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Developing Interactive Listening Materials Using Quiz Bot Telegram for EFL Learners

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Abstract

Listening is one of the essential skills in EFL learning, yet students often face difficulties due to limited interactive resources. This study aimed to develop interactive listening materials through a Telegram Quiz Bot using the Research and Development (R&D) approach based on the ADDIE model. The participants were 17 students of the English Education Study Program at Universitas PGRI Wiranegara in the 2024/2025 academic year. The development process began with an analysis of students' needs, whichh revealed challenges in understanding accents and limited access to engaging materials. In the design stage, twelve listening topics were created, each including text to speech (TTS) audio, worksheets, and interactive quizzes. The development stage involved transforming these materials into a Telegram Quiz Bot integrated through BotFather and validated by content and media experts to ensure accuracy, clarity, and usability. After revision, the product was implemented over nine sessions, during which students accessed and completed listening activities through the bot. Observation showed that students could use the bot effectively and were actively engaged. Questionnaire results indicated that students responded positively, highlighting the bot's interactivity, flexibility, and instant feedback features. Overall, the study concludes that the Quiz Bot Telegram is a feasible and practical tool for developing interactive listening materials. It enhances learning motivation, supports independent study, and demonstrates how technology, pedagogy, and content can be integrated effectively in EFL contexts.

Keywords: Material development, EFL learners, Listening materials, Telegram, Quiz Bot

Introduction

The advancement of digital technology has brought significant changes to education, especially in higher education where students are expected to develop global competencies. Conventional teaching methods, while still relevant, often fail to meet the learning styles of today's digital-native students. To respond to this challenge, educators are encouraged to integrate technology in ways that are meaningful and pedagogically sound. Mishra (2006), through the TPACK framework, argue that effective technology use requires the integration of content, pedagogy, and technology. In language education, this integration can create more interactive and flexible learning opportunities, particularly for skills that are traditionally difficult to teach, such as listening.

Listening is a core skill in English as a Foreign Language (EFL) learning because it provides the input necessary for the development of speaking, reading, and writing. Yet, it is also one of the most challenging skills for learners. Richards (2017) explains that listening instruction should train students in identifying main ideas, details, and discourse patterns. Field (2010) suggests structuring listening lessons into pre-, while-, and post-listening stages, while Vandergrift (2021) emphasize the

importance of using contextual and meaningful materials. Despite these insights, many EFL learners continue to struggle due to fast speech, unfamiliar accents, and limited vocabulary. Psychological barriers such as low confidence and anxiety further hinder their comprehension (Graham, 2017). At the same time, teachers often rely on outdated or limited resources, and authentic listening materials are not always easy to access (Gilakjani, 2016). This creates a gap between the ideal practice of listening instruction and the reality in the classroom.

To address these issues, mobile learning and microlearning have been increasingly recognized as effective approaches. Crompton (2019) highlights that mobile learning allows students to access materials anytime and anywhere, while Jahnke et al. (2020) note that microlearning delivers content in small, focused units that are easier to retain. Combining these approaches can provide EFL learners with short, engaging listening practices that fit naturally into their daily lives. One promising tool that reflects these principles is Telegram, a messaging platform that supports multimedia sharing and the use of bots. Through a Quiz Bot, teachers can deliver listening tasks, quizzes, and instant feedback, turning passive listening into an interactive activity. Research by Hidayat et al. (2021) and Istiqomah (2021) shows that Quiz Bots can enhance student motivation and engagement, making them valuable tools for language learning.

The use of Telegram Quiz Bot also aligns with the principles of Merdeka Belajar Kampus Merdeka (MBKM), which promotes student-centered and flexible learning. By providing interactive materials accessible on students' own devices, this approach supports autonomy and encourages learners to take responsibility for their progress. It also enables teachers to act more as facilitators rather than sole knowledge providers.

Some previous studies have discussed the use of Telegram in English learning. Abu-Ayfah (2020) found that students had positive views about using Telegram to learn vocabulary and grammar because it was easy to use and interactive. Likewise, Aisyah et al. (2021) found that Telegram helps EFL teachers apply the TPACK framework in classroom practice. However, these studies mainly focused on students' and teachers' perceptions, not on developing interactive listening materials.

This study develops and improves a previous Telegram Bot, called @UnderstandingTalks_UNIWARAbot, which only provided text to speech (TTS) listening materials. In this research, the bot was redesigned into an interactive Quiz Bot that combines TTS-based audio with listening quizzes, automatic scoring, and instant feedback. This development changes Telegram from a simple listening tool into an interactive learning platform that supports digital pedagogy, microlearning, and mobile-assisted language learning.

Based on these ideas, this study aims to develop interactive listening materials for EFL learners through Telegram Quiz Bot. The objectives are to describe the development process using the ADDIE model and to evaluate students' responses to the product. The developed materials combine text to speech audio with interactive quizzes that provide instant feedback and scores. Practically, this study offers teachers a model of digital listening materials that are more engaging and suitable for EFL learners. Theoretically, it shows how frameworks such as TPACK, digital pedagogy, mobile learning, and microlearning can be applied in real classroom contexts. The novelty of this study lies in the improvement of a previous Telegram Bot into an interactive Quiz Bot, providing new ways to teach listening through a platform that is familiar, accessible, and motivating for students.

Methods

This study used Research and Development (R&D) method with the ADDIE model, which consists of five stages: Analysis, Design, Development, Implementation, and Evaluation (Branch, 2009). The research was conducted in the English Education Study Program of Universitas PGRI Wiranegara during the academic year 2024/2025 with 17 students from the Listening class as the participants. The study took place from June to July 2025. The participants were selected purposively because they were the intended users of the developed materials.

To make the research process clearer and more systematic, the activities and objectives of each stage are summarized in below.

Table 1. The ADDIE Model Procedures and Objectives

Stage	Activities Conducted	Objectives
Analysis	Data were collected through classroom observation, syllabus review, and student interviews to identify learning needs, listening difficulties, and learning preferences. Instruments used included an observation checklist, syllabus analysis sheet, and semi-structured interview guide.	To identify students' learning needs and challenges as the foundation for developing the materials.
Design	Twelve listening topics were prepared based on the syllabus. Each topic contained TTS-based audio input, worksheets, and true/false quizzes with time limits. A material design blueprint and expert validation form were used to ensure the content sequence and instructional quality.	To design the structure, content, and flow of the listening materials and ensure alignment with course objectives.
Development	The listening texts were transformed into audio using text to speech (TTS) technology and integrated into a Telegram Quiz Bot through BotFather. Validation was conducted by two experts: a content expert (Head Lecturer of the English Education Study Program) and a media expert (Mediazone edupreneur). Their feedback was used to revise and improve the prototype.	To develop and refine the Telegram Quiz Bot and ensure content accuracy and technical functionality.
Implementation	The implementation took place on 7 July 2025 with 17 students in a classroom setting. Students accessed and completed the listening quizzes using their smartphones. Data were collected using a student response questionnaire and an implementation observation sheet.	To test the practicality, usability, and student engagement in using the developed materials.
Evaluation	Both formative and summative evaluations were conducted. Formative evaluation used students' quiz results, while summative evaluation was based on a questionnaire about their overall responses. All instruments were validated and piloted before use. Quantitative data were analyzed descriptively, and qualitative data were analyzed thematically	To evaluate the effectiveness, practicality, and student satisfaction toward the developed product.

Adapted from the ADDIE model (Branch, 2009).

This presentation clearly outlines the sequence and objectives of each ADDIE stage, allowing readers to understand how the product was systematically developed, tested, and evaluated.

According to Sugiyono (2019), questionnaire data can be analyzed descriptively by calculating the percentage of each response to show the tendency of respondents' answers. Similarly, Riduwan (2012) explains that percentage analysis is one of the simplest and most effective ways to describe data distributions in quantitative research.

$$P = \frac{f}{N} \times 100\%$$

Figure 1. Formula for Percentage Analysis

Description:
P = percentage of responses
f = frequency of respondents choosing a certain option
N = total number of respondents

According to Riduwan (2012), the percentage of questionnaire responses can be categorized into levels of interpretation to describe the tendency of respondents' answers. The categories are generally as follows:

Table 2. Interpretation of Percentage Results

Percentage (%)	Interpretation
0% - 20%	Very Low
21% - 40%	Low
41% - 60%	Moderate
61% - 80%	High
81%% - 100%	Very High

This categorization is used to describe the level of student response more clearly. Overall, the flow of development carried out in this study is presented in Figure 2

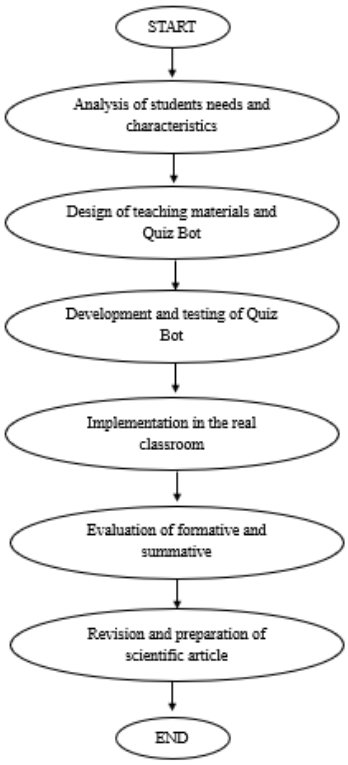


Figure 2. Flowchart of ADDIE Development Model

Result

The development process followed the ADDIE model, and the result of each stage are explained below.

1. Analysis Stage

The analysis was carried out through classroom observation on 16–21 June 2025 and student interviews on 23 June 2025 with five participants from the English Education Study Program at Universitas PGRI Wiranegara. The observation showed that many students faced difficulties in understanding different accents and intonation in listening activities. They often failed to catch the main idea of spoken texts, and the activities felt monotonous because they only listened to recordings without much interaction. This lack of variety reduced their motivation and made them less active during class.

The interviews confirmed these findings. Several students (R1, R2, R3, R4) said that the audio used in class was not clear and the time to answer questions was too short. They also wished for materials that could be accessed through their smartphones and supported independent learning (R2, R4). One student explained, “If the audio was clearer and the time was longer, I could do better” (R3, Interview, 23 June 2025). Another added that learning would be more interesting if the materials were interactive and available online (R4). These findings indicate that students not only needed listening

materials that were flexible, interactive, and capable of providing instant feedback, but also media that offered clear and high quality audio to support better comprehension during listening tasks.

2. Design Stage

After the analysis, the design was completed in late June 2025. A total of 12 listening topics were selected, such as Describing Personality, The Power of Music, Movie Review, and Google Classroom vs. Telegram. Each topic included three parts: (1) an audio track, (2) a worksheet, and (3) a quiz in the Quiz Bot with 10 true/false questions and a two-minute limit. The structure was made simple but systematic so that students could practice step by step. This design was developed based on the results of the needs analysis and guided by the listening teaching framework proposed by Field (2010), which emphasizes pre-, while-, and post-listening stages. The integration of audio, worksheets, and quizzes also referred to the principles of interactive learning and microlearning (Jahnke et al., 2020), allowing learners to receive input, practice, and immediate feedback in short and manageable cycles.

Table 3. Teaching Material Topics

No.	List of Materials
1.	Describing Personality
2.	My Best Friend
3.	My Favorite Thing
4.	Thing that Makes Me Happy
5.	Place I Want to Visit
6.	What Memories from the Photograph?
7.	The Power of Music
8.	Compare & Contrast
9.	Movie Review
10.	A Letter to Celebrity Crush
11.	Google Classroom VS Telegram
12.	E-Learning Minimize Teachers' & Students' Interaction

The design also focused on helping students stay engaged. The audio provided input, the worksheet gave practice, and the quiz tested their understanding with instant feedback. Telegram was chosen because it is already familiar to students and allows easy access to multimedia content. With this design, the materials were expected to be more motivating and aligned with the course learning outcomes.

3. Development Stage

The development took place from 24 June to early July 2025. Audio materials were produced using luvvoice.com, a text to speech (TTS) website that generates clear and natural voices. The quiz items were then entered into Quiz Bot through BotFather, resulting in a customized bot named Understanding Talks – UNIWARA. The bot menus included Description, List of Materials, Track, Worksheet, and Quiz.

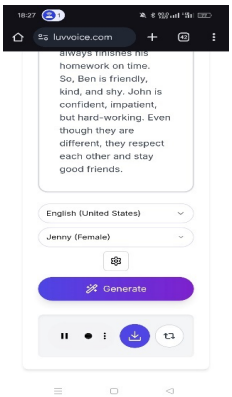


Figure 3. Website luvvoice.com

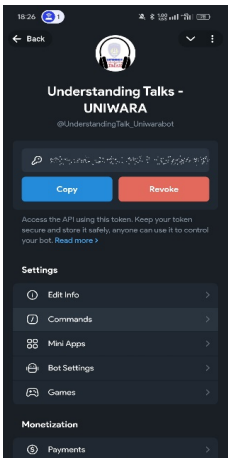


Figure 4. BotFather as a Telegram Bot Controller

Students could move easily between menus. For example, they could listen to the audio in Track, try exercises in Worksheet, and then answer the quiz in Quiz. The quizzes were short and interactive, with immediate feedback.

After the product was developed, it was validated by two experts: a material expert and a media expert. The validation aimed to evaluate the feasibility of the developed interactive listening materials and the Telegram Quiz Bot as a learning medium. The assessment used a 5-point Likert scale (1 = Very Poor, 5 = Excellent). The results are summarized in table 4.

Table 4. Expert Validation Results

No.	Aspect of Validation	Validator	Percentage (%)	Category	Remarks
1.	Material Validation	Head of the English Education Study Program Universitas PGRI Wiranegara	100	Very High (feasible)	The materials are fully relevant to learning objectives, linguistically accurate, and pedagogically appropriate. No revision required.
2.	Media Validation	Mediazone	90	Very High (feasible)	The Quiz Bot is easy to use, interactive, and engaging. Minor revision suggested for clearer instructions and more audio variety.

The validation results Indicate that both the content and media of the Quiz Bot achieved high levels of quality. The 100% score in material validation confirms that the instructional design, content quality, and learning objectives are fully aligned with EFL listening pedagogy. The 90% score in media validation shows that the Quiz Bot meets usability and functionality standards with only minor improvements needed. Based on the average percentage of 95%, the overall feasibility level of the developed product is categorized as very feasible for classroom implementation.

4. Implementation Stage

The implementation phase focused on applying the developed Quiz Bot in an authentic classroom setting to examine its practicality and usability. This stage was conducted over nine sessions from 7 July to 4 August 2025 with 17 students of the English Education Study Program at Universitas PGRI Wiranegara. At the beginning of the implementation, students were introduced to the Telegram-based Quiz Bot entitled Understanding Talks – UNIWARA and guided step by step to activate and access the available menus, which consisted of Description, List of Materials, Track,

Worksheet, and Quiz Bot. The lecturer demonstrated how to navigate through the menus and explained how each feature was used to support listening activities.

During the implementation, students participated in regular sessions that integrated the developed materials into the learning process. Each meeting followed a consistent procedure in which students first opened the relevant topic through the List of Materials menu and accessed the audio in the Track section. After listening to the text to speech (TTS) audio, they continued with short comprehension exercises provided in the Worksheet menu. Subsequently, they completed the interactive quiz in the Quiz Bot menu, which contained ten true-or-false questions designed to assess their understanding of the listening passage. The Telegram system automatically displayed feedback and scores immediately after students submitted their answers, enabling them to identify errors and learn from them in real time.

Throughout the implementation, the researcher observed students' behavior, engagement, and interaction with the bot. The observation revealed that students could operate the Quiz Bot independently after the second session, showing increasing familiarity with the menus and navigation process. Most students appeared focused and actively participated in each stage of the activity. They listened to the audio attentively, replayed it when needed, and discussed the content with peers before answering the quiz. The presence of instant feedback encouraged them to repeat quizzes to improve their scores, which reflected their enthusiasm and motivation to learn. In addition, students showed a preference for using their own smartphones, as it allowed them to work at their own pace and re-access materials outside class hours. However, a few students initially experienced minor issues such as unstable internet connections or delays in audio loading, but these problems were quickly resolved with the lecturer's guidance.

In general, the classroom atmosphere during the implementation was positive and interactive. The combination of listening activities, worksheets, and quizzes helped maintain students' attention throughout the sessions. The use of Telegram as the learning platform also promoted flexibility and accessibility, as students could continue practicing beyond classroom time. Based on the overall observation, it was concluded that the Quiz Bot functioned effectively as a learning medium, was easy to operate, and succeeded in engaging students actively in listening activities. At the end of the final session, students were asked to complete a questionnaire and share their impressions of using the Quiz Bot, which served as the basis for the subsequent evaluation phase.

5. Evaluation Stage

After the implementation process was completed, the next stage focused on evaluating the effectiveness, practicality, and students' responses toward the developed Quiz Bot. This evaluation consisted of both formative and summative elements. The formative evaluation was carried out during the classroom implementation through continuous observation and informal feedback from students, while the summative evaluation was based on a post-implementation questionnaire distributed through Google Form. The questionnaire aimed to measure students' perceptions of the practicality, interactivity, and benefits of using the Quiz Bot for listening comprehension. The results of the questionnaire are presented in table 5.

Table 5. Questionnaire Results

No.	Questions	Percentages (%)						Interpretation
		1	2	3	4	5	Positive	
Student's Perception of the Use of Quiz Bot on Telegram Bot in Teaching Listening Comprehension								
1.	Quiz Bot on Telegram Bot helps me learn listening	5,9	0	23,5	23,5	47,1	70,6	High
2.	Quiz Bot on Telegram Bot makes learning to listen more effective	0	0	23,5	41,2	35,3	76,5	High
3.	I am more interested in learning listening with Quiz Bot on Telegram Bot	0	11,8	35,3	29,4	35,3	64,7	High
4.	Quiz Bot on Telegram Bot's listening exercises are interactive and interesting	0	0	29,4	35,3	35,3	70,6	High

5.	Quiz Bot on Telegram Bots are more practical than other media	0	11,8	41,2	23,5	23,5	47,0	Moderate
Perceived Benefits of Using Quiz Bot on Telegram Bot in Teaching Listening Comprehension								
6.	I can learn listening anytime with Quiz Bot on Telegram Bot	0	5,9	35,3	23,5	35,3	58,8	Moderate
7.	Quiz Bot on Telegram Bot helps me recognize accents and intonations	0	5,9	41,2	29,4	23,5	52,9	Moderate
8.	I can repeat the listening exercise easily	5,9	5,9	17,6	41,2	29,4	70,6	High
9.	Quiz Bot on Telegram Bot boosted my confidence in listening	0	0	64,7	23,5	11,8	35,3	Low
10.	Quiz Bot on Telegram Bot helps me understand new vocabulary	0	0	47,1	35,3	17,6	52,9	Moderate
Perceived Challenges of Using Quiz Bot on Telegram Bot in Teaching Listening Comprehension								
11.	I had trouble understanding the words in the listening exercise on Quiz Bot on Telegram Bot	11,8	17,6	29,4	35,3	5,9	41,2	Moderate
12.	I find it difficult to understand the context of conversations on Quiz Bot on Telegram Bot	17,6	17,6	47,1	11,8	5,9	17,7	Very low
13.	The audio speed on Quiz Bot on Telegram Bot is too fast	5,9	35,3	41,2	5,9	5,9	11,8	Very low
14.	I experience technical problems when using Quiz Bot on Telegram Bot	5,9	41,2	35,3	5,9	5,9	11,8	Very low
15.	I'm less comfortable learning with Quiz Bot on Telegram than others media	11,8	41,2	23,5	17,6	5,9	23,5	Low

The findings from Items 1–5 show that students generally perceived the use of Quiz Bot on Telegram positively in learning listening comprehension. A high percentage of students agreed that Quiz Bot helped them in learning listening (70.6%), made listening more effective (76.5%), and provided interactive and interesting exercises (70.6%). These results fall into the "high" category, indicating that students felt motivated and engaged when using Quiz Bot. However, the practicality of Quiz Bot compared to other media (Item 5) received a moderate score of 47.0%. This suggests that while students valued its effectiveness, some still preferred other learning tools for practicality. Based on classroom observation during the implementation, this occurred because several students were still unfamiliar with operating the bot and needed clear guidance before using it. A few also experienced unstable internet connections and minor audio issues, which made the activity slightly less efficient than conventional classroom media. This suggests that while students valued its effectiveness, others still preferred different learning tools for practicality.

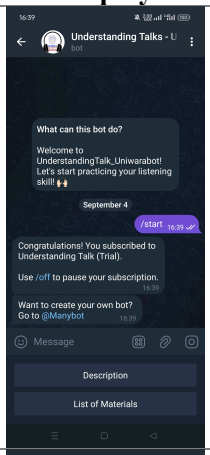
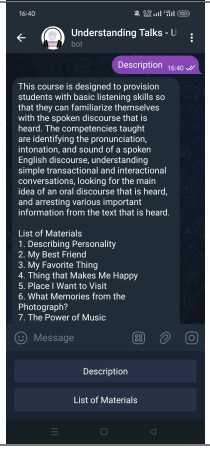
In terms of benefits (Items 6–10), the data show mixed results. Students appreciated the flexibility of using Quiz Bot, as 58.8% agreed that it enabled them to learn anytime, and 52.9% recognized its role in helping them understand accents and intonations. The highest benefit was found in Item 8, where 70.6% of students reported that Quiz Bot allowed them to repeat listening exercises easily, categorized as "high." However, confidence in listening (Item 9) scored low, with only 35.3% of students feeling more confident when using Quiz Bot. Vocabulary learning (Item 10) reached a moderate level (52.9%). These results suggest that while Quiz Bot supported accessibility and practice, it did not strongly enhance students' confidence in listening. Based on classroom observation, this occurred because several students tended to rely on the on screen text and looked uncertain when encountering unfamiliar vocabulary or accents, indicating that they still needed lecturer guidance to build confidence during independent listening practice.

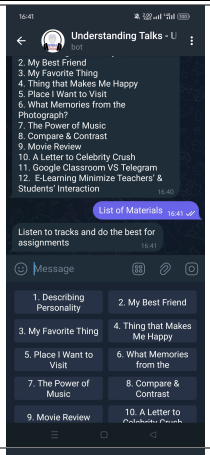
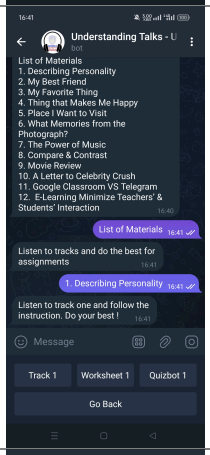
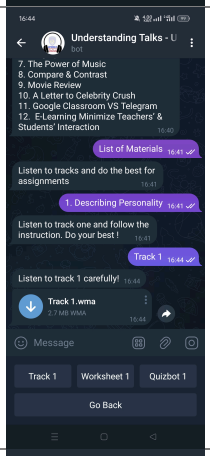
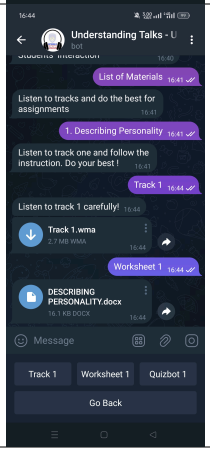
Regarding challenges (Items 11–15), most items received very low agreement percentages, indicating that only a few students experienced significant difficulties. For instance, only 17.7% of students reported problems in understanding the context of conversations (Item 12), and 11.8% felt that the audio speed was too fast (Item 13). Similarly, technical issues (Item 14) were reported by 11.8% of respondents. These findings suggest that challenges related to Quiz Bot were minimal and did not significantly hinder students' learning. However, 23.5% of students indicated discomfort compared to other media (Item 15), which reflects that although effective, Quiz Bot has not yet fully replaced traditional methods in terms of student preference. Observation during the implementation revealed that this discomfort was mainly due to students' limited familiarity with Telegram based features and occasional connection delays, which made them slightly less confident using the bot compared to conventional classroom tools.

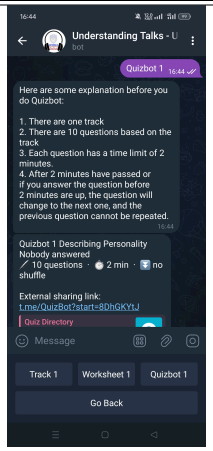
In general, students said that Quiz Bot was practical, interactive, and motivating. They appreciated the instant feedback because it helped them learn from their mistakes right away. However, many suggested improvements such as longer time for quizzes, clearer audio recordings, and more varied question types. One student commented, "If the audio and questions were more varied, it would be more interesting and challenging" (R5, Interview, 7 July 2025). These suggestions indicate that the product was already effective but still had room for further improvement.

After completing validation, trials and revision, the final display of the teaching materials that have been developed is presented in table 6.

Table 6. Final Display

No.	Display	Description
1.		Main Menu First, students need to access the Telegram Bot by clicking on the link provided, namely 'Understanding Talks – UNIWARA.' After that, students are directed to press the Start button as the first step to activate the bot.
2.		Description Menu Secondly, once the bot is active, students can select the Description menu to view a brief explanation of the material to be studied. This menu serves as an introduction to help students understand the general overview of the listening comprehension topics available.

3.		List of Materials Menu Thirdly, students can select the List of Materials menu to display a list of learning materials. There are 12 topics available in accordance with the teaching materials design, and students can access any of them as needed.
4.		Menu Display for Each Topic Fourth, each topic provides three main menus, namely Track (audio), Worksheet, and Quiz Bot. These three menus are designed to provide an integrated learning experience between listening, practicing, and testing comprehension.
5.		Track Menu In the Track menu, students can listen to the audio provided. This audio is the main source for understanding the material and serves as the basis for completing the next exercise.
6.		Worksheet Menu The Worksheet menu contains simple exercises that serve as an initial practice stage before entering the main evaluation.

7.	 	Quiz Bot Menu The Quiz Bot menu contains 10 true/false questions accompanied by audio. Students are given a time limit of two minutes to complete all questions. After completing an activity, students can press the Go Back button to return to the main menu. This feature gives students the flexibility to repeat previous activities, select other materials, or try different exercises according to their learning needs.

Discussion

The analysis stage revealed that students faced multiple challenges in listening comprehension. They struggled with different accents, intonation patterns, and identifying the main ideas of spoken texts. These difficulties are both linguistic and cognitive. According to Rost (2024), learners need exposure to varied and authentic listening materials to develop comprehension skills effectively. Without diverse input, learners' attention and understanding can decline. In this study, students also reported problems with unclear audio, rapid speech, and short time limits, which increased their anxiety and made concentration difficult. Vandergrift (2021) explains that anxiety and cognitive overload can interfere with the processing of listening input. Cognitive Load Theory further supports this by highlighting that learners have limited working memory capacity, and overloading it with unclear or fast input can reduce comprehension (Sweller et al., 2019).

Another important finding in the analysis stage was students' preference for materials accessible on smartphones. This aligns with the principles of autonomous and self-directed learning, where learners take control of the pace and context of their study (Lai, 2017). Mobile access allows learners to practice outside the classroom, supporting flexibility and individualized learning. These findings suggest that listening instruction should not only focus on linguistic content but also consider motivational and technological factors. Learners need materials that are clear, engaging, and convenient to access, highlighting the importance of designing digital learning tools that address both cognitive and affective needs.

In the design stage, the study addressed these needs by creating a structured, interactive, and mobile-accessible learning medium using Telegram. Telegram was chosen because it allows easy integration of multimedia, quizzes, and navigation menus, providing students with immediate access to content. Abu-Ayfah (2020) argues that Telegram can encourage interaction, active participation, and engagement, making it an effective platform for language learning. The Quiz Bot was designed according to Field's (2010) listening framework, which incorporates pre-, while-, and post-listening activities. Pre-listening activities activate background knowledge and set learning goals, while

listening tasks focus on comprehension, and post-listening exercises reinforce understanding and allow self-assessment.

The design also incorporated microlearning principles, breaking content into short, focused tasks that maintain learners' attention and motivation (Jahnke et al., 2020). Mayer's Cognitive Theory of Multimedia Learning (2024) informed the integration of audio and interactive quizzes. According to this theory, learning is more effective when multimedia is clear, well-structured, and includes interactive elements that support processing and retention. By combining audio input, worksheets, and quizzes in one flow, the design aimed to scaffold students' comprehension and provide continuous opportunities for practice and feedback. This approach also supports metacognitive development, allowing learners to reflect on their understanding and monitor their progress (Vandergrift 2021).

During the development stage, the design was translated into a functional learning product. Audio materials were produced using text to speech technology (luvvoice.com), providing clear and consistent pronunciation. Quizzes were integrated into Telegram using BotFather, resulting in the customized bot Understanding Talks (UNIWARA). Validation by the Head of the English Education Study Program and Mediazone ensured that both content accuracy and user-friendliness were maintained (Laksana, 2024). Validators recommended improvements to the naturalness of audio and the variety of quizzes, emphasizing the importance of refining materials to match learners' cognitive and motivational needs.

This development stage highlights a key principle in instructional design that technology alone is insufficient without careful alignment to pedagogical goals and learner needs (Alessi, 2000). The integration of audio, quizzes, and worksheets reflects a balance of content knowledge, pedagogy, and technology, in line with the TPACK framework (Mishra, 2006). Immediate feedback within the quizzes supports self-monitoring, enabling students to evaluate their performance and adapt strategies, which promotes metacognitive awareness and self-regulated learning (Zimmerman, 2002). The expert validation results show that the developed Quiz Bot meets both pedagogical and technical quality standards. The 100% score from the material expert indicates that the listening materials are fully aligned with the course objectives, accurate in language use, and well-organized. This proves that the product effectively combines content, pedagogy, and technology, as stated in the TPACK framework (Mishra, 2006). The result also supports Laksana (2024), who emphasized that high content validity reflects good instructional quality.

The 90% score from the media expert, categorized as very good, shows that the Telegram-based Quiz Bot is easy to use, efficient, and engaging. According to Alessi (2000), effective learning media should be user-friendly, minimize errors, and increase learner satisfaction. The expert only suggested minor improvements, such as clearer instructions and more varied audio, which align with usability design principles (Santilli et al., 2025).

The implementation stage provided insight into how students interacted with the Quiz Bot in authentic learning conditions. Students reported that the bot was flexible, interactive, and enjoyable, confirming that mobile-based tools can enhance motivation and engagement (Gilakjani, 2016). By practicing anytime, students could regulate their own learning and take responsibility for their progress, which is a core principle of self-directed learning (Lai, 2017). The structured combination of listening input, practice, and immediate feedback allowed students to actively engage with materials and consolidate comprehension skills. This indicates that technology-supported learning can address both cognitive and motivational aspects of listening instruction.

The evaluation stage highlighted the strengths and limitations of the Quiz Bot. Students benefited from structured listening tasks, quizzes, and instant feedback, but they faced challenges with fast audio, limited completion time, and occasional technical problems. These difficulties are consistent with known challenges in listening instruction, where learners struggle with rapid speech, unfamiliar accents, and vocabulary gaps (Field, 2010). Cognitive Load Theory suggests that learners can perform better when input is adjusted to match their proficiency level (Sweller et al., 2019). Future versions of the bot could incorporate adjustable audio speed, longer time limits, and more diverse quiz types to accommodate different skill levels and learning preferences.

From a pedagogical perspective, the Quiz Bot illustrates effective integration of technology, pedagogy, and content knowledge. Telegram represents technological knowledge, interactive listening activities reflect pedagogical knowledge, and alignment with course materials demonstrates content knowledge (Mishra, 2006). This synergy ensures that the tool is not only a technical innovation but

also pedagogically meaningful, providing students with opportunities to practice listening, monitor comprehension, and develop autonomy.

The Quiz Bot also supports principles of mobile learning and microlearning. Mobile learning allows students to access materials anytime, while microlearning presents information in small, manageable units that reduce cognitive load and improve retention (Sweller et al., 2019). These principles, combined with immediate feedback, help learners develop metacognitive awareness and strategic listening skills (Vandergrif, 2021). By encouraging students to plan, monitor, and evaluate their learning, the Quiz Bot promotes learner autonomy and self-regulation (Richards, 2017).

Overall, this study demonstrates that the Quiz Bot Telegram is an effective tool for listening instruction. It addresses cognitive, motivational, and autonomy-related needs by providing clear, structured, and interactive practice. The theoretical foundations, including cognitive load theory, multimedia learning, TPACK, microlearning, and self-regulated learning, support the pedagogical choices in design and development. The findings suggest that technology-based listening instruction can be highly effective when it balances content, pedagogy, and technology, and remains adaptable to learners' diverse skills and preferences. Future improvements, such as adjustable audio speed, extended time limits, and varied quiz formats, could make the tool even more inclusive and effective for all students.

Conclusion

This study concludes that Quiz Bot Telegram effectively provides an interactive and practical medium for teaching listening. Developed through the ADDIE model, it integrates audio tracks, worksheets, and quizzes, offering flexibility, immediate feedback, and repeated practice to support students' comprehension and motivation. The findings indicate that the Quiz Bot can complement classroom instruction and independent learning, supporting self-regulated learning and engagement. With improvements in audio quality, pacing, and task variety, it has the potential to become a sustainable and adaptive tool for the digital generation. However, this study has limitations. It involved a limited number of participants from a single institution and focused only on listening skills. Technical constraints, such as device compatibility and internet access, were not explored in detail. Future research could include larger and more diverse samples, examine the tool's impact on other language skills, and explore additional features such as adjustable audio speed, adaptive quizzes, or gamification to enhance learning outcomes further..

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