despite their different instructional characteristics. This finding suggests that while both approaches are effective for improving listening comprehension, neither demonstrated a clear advantage over the other under the conditions of the present study.

Taken together, the comparative analyses indicate a clear hierarchy of instructional effectiveness. Although all three technology-enhanced approaches significantly improved students' English listening comprehension, AI-assisted learning produced the greatest learning gains and outperformed both podcast-based listening and the shadowing technique. These findings directly address the second and third research questions and provide strong empirical evidence supporting the integration of AI-assisted technologies into university-level English listening instruction.

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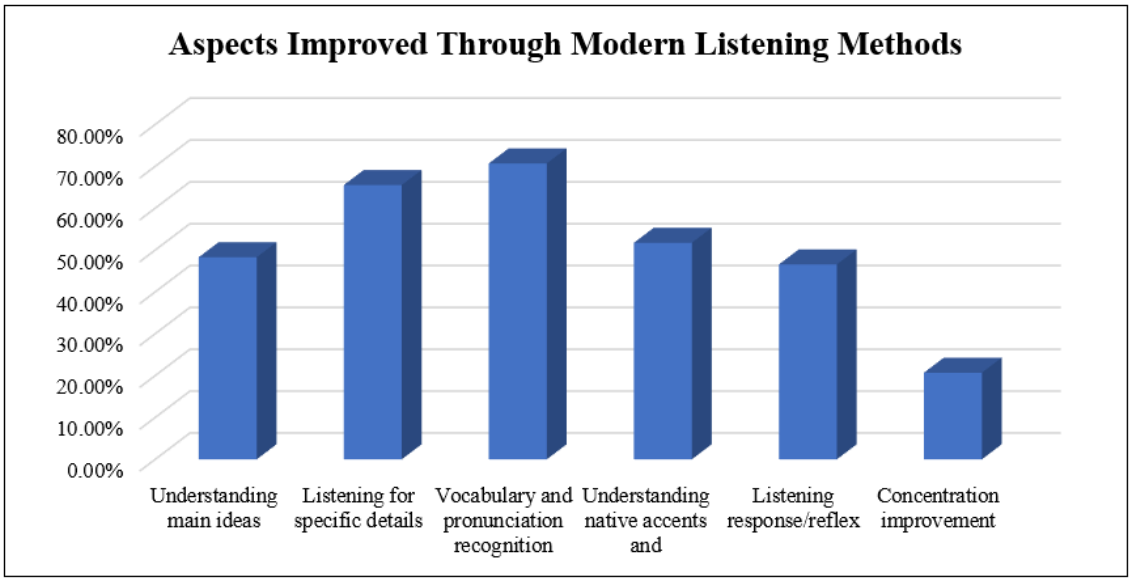
3.4 Students' Perceptions of the Three Listening Approaches

In addition to measuring listening performance, the study examined students' perceptions of the three technology-enhanced listening approaches after the intervention. The post-intervention questionnaire explored participants' perceived improvements, overall satisfaction, and attitudes toward the learning methods.

3.4.1 Perceived Improvement in Listening Skills

Figure 9. Aspects Improved Through Modern Listening Methods



(Source: Research survey results)

The questionnaire results indicate that students perceived noticeable improvements in multiple aspects of English listening comprehension following the intervention (Figure 9).

The highest proportion of respondents (70.69%) reported improvement in vocabulary recognition and pronunciation awareness, suggesting that regular exposure to authentic spoken English enhanced learners' ability to recognize lexical items and phonological features. Improvement in listening for specific details was also widely reported (65.52%), indicating greater accuracy in identifying factual information during listening tasks.

Moderate levels of improvement were observed in understanding native accents (51.72%), identifying main ideas (48.28%), and developing listening–speaking reflexes (46.55%). By comparison, relatively fewer students perceived improvement in maintaining concentration

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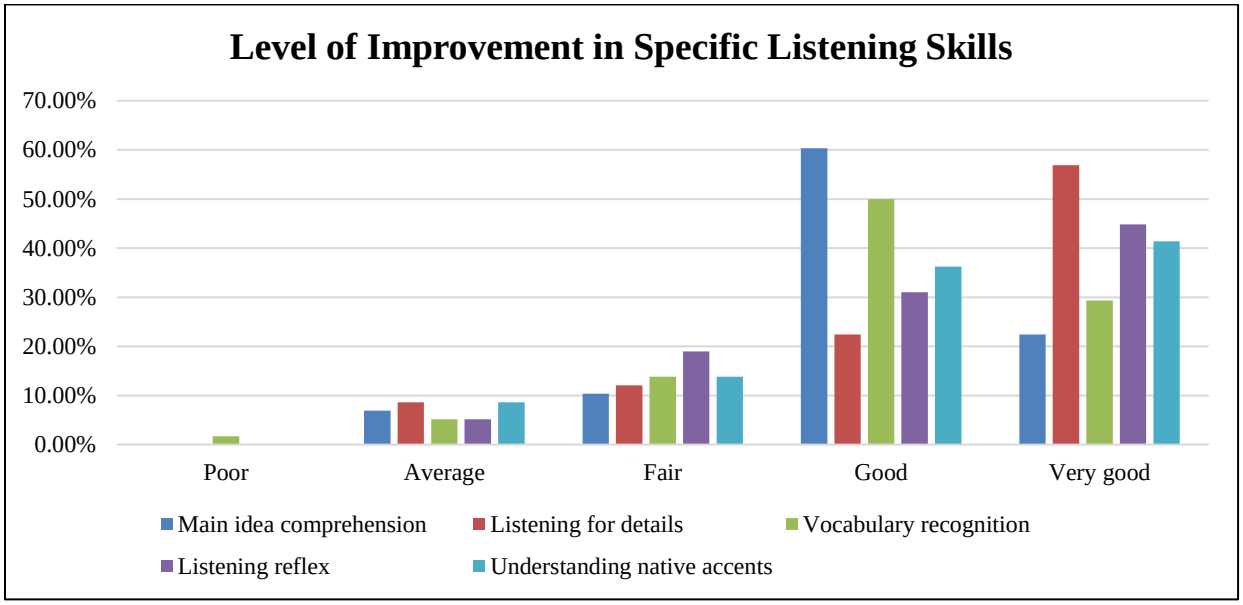
during listening activities (20.69%), implying that sustained attention may require additional instructional support beyond technology-enhanced practice.

Overall, these findings suggest that modern listening approaches were particularly effective in strengthening learners' bottom-up listening skills, including sound recognition, vocabulary identification, and detailed comprehension.

3.4.2 Improvement in Specific Listening Competencies

Figure 10. Level of Improvement in Specific Listening Skills



(Source: Research survey results)

Students also evaluated the degree of improvement across five specific listening competencies (Figure 10).

Listening for specific details received the highest evaluation, with 56.90% of participants rating their improvement as Very Good and 22.41% as Good. Listening reflexes also showed substantial improvement, with 44.83% selecting Very Good and 31.03% selecting Good.

Similarly, understanding native accents was positively evaluated, as 41.38% of respondents reported Very Good improvement and 36.21% reported Good improvement. Participants likewise expressed favorable evaluations of their ability to identify main ideas and recognize spoken vocabulary after the intervention.

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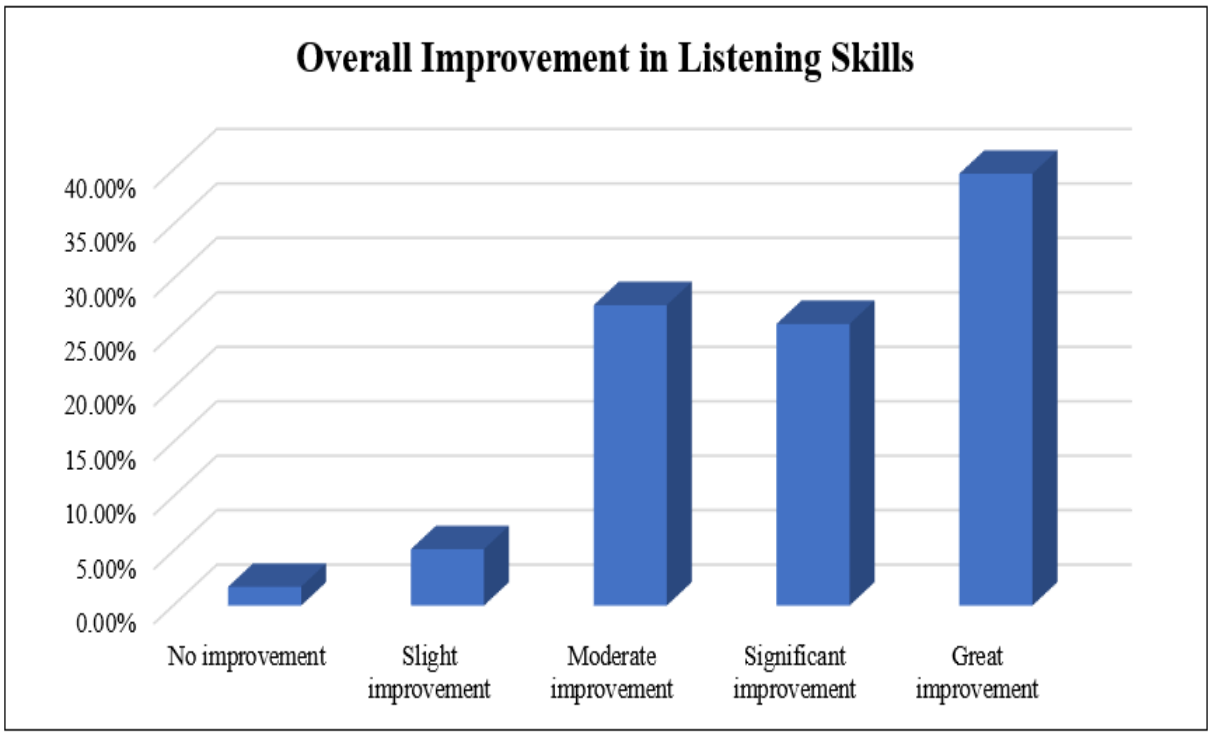
Across all listening competencies, only a small proportion of respondents reported limited improvement, while almost no students selected the Poor category. These findings demonstrate that students generally perceived meaningful progress in their listening abilities after participating in the technology-enhanced listening activities.

3.4.3 Overall Improvement in Listening Performance

Figure 11. Overall Improvement in Listening Skills



(Source: Research survey results)

Participants were further asked to evaluate their overall improvement in English listening comprehension (Figure 11).

The largest proportion (39.66%) perceived great improvement, followed by moderate improvement (27.59%) and significant improvement (25.86%). In contrast, only 5.17% reported slight improvement, while 1.72% indicated no noticeable improvement.

Taken together, more than two-thirds of the participants perceived moderate to substantial progress in their listening ability. These self-reported perceptions are consistent with the statistical improvements observed in the listening achievement tests, providing additional support for the effectiveness of the instructional interventions.

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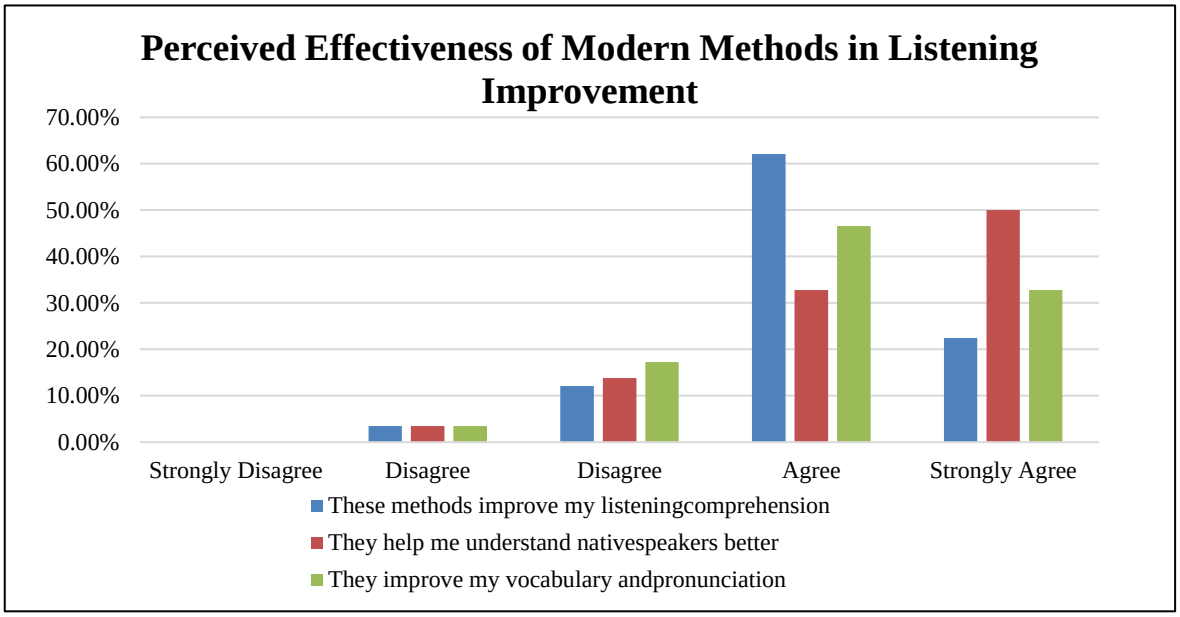
3.4.4 Students' Satisfaction with the Listening Approaches

Figure 12. Perceived Effectiveness of Modern Methods in Listening Improvement



(Source: Research survey results)

Students expressed highly positive attitudes toward the implementation of modern listening approaches (Figure 12).

More than half of the participants (55.17%) reported being very satisfied, while 22.41% indicated that they were satisfied with the learning methods employed during the intervention. Only a small proportion expressed neutral or negative opinions, suggesting a high level of learner acceptance.

The positive evaluations may be attributed to the flexibility, accessibility, and interactive nature of the instructional approaches. Students appreciated the opportunity to practice listening independently, receive immediate feedback, and engage with authentic English materials beyond the traditional classroom environment.

Overall, the high level of learner satisfaction indicates that technology-enhanced listening approaches were well received and perceived as valuable tools for supporting English listening development.

Summary of Students' Perceptions

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The questionnaire findings consistently demonstrate positive learner perceptions of the three instructional approaches. Participants reported improvements across multiple listening skills, particularly vocabulary recognition, pronunciation awareness, listening for details, and listening reflexes. In addition, students expressed high levels of satisfaction with the flexibility and effectiveness of technology-enhanced listening instruction.

Importantly, these subjective perceptions complement the objective findings obtained from the statistical analyses. While the listening tests confirmed significant improvements in listening performance, the questionnaire results suggest that students also recognized these improvements and valued the learning experiences provided by the interventions. The convergence of achievement data and learner perceptions strengthens the overall validity of the study's findings.

4. DISCUSSION

The present study investigated the comparative effectiveness of three technology-enhanced listening approaches—podcast-based extensive listening, AI-assisted learning, and the shadowing technique—in improving English listening comprehension among third-year English-major students at Trade Union University. The findings demonstrate that all three instructional approaches significantly enhanced students' listening performance after the four-month intervention. However, the magnitude of improvement differed considerably across the three methods, with AI-assisted learning producing the largest learning gains.

The significant improvement observed in all three experimental groups confirms the pedagogical value of technology-enhanced listening instruction. Compared with traditional classroom listening activities, modern digital tools provide learners with greater access to authentic language input, flexible learning opportunities, and increased exposure to natural spoken English. These characteristics are particularly beneficial in EFL contexts, where learners often have limited opportunities to interact with native or proficient English speakers outside the classroom.

Among the three approaches, AI-assisted learning demonstrated the greatest effectiveness. Students in the AI group achieved significantly higher post-test scores and larger learning gains than those in the Podcast and Shadowing groups. This finding may be explained by the adaptive and interactive nature of AI-supported learning environments. Unlike conventional listening materials, AI applications provide immediate corrective feedback, personalized learning pathways, adaptive task difficulty, and interactive communication practice. Such features enable learners to identify their weaknesses promptly, receive individualized support, and engage in repeated practice according to their own learning pace. Consequently, AI-assisted learning

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promotes not only listening comprehension but also learner autonomy, motivation, and sustained engagement throughout the learning process.

These findings are consistent with previous research highlighting the effectiveness of artificial intelligence in language education. Recent studies have reported that AI-supported language learning improves listening and speaking performance by providing personalized feedback, increasing learner interaction, and reducing communication anxiety (e.g., Zou et al., 2023). Similarly, studies on AI-assisted English learning have emphasized that adaptive learning technologies create more learner-centered environments, enabling students to practice more frequently and confidently than in traditional instructional settings.

Although podcast-based listening and the shadowing technique also produced statistically significant improvements, their effectiveness was comparatively lower than that of AI-assisted learning. Podcast-based listening primarily provides authentic language input and encourages extensive listening practice. While this approach successfully increases learners' exposure to natural English, it offers limited opportunities for interaction or individualized feedback. As a result, students may experience slower progress, particularly when they encounter unfamiliar vocabulary or pronunciation features that cannot be immediately clarified.

Similarly, the shadowing technique contributed positively to listening development by strengthening learners' phonological awareness, pronunciation, and listening–speaking integration. Repeated imitation of authentic speech may improve auditory processing and increase learners' sensitivity to stress, rhythm, and intonation. Nevertheless, because shadowing focuses primarily on intensive repetition rather than adaptive learning support, its overall effectiveness remained lower than that of AI-assisted learning in the present study.

An important finding of this research is the consistency between the objective and subjective evidence. Statistical analyses demonstrated significant improvements in listening achievement, while questionnaire responses indicated that students perceived meaningful progress in vocabulary recognition, pronunciation awareness, listening for details, and overall listening confidence. Furthermore, most participants expressed positive attitudes toward technology-enhanced listening instruction, suggesting that these approaches were not only effective but also well accepted by learners. The convergence of achievement data and learner perceptions strengthens the credibility of the study and provides additional evidence supporting the integration of digital technologies into English listening instruction.

The findings of this study also have several pedagogical implications. First, university English programs should consider integrating AI-assisted learning applications into listening courses as complementary learning tools rather than replacements for classroom instruction. Second,

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teachers may combine multiple listening approaches to maximize learning outcomes. For example, podcasts can be used to increase exposure to authentic spoken English, shadowing can strengthen pronunciation and listening fluency, while AI-assisted applications can provide individualized practice and immediate feedback. Such a blended approach may create a more comprehensive and learner-centered listening environment.

Despite these contributions, several limitations should be acknowledged. The study involved only 58 English-major students from a single university, which may limit the generalizability of the findings. In addition, the intervention lasted four months, and the study focused primarily on listening comprehension without examining long-term retention or transfer to other language skills. Future studies should include larger and more diverse participant samples, extend the duration of the intervention, and investigate how AI-assisted learning influences other aspects of language development, such as speaking, pronunciation, vocabulary acquisition, and learner autonomy. Further comparative studies involving additional digital learning technologies would also contribute to a more comprehensive understanding of technology-enhanced language learning in higher education.

5. CONCLUSION

This study investigated the comparative effectiveness of three technology-enhanced listening approaches—podcast-based extensive listening, AI-assisted learning, and the shadowing technique—in improving English listening comprehension among third-year English-major students at Trade Union University. Using a quasi-experimental pre-test–post-test design, the study examined both students' listening performance and their perceptions of these instructional approaches.

The findings demonstrate that all three listening approaches significantly improved students' English listening comprehension after the four-month intervention. However, the magnitude of improvement differed across the three instructional methods. AI-assisted learning produced the greatest learning gains and significantly outperformed both podcast-based listening and the shadowing technique. Meanwhile, podcasts and shadowing also contributed positively to listening development, although no statistically significant difference was identified between these two approaches.

Beyond the statistical findings, students expressed highly positive perceptions of technology-enhanced listening instruction. Participants reported improvements in vocabulary recognition, pronunciation awareness, listening for specific details, and overall listening confidence. They also appreciated the flexibility, accessibility, and learner-centered nature of modern digital learning environments. The consistency between objective achievement data and learners'

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subjective perceptions provides strong evidence supporting the effectiveness of integrating technology into English listening instruction.

From a theoretical perspective, this study contributes to the growing body of research on technology-enhanced language learning by providing a direct comparison of three contemporary listening approaches within the same instructional context. Unlike many previous studies that have examined podcasts, AI-assisted learning, or shadowing separately, the present study offers empirical evidence of their relative effectiveness under comparable learning conditions. These findings enrich current understanding of how different digital learning approaches influence listening development in EFL higher education.

The study also offers several practical implications for English language teaching. Rather than relying solely on traditional listening instruction, university lecturers are encouraged to integrate AI-assisted learning applications into listening courses to provide individualized practice and immediate feedback. At the same time, podcasts and shadowing should be incorporated as complementary learning activities that increase authentic language exposure and strengthen pronunciation, listening fluency, and autonomous learning. A balanced combination of these approaches may create a more effective and engaging listening environment for university students.

Despite its contributions, this study has several limitations. The research was conducted with a relatively small sample of English-major students from a single Vietnamese university, which may limit the generalizability of the findings. In addition, the intervention focused exclusively on listening comprehension over a four-month period. Future research should involve larger and more diverse participant populations, examine the long-term effects of AI-assisted language learning, and explore its impact on other language skills, including speaking, pronunciation, vocabulary acquisition, and learner autonomy. Comparative studies involving additional educational technologies and different learning contexts would further extend the understanding of technology-enhanced language learning.

In conclusion, this study provides empirical evidence that technology-enhanced listening instruction can substantially improve English listening comprehension among university EFL learners. Among the three approaches examined, AI-assisted learning demonstrated the greatest pedagogical potential by combining authentic language exposure with adaptive learning, immediate feedback, and personalized practice. As artificial intelligence continues to transform language education, its thoughtful integration into higher education curricula offers promising opportunities to promote more effective, learner-centered, and sustainable English language learning.

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