

CHAPTER FOUR

FINDINGS AND DISCUSSION

The research findings and a thorough discussion based on field data are presented in this chapter. While the second half includes a discussion that assesses the impact of using podcasts on students' listening abilities within the context of student-centered learning, the first section gives the research findings in the form of statistical data analysis and interview results.

4.1. QUANTITATIVE FINDINGS

The results of this study are based on an analysis of data obtained from an objective measurement instrument in the form of multiple-choice test questions that were given to the study participants, a control group of 12 students and an experimental group of 12 students in two stages, a pre-test and a post-test.

Before presenting the results of the main study, the listening comprehension instrument was tested through a pilot test. The validity and reliability tests were conducted to determine whether the instrument was appropriate for use in the main study.

4.1.1 Validity and Reliability of The Instrument

a. Validity Test

The validity of the fifteen test items was examined using the Pearson Product-Moment correlation through SPSS. The analysis was conducted by correlating each item's score with the total test score. The significance level was set at 0.05.

An item was considered to meet the statistical validity criterion when its significance value was below 0.05.

Table 4.1 Results of The Instrument Validity Test

Questions	Pearson Correlation	Sig.	Conclusion	Interpretation
1	0.494	0.009	Valid	Enough
2	0.711	0.001	Valid	High
3	0.556	0.003	Valid	Enough
4	0.531	0.004	Valid	Enough
5	0.099	0.624	Invalid	Very Low
6	0.438	0.022	Valid	Enough
7	0.438	0.022	Valid	Enough
8	0.578	0.002	Valid	Enough
9	0.443	0.021	Valid	Enough
10	0.299	0.130	Invalid	Low
11	0.317	0.107	Invalid	Low
12	0.564	0.002	Valid	Enough
13	0.484	0.011	Valid	Enough
14	0.666	0.001	Valid	High
15	0.386	0.047	Valid	Low

Based on Table 4.1, while three items, namely Items 5, 10, and 11, did not meet the criterion. Item 5 obtained a significance value of 0.624, Item 10 obtained 0.130, and Item 11 obtained 0.107. These values were higher than the significance level of 0.05. Meanwhile, the other twelve items obtained significance values below 0.05.

b. Reliability Test

After examining the validity of the test items, the reliability of the instrument was analyzed using Cronbach's Alpha through SPSS. The analysis was conducted using the responses of the 27 participants who participated in the pilot test. The reliability test was used to examine the internal consistency of the 15 test items.

Table 4.2 Reliability Test

Cronbach's Alpha	N of Items
.716	15

Based on Table 4.2, the listening comprehension test obtained a Cronbach's Alpha coefficient of 0.716 across the 15 items. This result indicated an acceptable level of internal consistency. Therefore, the instrument was considered sufficiently reliable for use in the main study.

4.1.2 The Percentage of Students' Experimental

Table 4.3 Classification of Students' Scores Pre-Test & Post-Test

Classification	Score	Pre-Test		Post-Test	
		Frequency	Percentage	Frequency	Percentage
Excellent	91-100	0	0%	5	41.7%
Very Good	81-90	0	0%	2	16.7%
Good	71-80	3	25%	3	25%
Fairly Good	61-70	2	16.7%	1	8.3%
Fairly	51-60	5	41.7%	1	8.3%
Fairly Poor	31-50	2	16.7%	0	0%
Poor	0-35	0	0%	0	0%
Total		12	100.0	12	100.0

The findings of the percentage and frequency classification of the students' pre-test and post-test scores in the experimental group are shown in Table 4.3. According to the pre-test findings, of the twelve pupils, three (25%) were rated as "good," two (16.7%) as "fairly good," five (41.7%) as "fair," and two (16.7%) as "fairly poor."

Meanwhile, the post-test results for the experimental group showed that out of 12 students, 5 students (41.7%) were classified as "excellent", 2 students (16.7%) as "very good", 3 students (25%) as "good", 1 student (8.3%) as "fairly good", and 1 student (8.3%) as "fairly".

4.1.3 The Percentage of Students' Control

Table 4.4 Classification of Students' Scores Pre-Test and Post-Test

Classification	Score	Pre-Test		Post-Test	
		Frequency	Percentage	Frequency	Percentage
Excellent	91-100	0	0%	5	41.7%
Very Good	81-90	0	0%	1	8.3%
Good	71-80	5	41.7%	3	25%
Fairly Good	61-70	3	25%	2	16.7%
Fairly	51-60	2	16.7%	0	0%
Fairly Poor	31-50	2	16.7%	1	8.3%
Poor	0-35	0	0%	0	0%
Total		12	100.0	12	100.0

The results of the classification of percentages and frequencies for the students in the control group's pre-test and post-test scores are shown in Table 4.4. Out of the twelve students, five (41.7%) were rated as "good," three (25%) as "fairly good," two (16.7%) as "fair," and two (16.7%) as "fairly poor," according to the pre-test results.

Out of the twelve students in the control group, five (41.7%) were rated as "excellent," one (8.3%) as "very good," three (25%) as "good," two (16.7%) as "fairly good," and one (8.3%) as "fairly poor," according to the post-test results.

4.1.4 Descriptive Analysis of Pre-Test and Post-Test

The statistical values from the descriptive analysis of the pre-test and post-test results for the experimental and control groups have been reviewed by the researcher.

Table 4.5 Descriptive Analysis Pre-Test and Post-Test of Experimental Group and Control Group

	N	Minimum	Maximum	Mean	Std. Deviation
Pre-Test Experiment	12	40	80	60.92	12.243
Post-Test Experiment	12	60	100	85.33	13.963
Pre-Test Control	12	40	80	65.25	12.359
Post-Test Control	12	33	100	80.25	19.708
Valid N (listwise)	12				

Based on Table 4.5, measurements were taken of 12 students in the experimental group and 12 students in the control group. The average listening proficiency score of the students in the experimental group increased significantly from 60.92 on the pre-test to 85.33 on the post-test. This increase in the mean was also accompanied by a significant rise in the lowest score, from 40 to 60, while

the highest score in the group rose from 80 to 100. Furthermore, the standard deviation in the experimental group increased from 12.243 to 13.963.

In contrast, the control group's average score increased from 65.25 on the pre-test to 80.25 on the post-test. While the highest scores in the control group stayed at 93 and 100, the lowest score decreased from 40 on the pre-test to 33 on the post-test. This caused the standard deviation in the control group to rise from 12.359 to 19.708, indicating that the distribution of student scores in this group was more varied.

4.1.5 Normality Test

The researcher analyzed the data used SPSS 26. The researcher conducted normality and homogeneity tests. Since the sample size was less than 50, the researcher used the Shapiro-Wilk test for normality. The results are shown in the table below.

Table 4.6 The Normality Test

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pre-Test Experiment	.229	12	.083	.928	12	.360
Post-Test Experiment	.187	12	.200 [*]	.899	12	.155
Pre-Test Control	.191	12	.200 [*]	.904	12	.177
Post-Test Control	.158	12	.200 [*]	.876	12	.077

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Based on the results in the table above, the normality tests for both groups showed sig. > 0.05, meaning (0.155 > 0.05) and (0.077 > 0.05). It is found that the residual value is distributed regularly.

4.1.6 Homogeneity Test

After the normality test, the researcher used Levene's test of homogeneity of variances. The results are shown in the table below.

Table 4.7 The Homogeneity Test

		Levene Statistic	df1	df2	Sig. ^a
Score	Based on Mean	1.172	3	44	.331
	Based on Median	1.173	3	44	.331
	Based on Median and with adjusted df	1.173	3	37.195	.333
	Based on trimmed mean	1.174	3	44	.330

a. Confidence Interval: 0%

The homogeneity test findings above indicate a significance value > 0.05 , indicating that the data variances are similar because the mean-based value, 0.331, is more than 0.05.

4.1.7 Hypotheses Test

The researcher conducted a hypothesis test using an independent samples t-test because this test is used to compare two unrelated samples. The results of this independent test are derived from the post-test scores of the two groups, namely the experimental and control groups. This determines whether the statistical result is significant or not. If $\text{sig.} < 0.05$, the hypothesis is accepted; conversely, if $\text{sig.} > 0.05$, the hypothesis is rejected.

Table 4.8 Independent Samples Test

		t-test for Equality of Means							
		t	df	Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
				One-Sided p	Two-Sided p			Lower	Upper
Score	Equal variances assumed	.729	22	.237	.474	5.083	6.972	-9.376	19.543
	Equal variances not assumed	.729	19.821	.237	.474	5.083	6.972	-9.469	19.636

Based on Table 4.8, the results of the independent samples t-test, the experimental group, which used podcasts, and the control group, which used audio textbooks or traditional materials, did not differ statistically significantly. Since the p-value was greater than the set significance level ($0.474 > 0.05$), the null hypothesis (H_0) was accepted and the alternative hypothesis (H_a) was rejected. Therefore, the use of podcasts did not result in a statistically significant improvement in students' listening skills compared to conventional instruction.

Table 4.9 Man Whitney U Test

	Score
Mann-Whitney U	63.000
Wilcoxon W	141.000
Z	-.528
Asymp. Sig. (2-tailed)	.597
Exact Sig. [2*(1-tailed Sig.)]	.630 ^b

a. Grouping Variable: Group

b. Not corrected for ties.

A Mann-Whitney U test was performed as a non-parametric substitute because the limited sample size produced non-significant results in the independent t-test. The Asymp. Sig. (2-tailed) value was 0.597, as seen in Table 4.9. The null hypothesis (H_0), which states that there is no statistically significant difference between the two groups, is maintained because this value is higher than 0.05.

4.1.8 N-Gain Score

The researchers conducted a Normalized Gain test. The purpose of this test was to assess the degree of change after the intervention by comparing the pre-test

and post-test scores. The results of the descriptive statistical analysis of N-Gain are presented in the following table.

Table 4.10 N-Gain of The Experimental Group Test

	N	Minimum	Maximum	Mean	Std. Deviation
NGain_Scores	12	.00	1.00	.6532	.31141
NGain_Persen	12	.00	100.00	65.3153	31.14132
Valid N (listwise)	12				

Based on the results of the data analysis, it was found that the average N-Gain score for the experimental group, consisting of 12 students, was 0.65, or 65%. According to Hake's N-Gain score categories, in terms of percentage, this score falls within the range of 56% to 75%. This suggests that the experimental group's students improved listening abilities fit into the "enough effective" category.

Table 4.11 The N-Gain of The Control Group Test

	N	Minimum	Maximum	Mean	Std. Deviation
NGain_Scores	12	-.35	1.00	.4655	.47034
NGain_Persen	12	-35	100.00	46.5559	47.02405
Valid N (listwise)	12				

Meanwhile, the results of the data analysis for the control group, consisting of 12 students, showed that the average N-Gain score was 0.46, or 46%. According to Hake's N-Gain score categories, this score falls within the 40% to 55% gain index criteria. This indicates that the improvement in the students' listening skills in the control group falls into the "less effective" category.

4.1.9 The Effect Size

The researcher calculated a measure of the effect of podcast use on students' listening ability using Cohen's formula. To determine it, see the average values in the table below.

Table 4.12 The Effect Size

	Group	N	Mean	Std. Deviation	Std. Error Mean
Score	Post-Test Experiment	12	85.33	13.963	4.031
	Post-Test Control	12	80.25	19.708	5.689

The experimental group had a mean score of 85.33 with a standard deviation of 13.963, while the control group had a mean score of 80.25 with a standard deviation of 19.708, according to the statistical data obtained from the post-test. Furthermore, the final calculation of Cohen's d computation produced a value of 0.29. Referring to the criteria for interpreting is within the range of $0.2 < d < 0.5$ according to the criteria for interpreting Cohen's d. This suggest that the use of podcasts has a small effect (small effect/modest effect) on students' listening skills.

Overall, the findings indicate that both groups' final test scores increased, with the experimental group's increase being higher than the control group's. Although the independent samples t-test not showing a statistically significant difference ($p = 0.474$), the N-Gain analysis indicated a higher rate of improvement in the experimental group. Therefore, these results imply that podcast-based training may aid in the improvement of listening abilities; however, this improvement cannot be interpreted as statistically significant based on the present data.

4.2. QUALITATIVE FINDINGS

Following the quantitative analysis, semi-structured interviews were used to provide additional clarification and to understand the quantitative findings in context. Reflective thematic analysis was used to analyze the interview data. Reading the transcripts, initial coding, developing candidate categories and themes, reviewing and refining themes, defining themes, and presenting the qualitative results were all part of the analysis. This method aligns with the methodological discussion by Braun and Clarke (2024) on reflective thematic analysis; they emphasize methodological coherence, transparency, and a clear distinction between themes and general topics.

4.2.1. Learner Control and Flexibility

The first theme concerns students' perception of their ability to control the listening process. This theme was especially prominent in interviews with students of the experimental group. Students describe podcast-based learning as providing opportunities to pause, rewind, replay, and adjust audio speed according to individual needs. For example, Experiment 2 students stated:

"I can pause, rewind or adjust the speed according to my own pace."

This statement suggests that students perceive podcasts as allowing greater control over the listening process. The student is not required to follow the audio at a fixed pace but can modify the playback according to the level of difficulty experienced. The same student also explained that the ability to pause is useful when dealing with unfamiliar vocabulary:

"I can just stop for a moment to look for the meaning..."

This shows that podcasts are not considered only as an audio source but as a learning resource that can be controlled according to the student's immediate understanding needs. However, interview data also show that students do not necessarily use this flexibility in exactly the same way. Student experiment 3 states:

"Listening to podcasts from start to finish without interruption allows me to synthesize content more effectively."

These findings suggest that flexibility does not necessarily mean that students always pause or replay the material. Rather, an important feature is the availability of controls. Students can choose whether to use repetition or uninterrupted listening depending on the need they feel.

The control group interviews provided a contrasting perspective. Control 2 students reported that students could not freely pause or replay conventional audio:

"We can't pause or replay as we like..."

The student further explained that the speed of the audio can cause information to be missed:

"With audio speed ... missed information."

The comparison showed that the two learning conditions differ not only in the type of audio material but also in the amount of control that students feel during the listening process. Therefore, this theme can be summarized as follows:

“While conventional audio instruction relies on established classroom protocols, podcast-based instruction gives students more control and flexibility in the listening process.”

Since the study did not independently measure student autonomy, the results do not show directly that the use of podcasts improves student autonomy as a psychological construct. Rather, the assessment shows how the student has control over the listening activity.

4.2.2. Listening Difficulties and Learning Barriers

The second theme concerns the difficulties students experienced during listening activities. An important finding was that both groups experienced listening difficulties, although the specific difficulties varied. Students in the experimental group identified several challenges. Experimental Student 2 explained:

“The biggest challenge is maintaining focus since it is an independent task... I easily get distracted by my phone.”

This response indicates that the flexibility of podcast-based learning may also create challenges. Because students have greater control over the learning process, they may also need to maintain their own attention without continuous teacher monitoring. Experimental Student 3 identified another difficulty:

“The main challenge is dealing with different accents, like British English...”

This suggests that exposure to different varieties of spoken English could challenge students' comprehension. Podcast-based learning therefore did not eliminate difficulties related to pronunciation, accent, or spoken-language processing.

The control-group students also reported substantial listening difficulties. Control Student 1 described listening as one of the most difficult English skills. Control Student 2 emphasized the speed of the audio and the possibility of missing information. Control Student 3 described native-speaker speech as difficult to follow:

“Every sentence ... foreign native speakers muttered....”

The findings demonstrate that listening difficulties were present in both instructional conditions. However, the characteristics of difficulty are different. Experimental students emphasized information retention, distraction, accent, and vocabulary, while control students emphasized recording speed, missed information, limited playback, and difficulty understanding native speakers' speech. As a result, the results suggest that podcast-based learning should not be considered a solution to the listening problem. Instead, podcasts can help students overcome this problem by giving them greater control over their voice.

4.2.3. Topic Relevance and Engagement

The third theme concerns students' perceptions of topic relevance and its relationship to their engagement with listening activities. Experimental Student 1 stated:

“The topics presented in the podcasts are more relatable because they reflect everyday life...”

The student further described podcast topics as including:

“hobbies, daily life, and personal interests.”

Experimental Student 2 also highlighted the nature of podcast topics:

“The topics are trendy and the tone is casual...”

Similarly, Experimental Student 3 reported selecting topics that were relevant to personal needs:

“I choose specific topics relevant to my needs, like health.”

These responses indicate that students valued the possibility of encountering topics connected with everyday life and personal interests. The control-group interviews revealed a similar perception. Control Student 1 stated:

“it's more interesting what I like.”

Control Student 3 provided football as an example of a topic that could attract interest:

“podcasts related to the world of football...”

These responses suggest that topic relevance was not exclusively associated with podcast users. Rather, students from both groups valued listening materials that corresponded to their interests. Therefore, these results suggest that podcast

content variation may partly provide value. Podcasting can give teachers or students the opportunity to choose a course that suits their interests. A study in Vietnam in 2024 found that students generally perceive podcasts well for listening comprehension, while a study in Indonesia in 2024 found that students perceive podcasts well for the fact that they are accessible, original, and flexible. However, topic relevance cannot be explained directly as a causal explanation of increased listening; this study did not experimentally distinguish topic relevance from other treatment attributes.

4.2.4. Perceived Benefits and Limitations of Podcast-Based Learning

The fourth theme concerns students' perceptions of the potential benefits and limitations of podcast-based learning. Students of the experimental group described some of the benefits based on their direct experience. These include greater control over audio playback, opportunities to replay difficult passages, vocabulary learning, exposure to pronunciation and accent, and access to topics related to personal interests. Control group Students also found podcasts potentially useful. Student Control 1 States:

"it can be repeated and it can be the topic / theme as I want..."

Student Control 2 states that:

"the podcast method would be very helpful."

These responses showed that the control group students recognized the potential benefits of podcasts, especially the possibility of playing back audio and choosing topics. However, the response of the control group also contained

important limitations. For example, Control Student 1 noted that listening to native speakers through podcasts may still be difficult:

"I think the native speakers are confused."

This response is important because it shows that students don't think podcasts automatically solve all listening problems. Therefore, qualitative findings suggest that students generally perceive podcasts as a potentially useful listening medium, primarily because of flexibility and choice of content, while also recognizing that difficulties such as accent and unfamiliar speech can persist.

4.3.DISCUSSION

An extensive analysis of the previously mentioned researcher findings is provided in this section. In the first phase, 12 students in the experimental class were given a pre-test consisting of 15 multiple-choice questions to gauge their preliminary listening abilities. Each right response received a score of 1. According to the pre-test results of the twelve students in the experimental class, three students (25%) were classified as "good," two students (16.5%) as "fairly good," five students (41.7%) as "fair," and two students (16.7%) as "fairly poor." Considering that most students were classified as "fair," and below, these findings provided a strong basis for the researcher to implement podcasts as a strategic solution to enhance students' listening skills.

The use of podcasts in listening instruction reinforces the principle of student-centered learning by giving students the freedom to explore the material. Observation results show that students not only act as listeners but are also able to

construct their own understanding by reenacting the podcast content using their own language styles and personal experiences. To maintain focus and depth in discussions, the researcher implemented a keyword-based question-and-answer strategy, which proved effective in encouraging active participation even among students who had previously been passive.

At the final session, the researcher administered a post-test that also consisted of 15 multiple-choice questions. The findings demonstrated a notable improvement in listening abilities. Out of the twelve students, five (41.7%) were classified as "excellent," two (16.7%) as "very good," three (25%) as "good," and one (8.3%) each as "fairly good" and "fair.". These results were far better than the pre-test scores, which had previously shown many students in the low category. This improvement proves that the students' listening skills truly developed after learning using podcasts. The increase in the average score from 60.92 on the pre-test to 85.33 on the post-test provides more evidence for this. According to these findings, second-year English Language Education program students' listening skills have improved as a result of using podcasts.

The data were initially assessed using normality and homogeneity analyses before proceeding to hypothesis testing. The test findings demonstrated that all of the data from both groups met the criteria, namely that they were normally distributed and had homogeneous variances. However, the statistical power of the analysis may have been constrained due to the study's small sample size (12 students per group). Studies have shown that insufficient sample sizes lower statistical power, making it more challenging to identify statistically significant

differences even when practical differences exist (Besekar et al., 2023). Therefore, to confirm and strengthen the data analysis on a small sample, the test was switched to the Mann-Whitney U procedure was employed as an alternative analysis, and its results confirmed the same overall outcome, falling into the “not significant” category.

The obtained p-value exceeded the predetermined significance level of 0.05, indicating the absence of statistical significance. Based on statistical decision-making criteria, this indicates that the null hypothesis (H_0) is accepted and the alternative hypothesis (H_1) is rejected. This means that listening performance remained statistically comparable across the podcast and conventional instruction groups. Score improvements were observed in both groups from the beginning to the end of the study; however, the relatively small sample may have limited the ability to identify statistically meaningful differences between the groups.

Although the hypothesis test yielded statistically nonsignificant results, the classification of findings based on the effectiveness analysis offers a positive perspective. Based on the N-Gain test calculations, the experimental group that used podcasts achieved an average score of 0.65 (a 65.31% increase). This figure falls within the “moderate” effectiveness category. Furthermore, to assess the magnitude of the treatment’s effect, the researchers used Cohen's d formula to determine the effect size, yielding a value of 0.29. According to Cohen’s criteria, this value falls within the range of $0.2 < d < 0.5$, indicating revealed students' listening abilities were only little impacted by the use of podcasts. When

comparing the two groups, the experimental group achieved a higher N-Gain score (0.65, or 65%) than the control group (0.46, or 46%).

This difference in gain scores indicates that, although both groups made progress, the student-centered approach facilitated through podcasts provided a more effective learning environment for skill development. These findings suggest that, although hypothesis testing did not reveal any statistically significant differences, podcast-based learning shows a positive trend in improving students' listening skills. Higher N-Gain scores and positive student perceptions indicate that podcasts can serve as a beneficial learning medium, although further research with a bigger sample size are required to validate their efficacy.

This finding is relevant to the theory of technology-supported listening learning. Nur Fitria (2021) explains that digital media can provide learners with varied English input and flexible access to listening materials. Similarly, Firmansyah et al. (2024) state that technology-supported language learning can provide opportunities for authentic audio exposure, repetition, and personalized learning. These characteristics were present in the podcast activities implemented in the experimental class.

In this study, the researcher used podcasts at the intermediate level, specifically CEFR levels B1 and B2. These levels were chosen to align with the students' abilities while providing a gradual progression of challenges. In addition, students were also encouraged to familiarize themselves with various podcast formats, ranging from monologues to two-person dialogues commonly found on social media. This was intentionally done to make the learning

experience more relevant to students' daily lives, so they could become more accustomed to listening to a more flexible and natural style of language.

The use of authentic material is another important factor in interpreting the findings. Kochkorova (2025) explains that podcasts can be categorized as authentic materials because they reflect real communication and natural language use in social and cultural contexts. Tran T. Dung et al. (2025) similarly emphasize that podcasts can expose learners to natural speech speed, intonation, and accent variation. In the present study, students reported that different English accents sometimes became a challenge. However, this difficulty did not prevent them from engaging with the material. Instead, students indicated that the differences in accents encouraged them to continue practicing their listening skills.

The interview findings particularly strengthen the interpretation of the quantitative results. The three students from the experimental group consistently described podcasts as providing greater control over their learning process. Students mentioned the ability to pause, replay, and adjust playback speed. These features enabled them to repeat difficult sections and learn according to their individual pace. Such experiences directly correspond with the concept of student-centered learning discussed, in which learners are positioned as active participants who are given opportunities to manage their own learning.

Tang (2023) explains that student-centered learning positions students at the center of learning activities, while lecturers function as facilitators who encourage active participation and independent learning. The students' responses in this study reflect these characteristics. Rather than depending entirely on

lecturer explanations, students could independently manipulate the audio material according to their needs. This indicates that the podcast did not merely function as an alternative source of audio but also supported a learning process in which students had greater responsibility for their comprehension.

The flexibility of podcast features is particularly important for listening comprehension because students do not always process spoken English at the same speed. A. Y. Putri et al. (2025) explain that features such as pausing, repeating, and adjusting audio speed can help learners manage oral input and reduce cognitive load. This theoretical explanation is reflected in the present interview findings. Students stated that replaying difficult sections helped them understand the content, while playback control reduced their dependence on the lecturer. Consequently, podcast technology can be understood as supporting not only access to listening materials but also learners' control over the process of processing those materials.

Furthermore, the interview findings support the theory that listening involves both bottom-up and top-down processing. The bottom-up process requires learners to recognize sounds, words, and linguistic details, whereas the top-down process involves using context, background knowledge, and expectations to construct meaning. In the present study, students reported that they used repeated listening to identify unfamiliar vocabulary and difficult words. At the same time, the relevance of podcast topics to everyday life helped them understand the broader context of the spoken message. Therefore, podcast activities potentially supported the interaction between bottom-up and top-down

listening processes described by Aryadoust and Luo (2023) and Binti Azhari et al. (2024).

Another important finding concerns students' motivation and engagement. The interview results showed that students considered podcast-based learning more interesting than conventional audio materials. They reported that the variety of topics made listening activities less monotonous and encouraged them to continue practicing. One student stated that podcasts increased motivation because the topics matched personal interests and introduced new vocabulary through authentic listening materials. Another student explained that although unfamiliar vocabulary could be an obstacle, the learning process remained enjoyable and encouraged continuous listening practice.

These findings support Harahap's (2020) previous study, which found that students had positive perceptions of podcasts because of the variety of content, clarity of pronunciation, and accessibility of the platform. The present study similarly indicates that content relevance and accessibility contributed to positive learner experiences. However, the present study extends this finding by connecting students' perceptions with quantitative listening outcomes. While Harahap (2020) primarily emphasized students' perceptions and motivation, the present research combines these perceptions with pre-test, post-test, N-Gain, and effect-size results.

The results can also be compared with Yeganeh and Izadpanah (2021), who found that podcasts and vodcasts significantly improved the listening skills of motivated EFL learners. Similarly, Chaves-Yuste and de-la Peña (2023) reported

positive effects of podcast use among secondary students in Spain, while Aybirdi et al. (2024) found that podcast-based extensive listening improved listening skills and reduced listening anxiety. The present study shows a similar direction in the descriptive and N-Gain results, but it differs in terms of statistical significance. The present study did not identify a statistically significant difference between the experimental and control groups.

The interview findings also revealed several limitations of podcast-based learning. Students identified unfamiliar vocabulary and different English accents as challenges. These findings are consistent with the theoretical discussion, that authentic podcasts may contain natural speech patterns, variations in accent, and contextual vocabulary. Hoang Nghiem and Vu Diem Thuy (2025) emphasize that exposure to different speech styles and accents can help learners adapt to linguistic variation, but such exposure may also require learners to develop greater listening competence. Thus, the difficulties experienced by the participants are part of the process of adapting to authentic spoken English.

The students' comments about unfamiliar vocabulary also demonstrate the importance of teacher guidance. Although podcasts encourage independent learning, students may still require support when encountering vocabulary or speech that is beyond their current proficiency. This supports the argument of Yugsan Gomez et al. (2019), Deda (2023), and Turner (2020) that the effectiveness of podcasts depends partly on teachers' ability to select relevant materials and provide appropriate classroom support. Therefore, student-centered learning does not mean that the teacher becomes unnecessary. Instead, the lecturer

remains important as a facilitator who helps students select materials, develop listening strategies, and reflect on their learning experiences.

The findings therefore suggest that the strongest contribution of podcasts in this study may not be statistical superiority but the way they changed the learning process. The quantitative findings showed that the experimental group obtained a higher N-Gain score and a higher post-test mean than the control group, while the qualitative findings showed greater learner control, flexibility, motivation, and engagement. These two forms of evidence complement one another. The quantitative data indicate the direction and magnitude of learning improvement, whereas the qualitative data explain how students experienced the learning process that accompanied that improvement.

Interestingly, the absence of statistically significant differences in this study is actually consistent with the literature cited by Rakhimova (2024). The researchers notes that the use of technology-based media in foreign language instruction often yields mixed results. According to Rakhimova (2024), the absence of significant differences between the use of digital media, such as podcasts, and traditional methods does not necessarily indicate the failure of such media. On the contrary, non-significant results are often influenced by other external variables, such as how media integration strategies are implemented in the classroom, the duration of students' exposure to the media, and differences in individual characteristics, which are naturally not uniform.

Although the results of the hypothesis testing did not show statistically significant figures, this situation can be objectively explained by several

methodological limitations during the experiment. The most fundamental limitation lies in the very small sample size, which involved only 12 students in each group. In quantitative research, a limited sample size directly reduces statistical power. Consequently, the analysis software lacked sufficient sensitivity to detect the actual differences that occurred across the experimental and control groups. Furthermore, the intervention was implemented over a relatively brief period, which may have limited the observable learning outcomes. This limited time was insufficient to fundamentally change the students' listening patterns and habits to the point of creating a striking difference in scores when compared to the control class. This is to be expected, given that building listening competence takes time because learners improve through ongoing interaction with authentic spoken input rather than short-term instruction.

The relatively short intervention is particularly relevant to listening development because listening competence involves repeated exposure and continuous practice. The theoretical framework, emphasizes that listening improvement requires exposure to sounds, vocabulary, structures, accents, and contextual meanings. Therefore, a longer intervention could potentially provide students with more opportunities to develop automaticity in recognizing spoken language. Future studies could investigate whether a longer period of podcast exposure would produce a stronger statistical effect.

The findings also suggest that the effectiveness of podcasts depends on how the medium is integrated into classroom activities. Podcasts may provide authentic input, but simply asking students to listen to an audio file may not be

sufficient to maximize learning. The present study incorporated keyword-based questions, repetition, and discussion activities, which helped students actively process the material. This is consistent with Datin Hullyany et al. (2024), who emphasized the importance of relevant content, interactive classroom activities, and structured guidance in optimizing podcast-based learning.

From the perspective of student-centered learning, the findings demonstrate that podcasts can create conditions for learners to take greater responsibility for their learning. Students could decide when to repeat difficult sections, adjust the playback speed, and engage with topics they considered meaningful. This corresponds to Orabah et al. (2022), who emphasize the importance of understanding learners' needs, interests, and learning styles in student-centered teaching. The present findings indicate that topic relevance played an important role in students' engagement because students reported that everyday and personally relevant topics made listening activities more meaningful.

The findings further support the argument that student-centered learning can move listening instruction away from a purely teacher-controlled process. In conventional instruction, students generally receive audio materials selected by the lecturer and follow the established playback procedure. In podcast-based learning, students can have greater control over how they interact with the material. This difference may explain why the experimental students described podcasts as more conducive to independent learning. However, because the statistical comparison between the groups was not significant, the present study

cannot claim that student-centered podcast learning is universally superior to conventional listening instruction.

The present findings also contribute to the contextual gap identified. Most previous experimental studies reviewed in this research were conducted with students outside Indonesia or with different educational levels. The current study provides evidence from second-year English Education students in an Indonesian university context. The findings show that podcast-based learning is feasible and positively perceived in this context, but its measurable statistical advantage remains limited under the conditions of the present study.

Therefore, in conclusion, podcasts continue to be a useful medium for promoting student-centered learning. Based on the N-Gain scores, this strategy has proven moderately effective in helping students independently develop their listening skills. Although statistical testing revealed only a modest effect and did not significantly outperform conventional methods due to the limited number of participants, podcasts have empirically demonstrated their potential. This medium has proven capable of serving as an authentic, adaptive, and highly relevant pedagogical tool to suit the learning demands of English Language Education students.

4.4.CONCLUDING REMARKS

This chapter integrated the quantitative findings with the qualitative evidence to provide a comprehensive interpretation of the research outcomes. Although the statistical analyses did not identify meaningful differences between students receiving podcast-assisted instruction and those following conventional listening activities, additional evidence obtained from descriptive statistics, learning gain analysis, effect size calculation, and interview responses demonstrated several educational benefits associated with podcast integration. Students showed improvements in listening performance, greater learning autonomy, and stronger motivation throughout the learning process. These outcomes indicate that podcasts function effectively as a supportive instructional resource despite the methodological constraints of this study, particularly the limited number of participants.