

# Investigating the Effectiveness of Metaverse-Based Training for Improving Listening Skills

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## Abstract

Malaysian students struggle with English as a second language, especially in listening. This area is often overlooked in schools, assuming it will improve naturally over time. To address this, a study on metaverse-based listening training to improve students' performance in listening assessments was conducted. The study used the Universe by ViewSonic app to evaluate if metaverse-based training can enhance listening skills and engagement. Twenty randomly selected 16-year-old Form 4 students participated. They took a standardized listening comprehension test at the beginning of the semester. Then, they received English language listening training on a virtual platform, facilitated by a teacher. This was followed by classroom discussions using a blended collaborative learning approach. Finally, they took the same post-test. Quantitative analysis compared scores before and after the intervention using t-tests and correlation analysis. The qualitative analysis involved thematic analysis of feedback surveys and interviews. The results showed significant improvement in listening skills and increased participation. Metaverse training also boosted self-confidence and enjoyment of listening materials among participants. This study contributes to understanding how the metaverse can enhance language learning, specifically listening skills.

**Keywords:** Listening skills, metaverse, immersive, blended collaborative learning

## 1. Introduction

Listening is a fundamental aspect of daily interactions, with numerous studies underscoring its significance in communication and educational settings. Imhof (2008) recommended allocating more class time to activities that focus on listening. Despite this, many language learning programs overlook listening skills development (Irma & Mohamad Jafre, 2020). For instance, in Malaysia, listening skills were only formally incorporated in the Sijil Pelajaran Malaysia (SPM) assessment in 2021. However, there is a growing concern that the emphasis on speaking abilities may overshadow the critical role of strong listening aptitude.

Traditional methods of improving listening skills, such as role-playing, lectures, and group discussions, have been effective, but they often fall short of providing an engaging and immersive learning experience that mirrors real-life listening situations (Lu et al., 2023).

Despite this, the teaching and learning of the English language in public high schools is constrained to just six credit hours per week, equivalent to around 3 hours over 42 weeks, which restricts the amount of time available for exposure to the language (Diana Purwati et al., 2023). Successful language learning necessitates regular exposure to the target language, such as listening and speaking the target language.

Without this exposure, the language learning process is constrained (Ismayatim et al., 2020). In contrast, Malay language instruction receives more instructional hours and is used widely, thereby contributing to better language proficiency.

Ismayatim et al. (2019) argue that current pedagogical methods for teaching listening skills, particularly in English language classes, are outdated. They claim that language classrooms often use non-authentic listening materials, like scripted audio recordings with non-native English speakers.

According to Kline and the ILA (2019), listening encompasses the interpretation of both verbal and nonverbal cues. There are four distinct types of listening: active, selective, empathic, and ignoring (Newton & Nation, 2021). Active listening surpasses mere hearing by striving for comprehension, while selective listening focuses on specific details. Empathic listening necessitates attentiveness and responsiveness, whereas ignoring listening reflects a lack of attention. Among these types, active listening is deemed the most effective, emphasising understanding and active engagement in communication.

Effective listening is crucial in personal and professional settings, impacting daily routines and work environments. In the corporate world, organisations prioritise employee listening skills and invest in training programs to improve them (Ryan, 2023), in line with the 4th Industrial Revolution. Proficient listening aids in comprehending and retaining added information for practical use (GGI Insights, 2024; Ryan, 2023). A lack of vocabulary and grammar knowledge can impede comprehension, underscoring the importance of intrinsic motivation in overcoming these challenges (Sri Ayu Handayani et al., 2023).

On the other hand, educators are highly encouraged to embrace blended learning to enhance students' listening comprehension skills. Blended learning is an instructional approach that merges interactive online resources with face-to-face classroom interactions to increase student engagement, address time and location constraints, and improve academic performance (Izquierdo Gracia et al., 2022; Sholihah et al., 2018). This flexible method, supported by technology, allows for feedback, collaboration, and personalised instruction (Syamsuddin & Jimi, 2019), thereby enhancing the overall educational process.

The study by Hidayat & Setiawan (2020) on the integration of virtual learning, online activities, and face-to-face discussions to enhance learning among language students indicates that the various activities implemented to improve participants' listening skills were beneficial, showing that the metaverse can stimulate student engagement and develop essential skills.

The Malaysian Education Development Plan recognises the potential of the Metaverse in revolutionising education (Kementerian Pendidikan Malaysia, 2018). By creating virtual identities and facilitating interactions (Narin & Aydın, 2021), the Metaverse promotes collaborative and blended learning through interactivity and physicality. It incorporates Virtual Reality and Augmented Reality to provide an immersive educational experience and innovative teaching methods (Kanematsu et al., 2014). Universities and companies like Facebook are embracing Metaverse technology (Ortega Rodríguez, 2022), with many universities worldwide already adopting it to enhance their educational approaches (Hirsh-Pasek et al., 2022). The Metaverse enhances student engagement by providing immersive experiences that go beyond physical limitations. Ongoing research explores ways to improve collaboration and communication within the Metaverse. The virtual environment promotes coexistence in learning settings without impacting real-world interactions (Jeong et al., 2021). Task-oriented scenarios in the Metaverse enhance oral communication skills and maintain engagement levels comparable to traditional classrooms (Jang, 2021). Digital human-based learning in the Metaverse has advanced teaching methodologies, with much research focusing on gender disparities and student

perspectives. Educators continue to play a crucial role in guiding the learning process (Narin & Aydın, 2021).

The Metaverse holds immense promise in transforming the realms of education, training, and entertainment (Basmah Issa, 2023). Through the utilization of virtual reality technology, there exists a unique opportunity to enhance listening comprehension skills (Lu et al., 2023). By immersing learners in realistic settings and providing them with interactive auditory training, their understanding and retention of information can be significantly improved (Thorne & Macgregor, 2018). Moreover, these interactive approaches cater to individual needs and ensure an elevated level of engagement. However, for Metaverse technology to be widely adopted, certain challenges such as cost, and program quality must be effectively addressed.

Recent research by Fan & Chiang (2023) has found that using virtual reality (VR) and the metaverse can improve listening skills training compared to traditional methods. This is because learners have better comprehension, memory retention, and engagement in a more immersive learning environment. Incorporating metaverse technology into English language learning can also lead to innovative engagement techniques and predict learners' academic success. However, online learning has challenges such as online fatigue and a potential decline in classroom instruction quality. To address these challenges, it is suggested to explore teaching approaches that combine online and offline platforms in a blended learning environment (Díaz, 2020). This includes establishing a strong connection between the platform and curriculum and integrating empathy and social skills education. Further investigation is needed to understand the relationship between online platforms and curriculum in blended learning settings.

Nevertheless, there are still areas of knowledge that necessitate further investigation, specifically regarding the influence of metaverse-based training on students' listening comprehension. While numerous studies have concentrated on English as a Foreign Language (EFL) learners, it is crucial to explore the impact on English as a Second Language (ESL) students to ensure generalizability. As the metaverse gains recognition in the realm of English language learning, research inquiries have emerged to assess the advantages and challenges of integrating it into language education. In the meantime, this research seeks to ascertain the efficacy of metaverse-based listening training by examining learners' engagement, retention, and comprehension, while also delving into the potential of the metaverse to create an immersive and captivating learning environment for the development of listening skills.

## 2. Research Methodology

### 2.1. Research Model

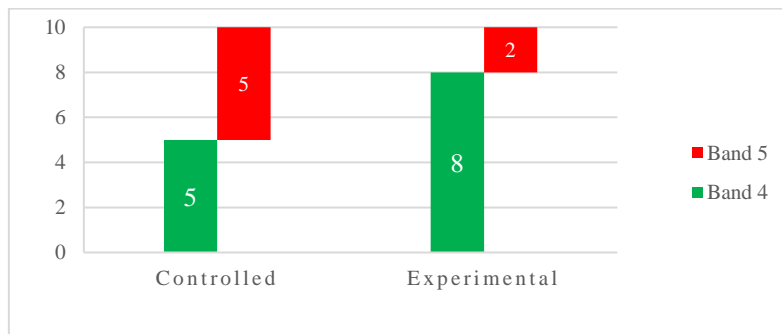
This study employs a randomised controlled trial (RCT) to evaluate the efficacy of utilising the metaverse as a means to improve listening skills. RCTs are widely regarded as the most reliable approach for assessing interventions, as they assign participants to various groups in a random manner, thereby minimizing the impact of extraneous variables.

### 2.2. Participants

The focus population of this study is adolescents currently attending a government-funded public high school in Johor Bahru, Malaysia. The target population includes individuals who meet specific criteria: aged sixteen, have English language proficiency ranging from CEFR level A2 to B1+, do not have any hearing impairments, are in Form 4, and own either an iPhone, iPad, or laptop with either Windows or iOS operating system. To obtain a representative sample, a simple random sample of 25% was chosen

from the large student population of the selected school, resulting in around eighty individuals who met the criteria to be included in the study. As a result, the sample size consisted of twenty individuals.

Figure 1 shows the distribution of participants based on their pre-test scores in a randomly assigned grouping for the research. Twenty participants took a CEFR-aligned listening examination, with slight differences in performance between the control and experimental groups. The control group had a balanced distribution, while the experimental group had more individuals in the B4 category than B5.



**Figure 1: Grouping Based on CEFR Achievement**

Table 1 shows participants' comfort with technology and preferences for technology-based learning, grouped accordingly. Both groups were confident in using technology and open to new advancements. The experimental group was more comfortable with virtual environments and interested in using metaverse for education. Both groups agreed that technology enhances learning and were eager to incorporate it into new educational settings.

**Table 1: Technology Comfort and Learning Preferences by Assigned Group**

Item	Scale	Controlled	Experimental
<b>I feel confident in using technology for various tasks.</b>	Strongly disagree	0	0
	Disagree	2	1
	Neutral	4	2
	Agree	4	7
	Strongly agree		
<b>I enjoy exploring new technologies and digital tools.</b>	Strongly disagree	0	0
	Disagree	1	0
	Neutral	4	2
	Agree	5	8
	Strongly agree		
<b>I am able to troubleshoot minor technical problems.</b>	Strongly disagree	0	0
	Disagree	3	4
	Neutral	5	3
	Agree	1	2
	Strongly agree		

<b>I am not afraid to ask for help when using technology.</b>	Strongly disagree	0	0
		1	0
	Disagree	2	1
	Neutral	2	4
	Agree	5	5
	Strongly agree		
<b>I am comfortable navigating virtual environments or metaverse platforms.</b>	Strongly disagree	0	0
		0	0
	Disagree	4	4
	Neutral	3	0
	Agree	3	6
	Strongly agree		
<b>I am open to trying out new Metaverse applications for educational purposes.</b>	Strongly disagree	0	0
		0	0
	Disagree	2	2
	Neutral	3	0
	Agree	5	8
	Strongly agree		
<b>I am excited to try new learning experiences using technology.</b>	Strongly disagree	0	0
		0	0
	Disagree	0	1
	Neutral	3	1
	Agree	7	8
	Strongly agree		
<b>I believe that technology can enhance learning experiences.</b>	Strongly disagree	0	0
		0	0
	Disagree	2	0
	Neutral	5	4
	Agree	3	6
	Strongly agree		

### 2.3. Data Collection Tool

To facilitate the intervention and gather data, a combination of physical and digital resources will be used in this research. Participants must have a smartphone or laptop with internet access for the pre-test and post-test assessments. If virtual reality headsets are unavailable, the study will continue without them. High-quality headphones or speakers will be provided for accurate completion of listening comprehension tests.

The Universe by ViewSonic platform will be utilized for its user-friendly interface and secure data storage. Participants will need an iPhone, iPad, or laptop with Windows or iOS to access this platform. A standardized listening comprehension test will be given as both the pre-test and post-test. Interactive audio exercises on the Metaverse platform will be used to improve active listening skills.

Virtual role-playing scenarios on Universe by ViewSonic will aim to enhance listening and communication skills. Participants will interact with virtual characters or other participants in real time.

Collaborative listening tasks will promote teamwork and shared learning. By combining physical and digital resources, this study aims to effectively improve listening abilities.

### 2.4. Collection of Data

The intervention was thoroughly evaluated using data from multiple sources. Standardized listening comprehension tests were conducted before and after the intervention to assess participants' pre-test and post-test scores. This quantitative data served as the primary measure of improvements in listening skills.

Data specific to the metaverse group was collected from the metaverse application, including login times and task scores. Analysing this data provided insights into participants' engagement patterns and overall involvement.

**Figure 2: Participants' Attendance in Session 3**



Performance data from the metaverse group, such as scores from interactive exercises and collaborative tasks, was examined to understand skill development within the metaverse environment.

A reflective feedback survey and face-to-face interviews were conducted with the metaverse group to gather qualitative data. This data offered valuable insights into participants' experiences with the metaverse platform and its impact on their listening skills.

### 2.5. Data Analysis

In this study, a blend of quantitative and qualitative data analysis techniques was utilized. The quantitative data analysis was conducted using SPSS version 29.0.2, while the qualitative data was examined using MAXQDA software.

### 2.6. Validity and Credibility

This study validates its findings using a mixed-methods approach. Quantitative analysis examines pre-test and post-test scores and in-app progress data, while statistical techniques like t-tests and correlation analysis enhance credibility. Qualitative data is gathered through interviews and surveys, exploring student experiences. The research instruments were reviewed by an expert. Integrating quantitative and qualitative data enhances credibility, but the small sample size of twenty participants limits generalizability.

## 3. Findings

The main finding of this investigation is a strong positive correlation (0.464) between the assigned groups and post-test scores. This suggests that using the metaverse for listening exercises is linked to higher scores in the final listening comprehension assessment. This correlation highlights the connection



between using the metaverse for listening exercises and achieving better scores on the listening comprehension exam.

**Table 2: Correlations**

		<b>Login ses- sions</b>	<b>Login duration</b>	<b>In-app score</b>	<b>Pre-test marks</b>	<b>Post-test marks</b>	<b>Assigned group</b>
<b>Login sessions</b>	Pearson cor- relation	1	.918**	.636*	.104	.184	.c
	Sig. (2-tailed)		.000	.048	.775	.611	.000
	N	10	10	10	10	10	10
<b>Login duration</b>	Pearson cor- relation	.918**	1	.602	-.075	.161	.c
	Sig. (2-tailed)	.000		.066	.836	.656	.000
	N	10	10	10	10	10	10
<b>In-app score</b>	Pearson cor- relation	.636*	.602	1	.200	.342	.c
	Sig. (2-tailed)	.048	.066		.580	.334	.000
	N	10	10	10	10	10	10
<b>Pre-test marks</b>	Pearson cor- relation	.104	-.075	.200	1	.413	-.302
	Sig. (2-tailed)	.775	.836	.580		.070	.196
	N	10	10	10	20	20	20
<b>Post-test marks</b>	Pearson cor- relation	.184	.161	.342	.413	1	.464*
	Sig. (2-tailed)	.611	.656	.334	.070		.040
	N	10	10	10	20	20	20
<b>Assigned group</b>	Pearson cor- relation	.c	.c	.c	-.302	.464*	1
	Sig. (2-tailed)	.000	.000	.000	.196	.040	
	N	10	10	10	20	20	20

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

c Cannot be computed because at least one of the variables is constant.

Table 2 shows strong positive correlations between login frequency and session duration (0.918), login frequency and in-app scores (0.636), and session duration and in-app scores (0.602). This suggests that individuals who logged in more often had longer sessions and higher scores. There is also a moderate positive correlation between higher initial scores and improvements (0.413) regardless of group assignment.

The correlation coefficient between "Assigned Group" and pre-test and post-test marks is a perfect 1.000, indicating a flawless linear relationship. The p-value for both correlations is 0.002, well below the conventional threshold of 0.05, showing a statistically significant relationship. The perfect correlation suggests that assigned groups accurately predict test scores. The low p-value implies this relationship is unlikely to occur by chance.

The weak correlation (0.342) between in-app scores and post-test marks suggests a lack of clear connection between training program performance and listening comprehension test results. To further investigate, interviews were conducted. An independent-sample t-test was used to compare standardised listening comprehension assessment scores before and after the intervention in both the metaverse and control groups to determine the significance of improvement.

**Table 3: Group Statistics**

	Assigned Group	N	Mean	Std. Deviation	Std. Error Mean
<b>Pre-test Marks</b>	Controlled	10	19.10	2.079	.657
	Experimental	10	17.90	1.912	.605
<b>Post-test Marks</b>	Controlled	10	19.00	3.559	1.125
	Experimental	10	22.70	3.889	1.230

The findings reveal that the control group had a slightly higher average pre-test score (19.10) compared to the experimental group (17.90). However, the standard deviations show some degree of variability within each group. Conversely, the average post-test score for the experimental group (22.70) significantly exceeded that of the control group (19.00), indicating an improvement in listening comprehension skills for the experimental group after the intervention. The standard deviations for post-test scores (3.559 and 3.889) also suggest variability within both groups.

Levene's Test was employed to evaluate the homogeneity of variances, specifically the equality of variances, between the metaverse and control groups in terms of their pre-test and post-test scores. The null hypothesis (H<sub>0</sub>) for Levene's Test posits that the variances of the two groups are indeed equal.

The outcomes of Levene's Test based on Table 4 indicate that there is no statistically significant difference in variances for both the pre-test (F = 0.468, Sig. = .503) and post-test scores (F = 0.049, Sig. = .828). This suggests that the variances of the pre-test and post-test scores can be considered equal across both the metaverse and control groups.

Levene's test indicated equal variances (p = .503) in Table 4, supporting the use of pooled variance. The independent-sample T-test revealed similar baseline listening comprehension skills before the intervention, but a significant difference between groups (p = .040) post-intervention. The metaverse group outperformed the control group in post-test score increases, supporting the first hypothesis and Jehma and Akaraphattanawongin's 2023 study.

The significant difference in post-test scores (p = .040) allows us to reject the null hypothesis, showing that individuals in the metaverse intervention group experienced greater improvement in listening comprehension skills compared to those in the control group. These results support the effectiveness of the metaverse intervention in enhancing listening comprehension skills.

**Table 4: Independent Samples Test**

	Levene's Test for Equality of Variances		t-test for Equality of Means					
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the



									Difference	
									Lower	Upper
<b>Pre-test Marks</b>	Equal variances assumed	.468	.503	1.344	18	.196	1.200	.893	-.677	3.077
	Equal variances not assumed			1.344	17.875	.196	1.200	.893	-.677	3.077
<b>Post-test Marks</b>	Equal variances assumed	.049	.828	- 2.220	18	.040	-3.700	1.667	-7.202	-.198
	Equal variances not assumed			- 2.220	17.861	.040	-3.700	1.667	-7.204	-.198

**Table 5: Motivation for Improving Listening Skills**

	Assigned Group	N	Mean	Std. Deviation	Std. Error Mean
<b>Pre-test Motivation</b>	Controlled	10	4.80	.422	.133
	Experimental	10	4.80	.422	.133
<b>Post-test Motivation</b>	Controlled	10	4.50	.527	.167
	Experimental	10	4.90	.316	.100

Table 5 shows survey results on motivation to improve listening skills, grouped by categories. Both groups had similar high motivation levels (average score of 4.80) at the start of the research. However, the experimental group had a slightly higher motivation score (4.90) compared to the control group (4.50) for improving listening skills. This indicates that using the metaverse may offer an advantage in enhancing listening abilities.

**Table 6: Confidence in Succeeding**

	Assigned Group	N	Mean	Std. Deviation	Std. Error Mean
<b>Pre-test Confidence</b>	Controlled	10	4.50	.527	.167
	Experimental	10	4.50	.850	.269
<b>Post-test Confidence</b>	Controlled	10	4.60	.516	.163
	Experimental	10	4.60	.316	.100

Table 6 shows the survey responses' descriptive statistics on confidence levels in achieving success in the research study. Both groups had an average score of around 4.50 before the intervention, indicating similar baseline confidence levels. In the post-test survey, the experimental group had a higher average score of 4.90 compared to the control group's 4.60, suggesting that the experimental group felt more confident after the study.

**Table 7: English Comprehension Proficiency**

	Assigned Group	N	Mean	Std. Deviation	Std. Error Mean
<b>Pre-test Comprehension Confidence</b>	Controlled	10	4.70	.483	.153
	Experimental	10	4.20	.919	.291
<b>Post-test Comprehension Confidence</b>	Controlled	10	4.30	.823	.260
	Experimental	10	4.80	.422	.133

**Table 8: Listening to Multi-Speaker Conversations**

	Assigned Group	N	Mean	Std. Deviation	Std. Error Mean
<b>Pre-test Multi-speaker Confidence</b>	Controlled	10	4.70	.483	.153
	Experimental	10	4.20	.919	.291
<b>Post-test Multi-speaker Confidence</b>	Controlled	10	4.30	.823	.260
	Experimental	10	4.80	.422	.133

The study found that metaverse-based listening training improved English listening abilities. Initially, the control group had a slightly higher average score in understanding spoken English, but the experimental group showed higher self-assurance and ease in comprehending spoken English at a regular pace in the follow-up assessment. The experimental group also found it easier to track conversations with multiple speakers compared to the control group. Overall, metaverse listening training had a beneficial impact on self-assurance and ease in following conversations with multiple speakers.

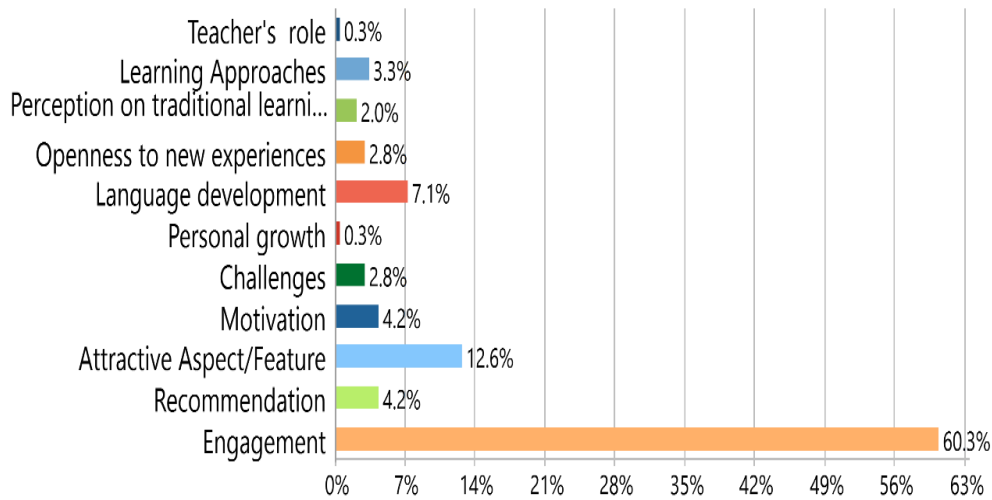
**Table 9: Belief in Listening Ability**

	Assigned Group	N	Mean	Std. Deviation	Std. Error Mean
<b>Pre-test Effective Listening Ability</b>	Controlled	10	3.70	1.059	.335
	Experimental	10	3.50	1.179	.373
<b>Post-test Effective Listening Ability</b>	Controlled	10	4.30	.823	.260
	Experimental	10	4.60	.516	.163

Table 9 examines how metaverse-based listening training may impact participants' self-reported confidence in effective listening. The control group had a slightly higher average confidence score during the pretest (M = 3.50, SD = 1.179) than the experimental group. However, both groups saw an increase in confidence, with the experimental group reporting a higher average score in the post-test (M = 4.60, SD = .516) than the control group (M = 4.30, SD = .823). These findings suggest that metaverse listening training may have a positive effect on participants' confidence in effective listening.

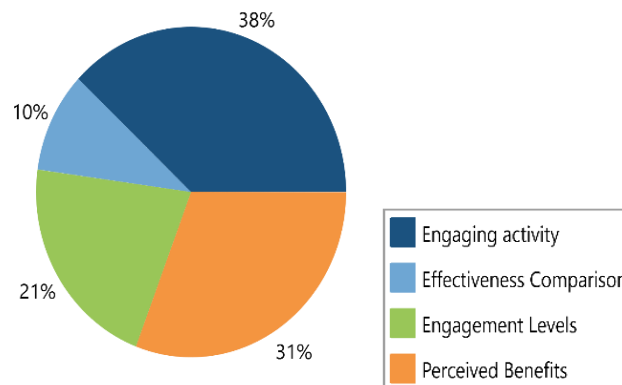
The qualitative investigation explored participants' experiences with the intervention and their views on the metaverse as a learning environment to enhance listening skills. MAXQDA software facilitated the analysis of responses from surveys and interviews. Thematic analysis was conducted on the data, segmenting feedback based on key themes related to the intervention's impact, engagement, motivation, and overall experience. Similar codes were clustered into broader thematic categories using MAXQDA's memo feature. Categorising feedback into these codes provided valuable insights into the efficacy of listening skills and metaverse training programs.

**Figure 3: Qualitative Code Percentage**



Upon careful examination of the qualitative code system (Figure 3), it was determined that the code representing engagement had the highest frequency at 60.3%, while motivation was recorded at 4.2%. The repetition of both codes was observed to be notably elevated.

**Figure 4: 'Engagement' Code Statistics**



The implementation of metaverse intervention for listening practice, offered by Universe by ViewSonic, has proven to be an enthralling and enjoyable experience for participants.

P12: The visuals and interactions in the metaverse made listening exercises more enjoyable.

The immersive environment, integration of interactive elements, and challenges maintained their interest. The application took an interactive and practical approach, providing a wide range of listening exercises and opportunities to practice in authentic scenarios.

P2: ... was really engaging and interactive.

P10: ... part of a futuristic experience, which kept me engaged.

Participants reported increased confidence in understanding accents and speech patterns, as well as actively engaging in real-time conversations.

P9: ... unique way to practice listening, making it easier for me to pick up on different accents and patterns.

The metaverse intervention resembled a game or expedition, making the learning process enjoyable and effective in enhancing technical and social skills. This innovative approach offered by Universe by ViewSonic presented a distinct means of improving English listening skills and boosting self-assurance.

P14: ... to enhance travel experiences, interact with destinations, and connect with others virtually intrigued me and made me curious about the future of travel.

In conclusion, metaverse training provided a unique pathway for refining listening comprehension abilities, facilitating group tasks and virtual conversations, and offering a practical and captivating method to enhance skills.

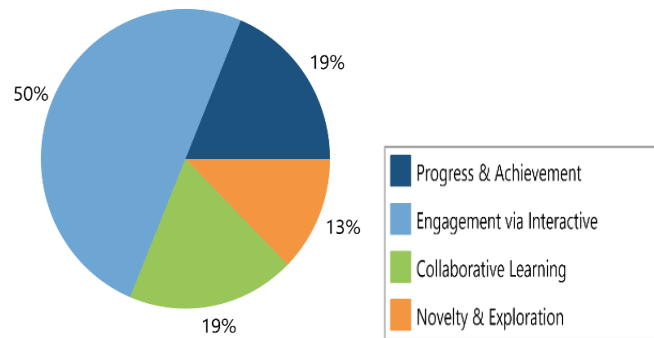
P3: ... which helped me get better at listening.

P8: ... enabled me to concentrate better on listening and understanding English...

P20: ... the best because it made learning English so much more exciting and interactive than the usual ways.

The hands-on nature of metaverse training offers a practical approach to enhancing listening abilities, making the training both informative and enjoyable. As a result, learners have gained the confidence to tackle more complex English listening materials with ease.

**Figure 5: ‘Motivation’ Code Statistics**



The utilization of the metaverse in interactive learning is found to be both engaging and motivating for language learners. Feedback from participants indicated that the interactive and immersive learning environment contributed to the improvement of their listening skills, transforming the learning process into an enjoyable game rather than a monotonous study session. The opportunity to practice listening in virtual settings added an element of excitement to the learning experience. Overall, metaverse training was perceived as a more effective and enjoyable approach to learning when compared to traditional methods.

P12: The interactive metaverse training kept me engaged and motivated during my listening practice sessions.

P13: ... I got to practice listening in virtual places, which made learning way more exciting.



**Figure 6. Discussion Activities in Universe**



**Figure 7. Discussion Activities in Universe**

The use of the metaverse for collaborative learning is identified as engaging and interactive. Collaborating with peers was enjoyable, and participants found it more thrilling and engaging than conventional learning methods.

P2: ... listen to virtual conversation and discuss the projects ... in the breakout room with friends, which made the learning really exciting.

Metaverse training has proven to be a significant source of motivation for participants, primarily due to its gamified approach and incorporation of rewards and challenges. As participants accumulated points and witnessed improvements in their listening abilities, they experienced a sense of achievement and progress. In comparison to traditional methods, this training offered a more captivating and stimulating experience, allowing individuals to enjoy the learning process while having fun.

P6: ... it had rewards and challenges that kept me interested.

P10: ... kept me motivated because I got rewards and played games...

**Figure 8: Mock Presentation during Session 4**



Participants were intrigued by the potential impact of the metaverse on their ability to listen effectively. They were eager to enhance their English language proficiency through an enjoyable learning experience.

P2: ... thrilled to give something new a shot and enhance my English skills...

To further improve future metaverse learning experiences, it is important to investigate the specific features or functionalities within the metaverse that contributed the most to engagement. By analysing more comprehensive data, as shown in Table 10, a clearer understanding of how the metaverse influences motivation and engagement in listening skills practice can be gained.



**Table 10. Code Reoccurrences Based on Favoured Intervention Activities**

Code system	Planning trip	Travel reflection	All
<b>Motivation</b>	3	2	3
<b>Motivation &gt; Progress &amp; Achievement</b>	0	0	2
<b>Motivation &gt; Engagement via Interactive Learning</b>	2	0	2
<b>Motivation &gt; Collaborative Learning</b>	0	2	0
<b>Motivation &gt; Novelty &amp; Exploration</b>	0	1	0
<b>Engaging activity &gt; Why engaging</b>	4	2	3
<b>Why engaging &gt; Interactive</b>	0	0	0
<b>Why engaging &gt; Immersive</b>	0	0	0
<b>Engaging &gt; Topic</b>	1	1	2
<b>Engaging &gt; Activity</b>	2	0	1
<b>Why engaging &gt; Fun</b>	3	0	2
<b>Why engaging &gt; Personal growth and reflection</b>	0	2	0
<b>Why engaging &gt; Creativity</b>	2	0	0

Several participants were motivated by factors such as "Progress & Achievement" and "Fun," supporting the research hypothesis, as presented in Table 10. Additionally, a couple of participants found motivation in "Personal growth and reflection," suggesting that the metaverse may have facilitated a deeper level of learning beyond basic listening skills practice, as Yang et al. (2024) suggested.

The frequency of "Topic" mentions in engagement, suggests that the listening practice topics in the metaverse were appealing to the participants. Overall, the data indicates that the metaverse effectively promotes motivation and engagement in listening practice, with participants finding motivation in progress, achievement, and enjoyment, as well as interacting with specific activities and topics, supporting the findings of Jehma & Akaraphattanawong’s (2023) research.

**4. Discussion**

Combining quantitative and qualitative analysis, it was found that the experimental group showed increased engagement and motivation in improving their listening skills. Both groups expressed an ardent desire to enhance their listening abilities. The experimental group also showed a greater enthusiasm for innovative learning methods after the intervention. This could be attributed to their exposure to the intervention. Initially, both groups had similar levels of confidence in the research project's success. At post-test evaluation, the experimental group displayed higher self-assurance in their accomplishments than the control group. This suggests an improvement in motivation and engagement due to the metaverse intervention. The research also highlighted a notable difference between the two groups in terms of overall motivation or perceived changes in motivation.

In the qualitative study, many participants shared their involvement in the metaverse and recognized its benefits. This suggests that the metaverse was appealing and valuable to the participants (Kamsulbahri & Norman, 2024). These findings align with the quantitative analysis, which showed that the experimental group experienced a significant increase in enjoyment from the listening materials. Student engagement is important for academic success, and interactive learning methods on Universe by ViewSonic indicate that users find it captivating.

The experimental group had higher motivation levels compared to the control group aligning with Lam & Norman (2024)’s study. This supports the advantage of using the metaverse in listening training.



Interactive activities were identified as a key motivating factor, aligning with the research hypothesis. Quantitative analysis showed that the experimental group improved their confidence levels for understanding English spoken at a standard pace, by different speakers, and with various accents. They also improved in grasping vital details and listening attentively.

The motivation codes focused on progress and achievement, with the metaverse tracking progress while celebrating accomplishments to motivate learners. At the same time, 21% of respondents' responses emphasized engagement levels, the higher percentages related to activities and benefits provided more information. Deutschmann et al. (2009); Wortley and Lai (2017) suggest role-play-based activities in the Metaverse world which proved effective in online teaching. In this research, role-playing exercises generated high engagement and enthusiasm.

The numerical data shows moderate positive correlations between login frequency, duration, and in-app scores. Those who logged in more frequently and spent longer online achieved higher scores. There is also a strong relationship between login frequency and overall duration, indicating dedication to learning. This finding is supported by Onu et al. (2023).

The correlation between login duration and post-test scores in the educational context of the metaverse suggests a need for improvements in learning experience design, as noted by Jehma & Akaraphattanawong (2023). Introducing more engaging and personalized activities is crucial for promoting active learning and improving listening comprehension skills in the metaverse, as emphasized by GGI Insights (2024). This discovery aligns with Hidayat & Setiawan's (2020) investigation found that learning preferences and technological proficiency impact an intervention's effectiveness. Some participants faced challenges with virtual reality headsets, such as navigating the platform and connectivity issues. Device compatibility restrictions also limited eligible participants, affecting result generalizability.

Therefore, it can be concluded that increased interaction with the program leads to improved performance, as highlighted by Dwivedi et al. (2022). The collaborative activities conducted on the metaverse platform were highly enjoyable for all members of the experimental group. Students expressed a desire to work together on the platform to create a holiday package for their teacher, which they later presented in class while roleplaying as travel agents. Placing students in authentic learning environments where they actively use the target language helps them connect the language with real-life situations, resulting in a deeper understanding and appropriate usage of the language (Wortley & Lai, 2017).

The low percentage of novelty and exploration suggests that the metaverse experience was not entirely new for all participants. While novelty can initially motivate, it may decrease over time (Shin et al., 2019). Therefore, participants' commitment to the metaverse approach can be ensured for the short term. The findings indicate that the metaverse has the potential to enhance motivation and engagement in listening practice. Participants showed interest in the activities, recognized the benefits of using the metaverse, and found interactive tasks motivating. This study also suggests that the metaverse can improve students' perception of its effectiveness as an educational tool, as demonstrated by Lam & Norman (2024; Mohd Ridhuan & Norman, 2023; Talan & Kalinkara, 2022). Furthermore, the results highlight the effectiveness of metaverse-based listening training in increasing motivation and engagement levels among participants, as supported by Çelik & Baturay (2024). This could generate greater interest in innovative learning methods and potentially boost students' confidence in their progress.

As suggested by Çelik & Baturay (2024), Universe by ViewSonic used in the study may not be suitable for improving listening comprehension skills. Some weak correlations observed could indicate that the chosen tool does not cater to the diverse learning preferences of all participants as claimed by Dwivedi et al. (2022). Alternative methods may be more beneficial for students of different learning styles.

Participants struggled with the new educational tool due to a lack of familiarity with the technology, hindering their involvement and motivation. The study's small sample size makes it difficult to conclude. The Universe platform lacks resources compared to other metaverse platforms, limiting its usefulness for educators. Testing options are limited, leading researchers to use a blended learning approach. While metaverse listening training improved confidence and enjoyment, more research is needed to evaluate motivation and engagement for stronger conclusions on effectiveness.

## 5. Recommendations and Conclusions

Based on the findings of the study, researchers have outlined several recommendations for further research in the field of metaverse-based listening skills training. These recommendations include increasing the sample size in future studies to improve the generalizability of results and to better identify weaker trends. Additionally, it is suggested that objective listening comprehension tests be included, motivation and engagement be directly evaluated, and a longitudinal study design be employed to assess long-term effects.

In order to identify the specific elements within the metaverse environment that contribute to potential benefits, it is advised that future research focus on exploring interactivity, immersive features, and specific functions that enhance the overall learning experience. Furthermore, to provide a more accurate assessment of the effectiveness of the metaverse approach, researchers should consider introducing a control group that undergoes traditional listening skills training methods for comparative analysis.

Future studies could also delve into investigating the causal mechanisms behind the enhanced learning experiences observed in metaverse training to gain valuable insights for optimizing the training process. It is important to note that the impact of metaverse training is not solely dependent on the amount of time spent logged in, but rather on the quality of focused activities and carefully curated experiences within the metaverse.

The metaverse has the potential to revolutionize education by providing immersive and interactive learning experiences that cater to the unique needs of students. By incorporating virtual classrooms, projects, presentations, lectures, and labs, the metaverse not only enhances listening skills but also promotes interactive engagement, stimulates creativity, deepens comprehension, and fosters collaboration.

To summarize, the metaverse holds immense potential to revolutionize education through its ability to offer personalized and immersive learning opportunities. It not only improves listening skills but also fosters interactive participation, creativity, comprehension, and collaboration. Research suggests that the metaverse significantly influences listening comprehension and student engagement. However, further investigation is required to assess the long-term effects of these interventions, their effectiveness for diverse learners, and the establishment of inclusive practices within the metaverse for educational purposes. By addressing these research gaps, educators can effectively utilize the educational prospects of the metaverse to create captivating and impactful learning experiences that cater to all students. It is important to note that the impact of metaverse training is not solely determined by the amount of time

spent logged in, but rather by purposeful activities and carefully curated experiences within the metaverse.

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