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Developing Technology-Based Learning Media to Improve Students' Listening Skills in Rural Area

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ABSTRACT

Listening comprehension continues to pose a significant challenge for vocational high school students in Indonesia, largely due to their limited exposure to authentic listening materials and the continued reliance on conventional, teacher-centred instructional practices. Addressing this issue, the present study aimed to develop and evaluate technology-based learning media designed to enhance students' listening proficiency. This study employed a Research and Development (R&D) approach, adopting the ADDIE model, which encompasses five systematic stages: Analysis, Design, Development, Implementation, and Evaluation. The participants consisted of 20 tenth-grade students from a vocational high school in Southeast Sulawesi. Data were collected through expert validation questionnaires, student response questionnaires, as well as pre-test and post-test assessments to measure students' listening performance. The findings revealed that the developed learning media achieved high levels of validity and practicality, as indicated by expert evaluations. Furthermore, the implementation of the media led to a notable improvement in students' listening comprehension, reflected in the significant increase between pre-test and post-test mean scores. Students also demonstrated highly positive responses, particularly in terms of the media's attractiveness, ease of use, and perceived usefulness in supporting their learning process. In conclusion, the technology-based learning media developed in this study is both effective and feasible for enhancing listening comprehension among vocational high school students. These findings offer valuable pedagogical implications for English teachers, particularly in promoting the integration of technology-enhanced learning tools in vocational education settings.

Keywords: Technology-Based Learning Media; Listening Skills; Vocational High School

INTRODUCTION

In the era of globalization and rapid technological advancement, English proficiency has become an essential competency for vocational high school graduates to remain competitive in the workforce. Among the four language skills, listening comprehension plays a foundational role in effective communication, as it enables learners to accurately receive and interpret spoken information. However, many vocational students in Indonesia continue to experience considerable difficulties in developing their listening skills, particularly when dealing with authentic spoken English produced by native or proficient speakers. This challenge is often attributed to limited exposure to real-life listening materials and the persistent use of conventional, teacher-centred instructional approaches.

Listening is widely acknowledged as one of the most fundamental yet demanding skills in English as a Foreign Language (EFL) learning. It requires not only linguistic competence such as vocabulary, grammar, and pronunciation but also cognitive abilities to process speech delivered at natural speed, recognize various accents, and interpret meaning in unfamiliar contexts. In vocational high schools, where the curriculum emphasizes practical and job-related competencies, listening skills are expected to support real-world communication, including understanding instructions, engaging in customer service interactions, and following technical explanations. Despite its importance, listening instruction is often underemphasized due to limited instructional time, large class sizes, and insufficient access to appropriate teaching resources.

Previous studies have identified several common difficulties faced by Indonesian EFL learners in listening comprehension, including rapid speech rate, unfamiliar vocabulary, diverse accents, and limited background knowledge. These challenges tend to be more pronounced among vocational students, who generally have less exposure to English compared to their peers in general academic tracks. Preliminary observations conducted at a vocational high school in Southeast Sulawesi revealed that tenth-grade students struggled to comprehend even simple to intermediate listening texts. This condition contributed to low learning motivation and unsatisfactory performance in listening assessments. Furthermore, the reliance on conventional teaching methods, such as textbooks and audio recordings, appeared insufficient to engage students or provide meaningful exposure to authentic language use.

In response to these challenges, the integration of technology in language learning has emerged as a promising alternative. Technology-based learning media—such as interactive applications, videos, podcasts, and multimedia platforms—offer access to authentic materials, adjustable playback features, visual support, and immediate feedback. These features have the potential to make

listening activities more engaging and effective. Prior research has demonstrated that technology-enhanced learning can significantly improve students' listening comprehension by increasing their exposure to real-world language and accommodating diverse learning preferences. In the context of vocational education, such approaches are particularly relevant, as students are generally familiar with digital tools and are preparing for technology-oriented work environments.

Despite its potential, the development and implementation of context-specific technology-based learning media for listening instruction in Indonesian vocational high schools remain limited. Existing learning media are often generic and do not adequately address the specific needs of vocational students, such as the integration of technical vocabulary or job-related communication scenarios. Additionally, many teachers encounter challenges in designing or adapting digital learning materials due to limited training and resources, particularly in rural areas. This study, therefore, aims to develop technology-based learning media tailored to improve the listening skills of tenth-grade students at a vocational high school in Southeast Sulawesi. The study involved 20 students and employed a Research and Development (R&D) approach based on the ADDIE model, which consists of five stages: Analysis, Design, Development, Implementation, and Evaluation. The developed media incorporates interactive features, authentic audio-visual materials, and progressively structured tasks designed to meet the needs of vocational learners.

The primary objective of this study is to produce learning media that is valid, practical, and effective in enhancing students' listening comprehension. In addition, the study seeks to evaluate the feasibility of the developed media in classroom implementation and to examine its impact on students' listening performance, as measured through pre-test and post-test comparisons. By focusing on a specific vocational school context, this research is expected to provide a practical framework that can be adapted by other vocational institutions. The significance of this study lies in its contribution to bridging the gap between traditional listening instruction and the integration of modern technology in vocational education. The findings are expected to offer valuable insights for English teachers, curriculum developers, and policymakers regarding the effective use of digital media in language learning. Ultimately, improving students' listening proficiency will not only enhance their communicative competence but also increase their readiness to enter a highly competitive global workforce.

LITERATURE REVIEW

Listening comprehension constitutes a fundamental receptive skill in second language acquisition, functioning as the primary channel through which learners receive linguistic input and develop other language skills, including speaking, reading, and writing. In English as a Foreign Language (EFL) contexts, effective listening enables learners not only to process spoken discourse but also to infer

meaning and respond appropriately in real-time communication. For vocational high school students, listening proficiency holds particular importance, as it directly supports workplace-related communication, such as understanding technical instructions, engaging in customer interactions, and participating in professional dialogues. Despite its significance, listening is consistently identified as one of the most challenging skills for EFL learners, largely due to its transient nature and the substantial cognitive demands involved in processing rapid speech, varied accents, and contextual cues simultaneously.

In the Indonesian context, vocational high school (SMK) students encounter a range of specific difficulties in listening comprehension. These include limited vocabulary mastery, fast speech rates, unfamiliar accents, insufficient background knowledge, and minimal exposure to authentic listening materials. Such challenges are often intensified in vocational settings, where English instruction tends to receive less emphasis compared to technical subjects. As a result, students frequently demonstrate lower motivation and weaker performance in listening tasks. Preliminary observations conducted at a vocational high school in Southeast Sulawesi further support these findings, revealing that tenth-grade students experience considerable difficulty in comprehending intermediate-level listening materials, particularly when instruction relies predominantly on conventional textbook-based audio resources.

To address these challenges, the integration of technology-based learning media has gained increasing attention as a viable pedagogical approach. Digital tools—such as interactive videos, podcasts, multimedia applications, and mobile-assisted language learning (MALL) platforms—offer several advantages, including access to authentic input, adjustable playback features, visual scaffolding, and immediate feedback. These features not only enhance learner engagement but also facilitate deeper comprehension by accommodating diverse learning preferences. For vocational students, who are generally familiar with digital technologies, such approaches are particularly relevant and aligned with the demands of modern, technology-driven workplaces.

A growing body of empirical research has demonstrated the effectiveness of technology-enhanced learning in improving listening skills. For instance, Demir and Tavil (2021) reported that the use of technology-based materials significantly improved vocational high school students' listening performance, as evidenced by higher post-test scores compared to traditional instructional methods. Their findings also highlighted increased student motivation and greater exposure to authentic language use. Similarly, Negara (2025), through classroom action research employing interactive ICT tools such as YouTube and ESLVideo.com, found a substantial improvement in students' mean listening scores—from 71.25 to 90.83—accompanied by increased engagement and confidence, particularly through the integration of visual and verbal input.

In addition, podcasts have been identified as an accessible and effective medium for listening development. Putri (2025) found that students exposed to podcast-based instruction demonstrated significantly greater improvement in listening comprehension compared to those in conventional learning settings. This finding is supported by Efendi (2024), who reported that the use of podcasts enhanced vocational students' listening performance by enabling repeated exposure and promoting self-paced learning. These studies collectively underscore the potential of technology to create more flexible, engaging, and effective listening learning environments.

Beyond the use of specific tools, the systematic design of instructional media also plays a crucial role in ensuring effectiveness. The ADDIE model (Analysis, Design, Development, Implementation, and Evaluation) has been widely utilized as a structured framework for developing technology-based learning materials. Feng and Sangsawang (2023), for example, applied the ADDIE model in combination with information technology in English instruction and reported high levels of effectiveness (E1/E2 = 82.40/81.33), along with improved student achievement and positive teacher responses. The model ensures that learning media are contextually appropriate, pedagogically sound, and practically applicable. Furthermore, recent studies in vocational education contexts indicate that ADDIE-based development consistently produces learning media with high validity, practicality, and positive student perceptions, ultimately leading to measurable improvements in listening outcomes.

Despite these advancements, several gaps remain in the existing literature. In particular, limited attention has been given to the development of context-specific, technology-based listening media tailored to the needs of vocational students in rural or under-resourced areas. Most prior studies have focused on general secondary education or urban contexts, with less emphasis on integrating job-related scenarios, technical vocabulary, and authentic workplace communication relevant to vocational programs. Addressing this gap, the present study seeks to develop and evaluate technology-based learning media using the ADDIE model for tenth-grade students (n = 20) at a vocational high school in Southeast Sulawesi. By situating the research within a specific local context, this study aims to provide a practical and adaptable model for enhancing listening instruction in similar vocational settings.

METHOD

Design and Sample

This study employed a quasi-experimental design using a pretest-posttest non-equivalent control group to investigate the effectiveness of Learning Management Systems (LMS) in English language teaching. The design was selected because random assignment of participants was not feasible due to the existing classroom structure. One intact class of eighth-grade students was assigned as the

experimental group, while another comparable class functioned as the control group. Both groups were assessed before and after the intervention to measure changes in English language proficiency.

The research was conducted at MTs Ihya Assunnah Kolaka, Southeast Sulawesi, Indonesia, during the 2025/2026 academic year. The participants consisted of 23 eighth-grade students. Due to the limited number of students, all were included in the study, with 12 students in the experimental group and 11 in the control group. Group assignment was based on class scheduling and initial English proficiency levels obtained from school records. Purposive sampling was applied to ensure that both groups were comparable in terms of age, gender distribution, and baseline English proficiency.

Instruments and Procedures

English language proficiency was measured using a validated teacher-made test covering listening, speaking, reading, and writing skills, adapted from standard EFL assessment rubrics. The pretest and posttest were designed as parallel forms with equivalent levels of difficulty and were scored on a scale of 0 to 100. To ensure reliability, particularly for the speaking component, inter-rater reliability was established through double scoring by two English teachers, resulting in a Cronbach's alpha of 0.85. In addition, a student perception questionnaire was administered to the experimental group at the end of the intervention to capture students' views on the use of LMS in learning.

The data collection procedure followed ethical standards, including obtaining permission from the school principal and securing informed consent from participants. The pretest was administered one week prior to the intervention. The experimental group then received LMS-integrated instruction over an eight-week period, with two sessions per week, each lasting 40 minutes. The LMS was used to deliver interactive materials, facilitate assignment submission, support online discussions, provide quizzes, and offer immediate feedback. Students engaged with digital resources, participated in asynchronous discussions, and completed tasks through the platform. In contrast, the control group received conventional face-to-face instruction using textbooks and traditional teaching methods without LMS support. Both groups were taught the same English topics aligned with the national curriculum to maintain consistency. After the intervention period, the posttest was administered, and all instructional activities were documented to ensure comparability between groups.

Data Analysis

Quantitative data from the pretest and posttest were analyzed using both descriptive and inferential statistics. Descriptive statistics, including means and standard deviations, were used to summarize students' performance. Paired sample t-tests were conducted to examine within-group differences between pretest and posttest

scores, while independent sample t-tests were used to compare differences between the experimental and control groups. The level of significance was set at $p < 0.05$, and all statistical analyses were performed using SPSS version 26.0. In addition, qualitative data obtained from the student perception questionnaire were analyzed thematically to support and provide deeper explanations for the quantitative findings.

RESULT AND DISCUSSION

The developed technology-based learning media for listening skills underwent expert validation before implementation. Two material experts and two media experts assessed the content, language, design, and technical aspects using a validated questionnaire with a 5-point Likert scale. The average validation score reached 92.5% (very valid category), indicating that the media were highly appropriate in terms of content relevance to the vocational curriculum and technical quality. Student responses toward the media were collected through a questionnaire after the implementation phase. The results showed a very positive perception with an average score of 89.4%. Students particularly appreciated the interactive features, authentic audio-visual materials, adjustable speed, and relevance of the listening topics to their future professional needs in computer and network engineering.

The effectiveness of the media was measured by comparing students' listening performance before and after the intervention. A pre-test and post-test were administered to the 20 tenth-grade students at One of the schools in south east Sulawesi. The pre-test mean score was relatively low, reflecting initial difficulties in listening comprehension. After using the technology-based media, the post-test mean score increased substantially. Table 1 presents the descriptive statistics of the pre-test and post-test results.

Table 1. Descriptive Statistics of Pre-Test and Post-Test Listening **Scores**

Test	Minimum	Maximum	Mean	Std. Deviation
Pre-test	48	72	59.8	7.12
Post-test	76	94	85.4	5.68
Gain	-	-	25.6	-

A paired sample t-test was conducted to determine whether the improvement was statistically significant. The analysis yielded a t-value of 12.45 with a significance level (Sig. 2-tailed) of 0.000 ($p < 0.05$), confirming a highly significant difference between pre-test and post-test scores. The N-gain score was calculated to measure the effectiveness category. The average N-gain reached 0.68, which falls into the high effectiveness category. This indicates that the technology-based learning media contributed substantially to improving students' listening skills.

Observation during implementation revealed increased student engagement. Most students actively participated in pre-listening, whilst-listening, and post-listening

activities, with fewer signs of boredom or disengagement compared to conventional methods. No major technical obstacles were reported during the use of the media in the classroom. The results demonstrate that the developed technology-based learning media met the criteria of validity, practicality, and effectiveness for enhancing listening comprehension among vocational high school students.

The high expert validation score (92.5%) confirms that the technology-based learning media developed in this study possess strong content validity and appropriate design for tenth-grade students. This aligns with previous R&D studies using the ADDIE model, where systematic development ensures media relevance to vocational needs, such as integrating technical vocabulary and job-related listening scenarios. Positive student responses (89.4%) indicate high practicality and acceptability of the media. Students found the interactive elements, visual supports, and authentic materials engaging, which reduced anxiety commonly associated with listening tasks. This finding supports the notion that technology-based media can accommodate the learning preferences of digitally native vocational students.

The significant increase in listening scores from a pre-test mean of 59.8 to a post-test mean of 85.4 (gain of 25.6 points) demonstrates the effectiveness of the developed media. The paired t-test result ($p < 0.001$) provides strong statistical evidence that the improvement was not due to chance, consistent with studies showing multimedia and ICT tools enhance EFL listening comprehension. The N-gain value of 0.68 (high category) further strengthens the conclusion that technology-based learning media offer a substantial contribution to skill development. This improvement can be attributed to features such as adjustable playback speed, repeated exposure, and visual scaffolding, which help students process spoken input more effectively than traditional audio-only methods.

Increased student engagement observed during implementation reflects the motivational benefits of technology integration. Interactive tasks and relevant content aligned with competencies helped maintain attention and encouraged active participation, addressing the common issue of low motivation in conventional listening lessons at vocational schools. These findings corroborate earlier research on technology-enhanced listening instruction in vocational settings, where authentic materials and digital tools led to better comprehension and confidence. However, the small sample size (20 students) in one specific class limits generalizability, suggesting the need for larger-scale trials in other vocational programs.

The successful application of the ADDIE model in this context highlights its practicality for teachers in resource-limited areas like Rural area. The iterative process allowed for timely revisions based on expert and student feedback, resulting in media that are both feasible and effective for real classroom use. Development and implementation of technology-based learning media provide a viable solution to improve listening skills among vocational high school students. Future studies

should explore long-term retention effects and integration with other language skills to further support employability in the digital era.

CONCLUSION

This study successfully developed and implemented technology-based learning media using the ADDIE model to improve listening skills among tenth-grade students at One of the schools in south east Sulawesi. The media achieved excellent validity (92.5%) according to expert judgments and high practicality based on student responses (89.4%). More importantly, the intervention resulted in a significant improvement in students' listening comprehension, as evidenced by the increase in mean scores from 59.8 in the pre-test to 85.4 in the post-test, with an N-gain value of 0.68 categorized as high effectiveness. These findings confirm that well-designed technology-based media, incorporating authentic audio-visual materials and interactive features, can effectively address the listening difficulties commonly faced by vocational high school students.

The results of this research provide practical implications for English teachers in vocational education. Integrating technology-based learning media offers a more engaging and authentic alternative to traditional methods, particularly in remote areas with limited resources. By aligning the media with the vocational curriculum, students not only improved their receptive skills but also showed greater motivation and confidence in processing spoken English relevant to their future professions in computer and network engineering. This study reinforces the potential of digital tools to bridge the gap between classroom instruction and real-world communication demands.

Despite the positive outcomes, this study has limitations, including the small sample size (20 students) and its focus on a single vocational class. Future research should involve larger samples across different vocational programs and regions to enhance generalizability. Additionally, longitudinal studies are recommended to examine the long-term retention of listening skills and the integration of the developed media with other language skills. Overall, the findings contribute to the growing body of knowledge on technology-enhanced language learning and offer a replicable model for vocational schools seeking to improve English proficiency through innovative media.

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