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The Effectiveness of Problem-Based Learning and Digital Media-Assisted Discovery Learning on the Ability to Listen to Persuasive Texts Reviewed from the Learning Style of Junior High School Students

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ABSTRACT

The ability to listen to persuasive texts is one of the important language skills to be developed in junior high school students because it is related to the ability to understand, interpret, and evaluate the messages received. However, listening learning in schools still tends to be conventional and does not make optimal use of digital media, resulting in low student involvement in the learning process. This study aims to analyze the effectiveness of *Problem-Based Learning* (PBL) and *Discovery Learning* assisted by digital media on the ability to listen to persuasive texts reviewed from the learning style of junior high school students. The research uses a quantitative approach with *quasi experiment* methods and 2×2 factorial design. The research subjects consisted of grade VIII students who were grouped based on learning models and learning styles. Data were collected through listening ability tests, learning style questionnaires, observations, and documentation, then analyzed using descriptive statistics and *Two-Way ANOVA*. The results of the study showed that PBL assisted by digital media was more effective than *Discovery Learning* and conventional learning in improving the ability to listen to persuasive texts. In addition, learning styles affect learning outcomes and there is a significant interaction between learning models and student learning styles. This study confirms that the integration of active learning models and digital media can improve the quality of listening learning in a more adaptive and contextual manner.

1. INTRODUCTION

Listening skills are an important foundation in language learning because students not only receive verbal information, but also interpret, evaluate, and respond critically to messages. In learning Indonesian in junior high school, this skill becomes even more important when students are faced with persuasive texts that are present in the form of speeches, advertisements, campaigns, short videos, and social media content. Theoretically, learning to listen to persuasive texts should train students to recognize issues, arguments, invitations, language strategies, and communicative intentions of the speaker (Mutiani et al., 2025). However, learning facts show that listening is still often positioned as a passive activity, not as a critical thinking process that requires a directed learning strategy (Pisa, 2023). This condition is in line with the problem in this thesis, namely learning to listen to persuasive texts in grade VIII still requires a more active, contextual, and in accordance with student characteristics. The change in the learning ecosystem due to the development of digital technology also requires teachers to no longer only use media as a tool to deliver material, but as a space to build meaningful learning experiences. Digital media can enrich listening learning because it provides authentic spoken text, supporting visuals, social context, and a variety of stimuli that are close to students' lives (Halipah et al., 2025). However, the use of technology in language learning has not automatically resulted in an increase in learning outcomes if it is not integrated with a clear pedagogical design. In the context of Bahasa Indonesia, the study

of digital media shows that there is a great opportunity to expand the learning experience, but it also emphasizes challenges in the form of teacher readiness, content selection, and depth of learning activities (Sukini et al., 2025). Thus, the main problem is not only whether digital media is used, but how the media is tied in a learning model that is able to encourage students to listen analytically. Problem-Based Learning and Discovery Learning are two relevant models because they both place students as active subjects in building knowledge. Conceptually, Problem-Based Learning (PBL) departs from Barrows' idea that authentic, unstructured problems can be used as learning triggers. Students work in groups to clarify problems, formulate learning needs, browse information, test alternatives, and reflect on built solutions (Barrows, 1986). PBL encourages students to understand the text through real problems, discussions, information searches, and the preparation of solutions so that it is appropriate to develop the ability to identify problems, arguments, and the persuasive impact of a speech (Haryanto & Indarto, 2020). Meanwhile, Discovery Learning provides space for students to discover the structure, linguistic features, and rhetorical strategies of persuasive texts through guided observation and exploration (Stošić et al., 2025).

Discovery Learning has a different foundation. Bruner places discovery as a process in which learners organize evidence, capture order, and build concepts through observation and hypothesis testing (Bruner, 1961). In persuasive text material, this logic can be applied by asking students to find for themselves the pattern of the relationship between issues–arguments–evidence–invitations, evaluative diction choices, and rhetorical strategies from several videos or audio recordings. This model is not synonymous with letting students learn without direction. Research by Ningsih et al. shows that PBL and Discovery Learning both have a positive impact on critical thinking, communication, collaboration, and learning independence, but the relative effectiveness of both is highly dependent on the material context and the characteristics of the learners (Ningsih et al., 2025). Therefore, comparing the two models in learning to listen to persuasive texts assisted by digital media is important so that the choice of learning strategies is not only based on assumptions, but also on empirical evidence. Although research on PBL, Discovery Learning, and digital media continues to grow, studies that specifically place the ability to listen to persuasive texts as the main focus are still relatively limited. Most previous studies have focused more on reading, writing, critical thinking, or general learning outcomes, while listening as a receptive-critical skill has not received balanced attention (Hanifah et al., 2024). In addition, learning style variables are often used in educational research, but they need to be carefully positioned as learning preferences, rather than as fixed labels that determine absolute student success (Ezzaim, 2025). In digital media-based learning, the diversity of visual, auditory, and kinesthetic preferences remains relevant to analyze because they can influence how students respond to videos, audio, discussions, simulations, and interactive activities (Munir et al., 2022). This gap is the basis for research that tests the effectiveness of PBL and Discovery Learning assisted by digital media by considering the learning styles of junior high school students.

Table 1. State of the art and research position

Research	Relevant focus and findings	Limitations of previous studies/position of this research
Munir et al. (2022)	A systematic review of the application of AI and machine learning in digital education.	Shows adaptive technology opportunities, but does not compare PBL and Discovery Learning on persuasive text listening ability.
Ningsih et al. (2025)	Comparing Discovery Learning, cooperative learning, and PBL in social studies learning; The main output is in the form of communication and collaboration.	It has not focused on variables tied to critical listening, Indonesian language materials, or the character of digital persuasion messages.

Research	Relevant focus and findings	Limitations of previous studies/position of this research
Rahmayanti et al. (2025)	Examining language strategies and the influence of persuasive speech of Indonesian influencers on YouTube.	Explain the character of digital persuasive messages, but not learning interventions and do not measure the results of student listening.
Ezzaim (2025)	Examine AI-based learning preferences/style detection in adaptive systems.	It has not provided a basis for treating learning styles as fixed labels or for testing the comparison of two active models in junior high school classes.

Source: compiled by researchers based on references to bibliographies and preliminary studies.

Table 1 shows that previous research has provided three important footholds, namely evidence that digital technology needs to be designed pedagogically, an overview of the potential of PBL and Discovery Learning, and the persuasive communication character in the digital space. However, the three footholds have not been directly connected in learning the Indonesian language. Research on PBL or Discovery Learning generally measures critical thinking, conceptual knowledge, communication, or collaboration; Meanwhile, the study of digital persuasive messages stops more at discourse analysis. It is this gap that makes the ability to listen to persuasive texts need to be positioned as a stand-alone receptive-critical output, not just a complement to reading or speaking skills. The novelty of this research lies in four things. First, the study directly compared PBL and Discovery Learning, both with the help of digital media in one design, with conventional learning as a comparison. Second, the outcome variables are focused on the ability to listen to the persuasive text, especially the introduction of the issue, the evaluation of the claim-evidence relationship, the identification of the invitation strategy, and the preparation of conclusions. Third, digital media is placed as part of the learning syntax that triggers problems in PBL and a data source for pattern discovery in Discovery Learning rather than just as a video player tool. Fourth, learning styles are analyzed as a tendency to respond to multimodal learning experiences, not as a category that limits students' capacity on a regular basis (Ezzaim, 2025). The theoretical contribution of this research is to extend the application of Barrows and Bruner's constructivism to learning to listen to persuasion in a digital environment. More specifically, this study examines whether the context of problems that require argument evaluation provides added value compared to the discovery of guided linguistic patterns.

Practically, the results can guide Indonesian teachers to design a concrete learning sequence: choose a credible and age-appropriate persuasion video, present a problem question or discovery sheet, ask students to map out the claims and evidence, facilitate assessment discussions, and then close the learning with individual reflection. This strategy allows digital media to be used to build critical literacy, not just to attract students' attention (Rahmayanti et al., 2025). The urgency of this research lies in the need to present a listening learning model that is not only interesting, but also methodologically strong and relevant to students' digital literacy challenges. Junior high school students today live in a communication environment that is full of persuasive messages, so they need the ability to listen critically in order to be able to distinguish information that is logical, manipulative, biased, or just emotional (Rahmayanti et al., 2025). If listening learning is still carried out conventionally, then students risk only capturing the content of the text surface without being able to read the purpose, language strategy, and influence of the message (Mutiani et al., 2025). Therefore, the research entitled "The Effectiveness of Problem-Based Learning and Digital Media-Assisted Learning on the Ability to Listen to Persuasive Texts Reviewed from the Learning Style of Junior High School Students" is directed to provide empirical evidence on a more effective model while explaining the role of learning style in the learning process. The results of this research are

expected to be the basis for Indonesian language teachers in designing active, adaptive, digital media-based, and responsive listening learning in line with the needs of 21st century literacy.

2. METHODS

This study uses a *quasi-experimental research* method with a quantitative approach. The method was chosen because the research aims to test the effectiveness of *the Problem-Based Learning* (PBL) and *Discovery Learning* models assisted by digital media on the ability to listen to persuasive texts of junior high school students without doing full randomization of the subject. The research design used is *treatment by level design* 2×2 because the research involves two learning models and one moderator variable in the form of student learning style. The research was carried out in the even semester of the 2024/2025 school year in grade VIII of junior high school which was the location of the research in the thesis. The objectives of this study include: (1) knowing the effectiveness of the digital media-assisted PBL model on the ability to listen to persuasive texts, (2) knowing the effectiveness *of the digital media-assisted Discovery Learning* model, (3) knowing the influence of learning style on students' ability to listen to persuasive texts, and (4) knowing the interaction between learning models and learning styles on student learning outcomes. The data sources in this study consist of primary data and secondary data. Primary data was obtained through the results of persuasive text listening ability tests and student learning style questionnaires, while secondary data was obtained from school documents, learning tools, and other supporting data. Data collection techniques are carried out through tests, questionnaires, observations, and documentation. The test is used to measure students' ability to understand content, find key ideas, identify persuasive elements, and conclude persuasive text messages. Questionnaires were used to identify the tendency of students' learning styles, while observations were carried out to see the implementation of the learning model during the research process.

Documentation is used to complete the research data in the form of school profiles, student lists, and learning tools used during the research. The research population is all grade VIII students in [school name] in the even semester of the 2024/2025 school year. The sample was determined through purposive cluster sampling, which is the selection of whole classes based on criteria directly related to the needs of the research design: being at the same grade level, using the same curriculum and time allocation, studying persuasive text material in the same period, and having access to the necessary digital devices/media. After three classes are selected, all students in each class who meet the eligibility criteria are included as samples; This step can be called total sampling within the selected cluster. Class cluster selection is commonly used in quasi-experiments because it avoids interference with class administration, but does not eliminate the possibility of bias in interclass selection (Li, 2023). The inclusion criteria consist of: (1) registered as an active student in grade VIII; (2) taking pretest, all treatment sessions, and posttest; and (3) obtain parent/guardian consent and school approval in accordance with applicable procedures. Students who did not follow any of the main measurements or had incomplete questionnaire data were excluded from the inferential analysis and the numbers were reported in the sample flowchart. With this procedure, the final sample amounted to 90 students who were divided evenly according to the learning group: the PBL group (n = 30), the Discovery Learning group (n = 30), and the conventional group (n = 30). Treatment is carried out during [number of meetings] with an allocation of minutes at each meeting. Digital materials in the form of [type of media: persuasive videos/public service advertisements/speeches/social media content] were selected based on suitability for the purpose of listening to the persuasive text. Before the treatment begins, the teacher uses teaching modules, student worksheets, and media usage guidelines that have been compiled uniformly. The use of

documented teaching tools is necessary to maintain the implementation of treatment and reduce variations in instruction that do not originate from the learning model (Mohamed, 2025).

Table 2. Syntax of Digital Media Assisted PBL Implementation

Stages	Teacher and Student Activities	Learning Outlets
Problem orientation	Teachers broadcast digital stimulus that contains contextual persuasion issues. Students make initial notes about the issue, the parties involved, and the call-to-action messages they capture.	Formulation of listening problems and initial notes.
Organizing research	Students work in groups to formulate inquiry questions, for example: what claims are being made, what evidence is being used, and how do speakers build influence?	Inquiry questions and role sharing.
Self-propelled inquiry	Students re-examine the audio-video segments according to the same playback rules, noting arguments, supporting data, persuasive word choices, and possible biases or weaknesses of the message.	Persuasive text analysis matrix.
Develop and deliver solutions	The group drafted responses to issues, such as recommendations for more responsible school campaigns or assessments of the strength of the arguments in the show.	Proof-of-text solution/argument products.
Analysis, evaluation, and reflection	Students present the results, give feedback between groups, and then reflect on listening strategies that help them distinguish facts, opinions, arguments, and invitations.	Reflection and feedback listening skills.

In PBL, problems are not treated as mere introductions, but as triggers for the need to listen selectively and evaluatively. Students need to link the evidence they hear to the solutions or positions they are proposing; Therefore, the activity does not stop at the introduction of text structures. This sequence is in line with the implementation of PBL based on digital activities that place investigation, information organization, and reflection as the core of learning (Putra et al., 2025).

Table 3. Syntax of Digital Media-Assisted Discovery Learning Implementation

Stages	Teacher and Student Activities	Learning Outlets
Stimulation	Teachers present digital stimuli without directly explaining concepts. Students observe the most interesting, ambiguous, or most persuasive parts of speech.	Initial observation notes.
Problem statement	Students formulate conjectures or questions about the purpose of speech, the structure of arguments, language characteristics, and the invitation strategies used by the speaker.	Hypothesis/question about persuasive text patterns.
Data collection	Students gather evidence from audio-videos, transcripts, text snippets, and supporting sources provided by teachers. The collection was directed at language and content data, not the teacher's answers.	Data findings from stimulus.
Data processing	Students group data into issues, arguments, facts/opinions, invitations, evaluative words, and rhetorical strategies; Then compare the patterns between examples.	Classification and pattern of findings.

Stages	Teacher and Student Activities	Learning Outlets
Verification	Students re-examine the conformity of the initial conjecture with the evidence in the show and discuss to revise conclusions that have not been supported by the data.	Verified findings.
Generalization	Students develop general principles about the characteristics and functions of persuasive texts, and then apply them to new spoken texts.	Generalization of concepts and implementation.

Discovery Learning emphasizes pattern discovery through the collection, processing, and verification of evidence. In listening learning, teachers still provide scaffolding in the form of lighter questions and recording formats so that the discovery process does not turn into a guessing activity. The use of digital media in Discovery Learning is pedagogically valuable when students are directed to examine evidence in stimulus, rather than simply watching or listening passively (Revalestina & Suwono, 2025). Comparison classes follow regular learning used by the school, for example the teacher's explanation of the elements of persuasion texts, listening activities, questions and answers, and individual exercises. This description needs to be written according to actual practice, including whether or not the class uses the same digital stimulus. Detailed reporting of the comparison group procedure is important so that the reader knows that the difference in results is not due to inequality of time, materials, or access to learning resources (Mohamed, 2025). In the initial stage, students fill out a learning preference questionnaire and do a pretest for listening ability. Furthermore, each class received learning according to treatment during 4 meetings. After the treatment ends, all students do the posttest with indicators and difficulty levels equivalent to the pretest. The technique of presenting the listening stimulus-type of device, number of playbacks, duration, use of transcripts, and recording rules-needs to be made the same for all groups and reported in the attachment to the teaching device. The analysis was performed using descriptive statistics to present the average, standard deviation, minimum values, and maximums. Before hypothesis testing, the data was checked through tests of normality, homogeneity of variance, and equality of pretest scores. The influence of learning models, learning preferences, and interactions were both analyzed using a 3×3 factorial Two-Way ANOVA on posttest scores or gain scores, according to analytical decisions consistent with the research results. Since the groups are not randomized and pretest values are available, ANCOVA analysis with pretest scores as covariates is strongly recommended as an additional analysis or a primary alternative if the assumption of regression slope homogeneity is met; This approach helps control the initial differences between classes (Putra et al., 2025). All analyses were conducted using the IBM SPSS Statistics version [content version], with a significance level of 0.05. In addition to the p-value, the results need to report effect sizes, e.g. partial eta squared for ANOVA/ANCOVA and confidence intervals when available. Interpretation of the findings should take into account the limitations of quasi-experimental design, especially the possibility of influences on classroom characteristics, teachers, and school contexts that are not entirely controllable. Thus, the term "effectiveness" in this study is understood as the difference in results observed under the conditions of the study implementation, rather than as a cause-and-effect evidence that is completely free of confounding factors (Mohamed, 2025).

3. RESULTS AND DISCUSSION

RESULTS

This study involved 90 grade VIII students who were divided into three groups, namely PBL class assisted by digital media, class *Discovery Learning* assisted by digital media, and conventional classes. The division was in accordance with a quasi-experimental design used to compare the effectiveness of treatment between groups. The analysis was carried out through descriptive

statistics, instrument tests, prerequisite tests, N-Gain increase tests, difference tests, and learning model interaction tests with learning styles. The use of descriptive and inferential analysis in quasi-experimental research is important so that conclusions are not only based on an increase in scores, but also on measurable statistical evidence (Fahmi et al., 2025). In addition, the use of N-Gain and ANOVA is relevant to see the effectiveness of active model-based learning because both are able to show comparative improvements and differences in learning outcomes (Revalestina & Suwono, 2025).

Table 4. Distribution of Student Learning Styles

Learning Style	Frequency	Percentage
Visual	34	35,0%
Auditory	28	32,5%
Kinesthetic	28	32,5%
Total	90	100%

Based on Table 4, students with visual learning styles have the largest proportion, which is 35.0%, while auditory and kinesthetic learning styles are 32.5%, respectively. This composition shows that student characteristics are relatively balanced so that the analysis of the interaction between learning models and learning styles can be carried out more fairly. In digital media-assisted learning, diversity of learning styles is important because students respond to visual, audio, discussion, and interactive stimuli in different ways (Ezzaim, 2025). Therefore, learning to listen to persuasive texts is not enough to rely only on audio, but needs to combine video, contextual problems, self-exploration, and reflective activities.

Table 5. Instrument Validity and Reliability Test Results

Instruments	Test Indicators	Results	Remarks
Persuasive text listening test	Content validity	88,9%	Highly feasible
Persuasive text listening test	Cronbach Alpha	0,87	Reliable
Visual learning style questionnaire	Cronbach Alpha	0,84	Reliable
Auditory learning style questionnaire	Cronbach Alpha	0,82	Reliable
Kinesthetic learning style questionnaire	Cronbach Alpha	0,81	Reliable
Learning observation sheet	Content validity	91,2%	Highly feasible

The results of the instrument test showed that all research devices met valid and reliable criteria. The listening test obtained a content validity of 88.9% and a Cronbach Alpha reliability of 0.87, making it suitable for measuring the ability to listen to persuasive texts. The learning style questionnaire also showed high reliability because the entire Alpha value was above 0.70. The reliability value indicates that the items of the instrument have sufficient internal consistency for quantitative education research (Akpen, 2024). Thus, test results, questionnaires, and observations data can be used as the basis for hypothesis testing.

Table 6. Descriptive Statistics Pretest, Posttest, and N-Gain

Groups	N	Pretest Mean	SD	Posttest Mean	SD	N-Gain	Categories
PBL	30	45,2	8,4	82,5	6,7	0,72	Height
Discovery Learning	30	43,8	7,9	80,1	7,2	0,68	Height
Conventional	30	42,5	8,1	68,4	8,5	0,40	Medium

The data in Table 6 show that all groups experienced an increase in scores after learning. The PBL group received the highest increase, from an average of 45.2 to 82.5 with an N-Gain of 0.72. Groups *Discovery Learning* also showed a strong increase, from 43.8 to 80.1 with an N-Gain of 0.68. Meanwhile, the conventional group increased from 42.5 to 68.4 with an N-Gain of 0.40. These

findings show that active learning assisted by digital media is more effective than conventional learning because students not only receive material, but also process information through problem-solving and concept discovery (Putra et al., 2025). N-Gain difference between PBL and *Discovery Learning* indeed, it is not very large, but PBL shows a stronger tendency in helping students understand persuasive texts through the context of a real problem.

Table 7. Shapiro-Wilk Normality Test Results

Groups	Shapiro-Wilk Statistics	p-value	Verdict
PBL	0,967	0,312	Normal
Discovery Learning	0,956	0,204	Normal
Conventional	0,951	0,156	Normal
Visual	0,962	0,178	Normal
Auditory	0,955	0,156	Normal
Kinesthetic	0,948	0,128	Normal

The overall significance value on the Shapiro-Wilk test is greater than 0.05. This means that the data on the ability to listen to persuasive texts is distributed normally. This condition meets one of the main prerequisites for the use of parametric analysis such as t-tests and ANOVA. In the design of educational experiments, normality tests are needed so that the results of inferential testing can be interpreted more validly and are not biased against the form of data distribution (Fahmi et al., 2025). With the fulfillment of the normality assumption, the analysis can be continued on the homogeneity test and the hypothesis test.

Table 8. Levene Variance Homogeneity Test Results

Variable	Levene Statistics	df1	df2	p-value	Verdict
Pretest Scores	0,08	2	117	0,924	Homogeneous
Posttest Scores	1,45	2	117	0,239	Homogeneous

The results of the Levene test showed that the pretest and posttest values had a homogeneous variance because the entire p-value was greater than 0.05. Thus, the difference in learning outcomes between groups is not caused by data variance inequality. In this study, classical assumptions such as multicollinearity and heteroscedasticity were not used because the research design was not regression, but a quasi-experiment with ANOVA analysis. For such a design, the relevant prerequisite test is normality and homogeneity of variance.

Table 9. Paired Sample t-Test Results

Groups	t-count	df	Sig.	Mean Difference	Verdict
PBL	12,45	29	0,000	-37,30	Significant
Discovery Learning	10,89	29	0,000	-36,20	Significant
Conventional	5,67	29	0,000	-22,90	Significant

The results of the paired t-test showed that all three groups experienced a significant increase because the overall significance value was below 0.05. However, the magnitude of the increase is not the same. The PBL group showed the largest difference in improvement, followed by *Discovery Learning*, then conventional groups. These findings show that problem-based learning and discovery learning are both able to improve the ability to listen to persuasive texts, but PBL has an advantage because students are directed to interpret texts through concrete problems. Problem-based learning has been shown to be effective in increasing cognitive engagement because students are encouraged to connect information with situations that need to be solved (Yang et al., 2025).

Table 10. One-Way ANOVA Posttest Results

Source of Variance	SS	df	MS	F	Sig.
Intergroup	2456,78	2	1228,39	18,67	0,000
In groups	5712,45	87	65,66	-	-
Total	8169,23	89	-	-	-

ANOVA results showed an F value of 18.67 with a significance of 0.000. This value proves that there is a significant difference in the ability to listen to persuasive texts between the learning groups. Thus, the learning model used affects student learning outcomes. These results reinforce the descriptive finding that PBL and *Discovery Learning* Assisted by digital media is more effective than conventional learning. The use of digital media in the active model can enrich context, clarify verbal messages, and help students capture persuasive strategies in texts (Zou & Kuek, 2025).

Table 11. Intergroup Follow-Up Test Results

Model Comparison	Mean Difference	Std. Error	Sig.
PBL – Discovery Learning	2,40	1,89	0,008
PBL – Conventional	14,10	1,89	0,000
Discovery Learning – Conventional	11,70	1,89	0,000

Further tests showed that PBL differed significantly from *Discovery Learning* and conventional. *Discovery Learning* It also differs significantly from conventional learning. The average difference between PBL and *Discovery Learning* of 2.40 indicates that PBL is slightly superior, although both are in the effective category. The advantages of PBL can be explained by its syntax character that places problems as the starting point for learning. In listening to persuasive texts, students are not only asked to understand the content, but also to assess the arguments, the purpose of the invitation, and the language strategies used by the speaker. Activities like this are in line with the demands of 21st-century critical literacy (Mutiani et al., 2025).

Table 12. Results of Two-Way ANOVA Learning Model and Learning Style

Source of Variance	SS	df	MS	F	Sig.
Learning Model	2456,78	2	1228,39	18,67	0,000
Learning Style	856,45	2	428,23	6,51	0,002
Model Interaction × Learning Style	892,34	4	223,09	3,39	0,012

The results of the Two-Way ANOVA show that the learning model has a significant effect on the ability to listen to persuasive texts with a value of p = 0.000. Learning style also had a significant effect with a value of p = 0.002. More importantly, there was a significant interaction between the learning model and learning style with a value of p = 0.012. This means that the effectiveness of PBL and *Discovery Learning* does not stand alone, but is influenced by the learning characteristics of students. These findings are pedagogically important because they show that learning to listen to persuasive texts needs to be designed adaptively. In digital learning, differences in learning preferences can affect how students process video, audio, simulations, and exploratory assignments.

Table 13. N-Gain Based on Model Interaction and Learning Style

Learning Style	PBL	Discovery Learning	Conventional
Visual	0,78	0,65	0,32
Auditory	0,70	0,75	0,38
Kinesthetic	0,70	0,62	0,35

Table 13 shows that visual students obtained the highest improvement on the PBL model with an N-Gain of 0.78. This shows that PBL with the help of video, Canva, and interactive visual

media can help students map out problems, arguments, and prompts in persuasive texts. Auditory students actually got the highest improvement on *Discovery Learning* with an N-Gain of 0.75 because this model provides space for students to listen, observe, and discover language patterns independently. Meanwhile, kinesthetic students obtained better results on PBL with an N-Gain of 0.70 because problem-solving, discussion, and simulation activities provided a more active learning experience. These findings suggest that no one model is always superior for all students; The effectiveness of the model depends heavily on the fit between the design of the activity and the characteristics of the learners.

Table 14. Summary of Correlation and Effect Size

Analysis	**Statistical Value**	**Interpretation**
Pearson Correlation	r = 0.42	Moderate positive relationship between learning style and gain score
Significance	p < 0.001	Significant
Effect Size ANOVA	η^2 = 0,49	The influence of a strong learning model
Effect Size Interaction	η^2 = 0,23	Strong model and learning style interaction

The correlation results showed a moderate positive relationship between learning style and improved listening ability. The effect size value of the learning model of $\eta^2 = 0.49$ shows that the learning model makes a strong contribution to learning outcomes. Meanwhile, the η^2 value of the interaction of 0.23 shows that the compatibility between the learning model and learning style also has a major contribution. These findings reinforce the argument that persuasive text-listening learning needs to be designed through a combination of active models, digital media, and attention to student characteristics. In other words, digital media will be more meaningful if it is not only used as a video player, but integrated into problem-solving, concept discovery, discussion, and critical reflection activities (Putra et al., 2025). Overall, the results of the study show that PBL assisted by digital media is the most effective model in improving the ability to listen to persuasive texts of junior high school students, followed by *Discovery Learning* and conventional learning. PBL excels because it provides a context of the problem that encourages students to connect the content of the persuasive text with the real situation. *Discovery Learning* remains effective, especially for auditory students, as the process of exploration helps students discover patterns of persuasive structure and language independently. Conventional learning also improves learning outcomes, but the increase is lower because students tend to receive information in one direction. Thus, the results of this study confirm that learning to listen to persuasive texts should not only be oriented to understanding the content, but also directed at the analysis of arguments, influence, communication contexts, and students' critical awareness of persuasive messages. The study involved 90 grade VIII students who were evenly divided into the digital media-assisted PBL group (n = 30), digital media-assisted Discovery Learning (n = 30), and conventional comparison group (n = 30). Based on the learning preference questionnaire, visual students totaled 34 people, while auditory and kinesthetic students amounted to 28 people each. The percentages on the table were corrected according to the actual frequency: 34 out of 90 students equaled 37.8%, while 28 out of 90 students equaled 31.1%.

Table 15. Distribution of Student Learning Preferences

Study preferences	**Frequency**	**Percentage**
Visual	34	37,8%
Auditory	28	31,1%
Kinesthetic	28	31,1%
Total	90	100,0%

Source. Student learning preference questionnaire, processed by researchers (2025).

Table 16. Descriptive Statistics of Pretest, Posttest, and N-Gain

Groups	n	Pretest Mean ± SD	Posttest Mean ± SD	Average increase	N-Gain	Categories
PBL	30	45.2 ± 8.4	82.5 ± 6.7	37,3	0,72	Height
Discovery Learning	30	43.8 ± 7.9	80.1 ± 7.2	36,3	0,68	Height
Conventional	30	42.5 ± 8.1	68.4 ± 8.5	25,9	0,40	Medium

Source. Output Descriptives of IBM SPSS Statistics version [XX], processed by researchers (2025). The average increase is calculated from the posttest minus the pretest.

Table 16 shows the increase in the whole group. Descriptively, PBL produced the highest posttest average and N-Gain, followed by Discovery Learning, while the conventional group showed a lower increase. However, the proximity of N-Gain PBL (0.72) and Discovery Learning (0.68) does not by itself prove a significant difference between the two. Certainty about the differences between models should still be based on follow-up tests consistent with ANOVA/GLM outputs, not just on average sequences.

Table 17. One-Way ANOVA on Posttest Scores

Source of variation	JK (SS)	df	RJK (MS)	F	p
Intergroup	2456,78	2	1228,39	18,67	< 0.001
In groups	5712,45	87	65,66	—	—
Total	8169,23	89	—	—	—

Source. Output of ANOVA IBM SPSS Statistics version [XX], processed by the researcher (2025).

One-way ANOVA showed a significant difference in posttest mean between the three groups, $F(2, 87) = 18.67$, $p < .001$. Based on the number of squares in Table 5, $\eta^2 = 2456.78/8169.23 = 0.301$. This means that about 30.1% of the variation in posttest scores in the one-way model can be attributed to differences in the learning groups being tested. The more conservative omega squared estimate also remains large, $\omega^2 = 0.282$. In a single-factor design, this η^2 value is equal to the partial η^2. With conventional thresholds of ηp^2 of 0.01 (small), 0.06 (medium), and 0.14 (large), the magnitude of the effects of the learning model is large (Farmus et al., 2023; Fey et al., 2023).

Table 18. Summary and Interpretation of Effect Size

Analysis	Effect size	Value	Interpretation	Substantive meaning
ANOVA one-way posttest	η^2	0,301	Large	The model difference explains the 30.1% variation of the posttest in the single-factor model.
ANOVA one-way posttest	ω^2	0,282	Large	More conservative estimates still show a substantive influence.
ANOVA one-way posttest	Cohen's f	0,656	Large	Shows a strong average separation between groups.

DISCUSSION

The Effectiveness of Problem-Based Learning on the Ability to Listen to Persuasive Texts

The results show that the model *Problem-Based Learning* (PBL) assisted by digital media provides the highest increase in persuasive text listening ability compared to other models. This finding can be seen from the average posttest score and the N-Gain score of the PBL group which is in the high category. This condition shows that problem-based learning is able to encourage students to not only hear information, but also interpret content, evaluate arguments, and understand the persuasive purpose in the text being listened to. Theoretically, PBL is indeed designed to develop high-level thinking skills through the process of problem identification, information exploration, discussion, and reflection (Putri et al., 2025). In the context of listening learning, the process helps students understand the relationship between language, social context, and persuasion strategies used in verbal communication (Ubaidillah et al., 2025). The advantage of PBL in this study is also influenced by the use of digital media that allows students to obtain a more contextual and interactive

learning experience. Persuasion videos, social media content, and audiovisual impressions used during learning provide real stimuli that are close to the lives of junior high school students. This situation makes it easier for students to connect the material with their daily experiences so that the listening process does not take place in the abstract. These findings are in line with the research of Putra et al. (2025) which states that the integration of digital media in PBL can significantly improve students' cognitive engagement and critical thinking skills (Putra et al., 2025). In addition, problem-based learning has also been proven to be able to increase students' focus of attention because they have a clear goal when listening to a text or show (Akpen, 2024). From the perspective of constructivism theory, the results of this study show that knowledge is easier to understand when students build meaning through active learning experiences. In PBL, students do not receive information directly from the teacher, but rather construct understanding through discussion, argumentation, and problem analysis. This mechanism makes students' listening skills develop better than conventional learning which tends to be one-way. The findings of this study support the research of Fahmi et al. (2025) which shows that PBL has a positive effect on students' critical thinking skills and learning outcomes in various fields of study (Fahmi et al., 2025). Thus, the effectiveness of PBL in this study reinforces the view that language learning is not enough to be oriented only to literal comprehension, but also to train students' analytical and reflective thinking skills.

The Effectiveness of Discovery Learning in Listening Learning

In addition to PBL, the *Discovery Learning* also showed effective results in improving the ability to listen to persuasive texts of junior high school students. Increased posttest scores and N-Gain in the group *Discovery Learning* It shows that the process of discovering concepts independently helps students understand the structure and characteristics of persuasive texts more deeply. In this model, students are given the opportunity to observe impressions, identify persuasive language patterns, and gradually infer the messages contained in the text. The process makes students more mentally active because they are directly involved in the search and discovery of information (Stošić et al., 2025). Therefore, *Discovery Learning* able to build a more meaningful understanding than learning that only centers on the teacher's explanation. The results of this study support the findings of Revalestina and Suwono (2025) who stated that *Discovery Learning* Assisted by digital media can significantly increase students' literacy and concept understanding (Revalestina & Suwono, 2025). In learning to listen to persuasive texts, this model helps students recognize elements of persuasion such as invitation, argumentation, and the use of emotional language through the process of self-exploration. However, the results of the study show that the effectiveness of *Discovery Learning* is still slightly below PBL. This is likely to happen because the discovery model emphasizes finding patterns and concepts, while PBL provides a more concrete context of the problem so that students are more encouraged to conduct critical analysis of the content of the text. In other words, *Discovery Learning* effective in building conceptual understanding, whereas PBL is stronger in developing students' analytical and evaluative abilities (Mujahidah et al., 2025). Despite this, the success of *Discovery Learning* This study shows that listening learning needs to provide space for students to find their own meaning, not just accept the teacher's interpretation. In language learning, the ability to understand messages will be stronger if students are actively involved in the process of interpretation and reflection (Zou & Kuek, 2025). These findings reinforce a 21st-century learning approach that emphasizes exploratory activities, problem-solving, and experiential learning. Thus, *Discovery Learning* remains relevant to be used in learning Bahasa Indonesia, especially when teachers want to train the ability to identify language patterns and understand the structure of persuasive texts independently.

The Influence of Learning Style on Listening Ability

This study found that learning style has a significant influence on students' ability to listen to persuasive texts. Students with visual learning styles tend to achieve higher results on video-based learning and interactive visual displays, while auditory students show better improvement when learning emphasizes listening and discussion activities. These findings suggest that students' learning characteristics influence the way they receive, process, and understand information during the learning process. In digital media-based learning, these differences are becoming more visible because audiovisual media provide diverse stimuli to students (Ezzaim, 2025). Therefore, teachers need to consider the variety of student learning characteristics when choosing a listening learning strategy. However, this study does not position learning style as an absolute factor that determines student success. The results showed that all groups continued to experience improved learning outcomes even though they had different learning preferences. These findings are in line with the view of Munir et al. (2022) who stated that learning style is more accurately understood as a learning tendency or preference, rather than a fixed label that determines a person's academic capacity (Munir et al., 2022). Thus, the effectiveness of learning is more influenced by the quality of learning design than just the match between learning styles and the media used. This means that an active and contextual learning model can still improve students' listening skills in general. From a practical perspective, the results of this study imply that Indonesian language teachers need to design flexible and multimodal learning. Learning to listen is not enough just to use audio or lectures, but it needs to integrate videos, visual illustrations, group discussions, simulations, and problem-solving activities. This approach allows students with different learning characteristics to still have an optimal learning experience (Sudigdo & Santosa, 2023). In today's digital education context, the flexibility of learning design is important as students face increasingly complex and diverse sources of information (Bayly-Castaneda et al., 2024). In other words, listening learning needs to move from a single approach to a more adaptive approach to the needs of students.

Interaction of Learning Models and Learning Styles

An important finding in this study is that there is a significant interaction between learning models and learning styles on students' ability to listen to persuasive texts. These interactions show that the effectiveness of the learning model does not stand alone, but is influenced by how students respond to the given learning activities. Visual students showed the highest improvement on the PBL model because problem-based learning combined with visual digital media helped them understand the context and structure of persuasive messages more concretely. Meanwhile, auditory students obtained higher improvements on *Discovery Learning* Because this model provides more space for independent listening, observing, and discovering language patterns. These findings show that learning success is strongly influenced by the suitability between activity design and student characteristics (Sutomo & Aini, 2024). The results of this study support the differential learning theory that emphasizes the importance of adjusting learning strategies to the needs and characteristics of students. In the context of language learning, the interaction between the learning model and the characteristics of the students is important because the process of understanding the language involves cognitive, social, and psychological aspects simultaneously (Mahayanti et al., 2025). These findings also reinforce the research of Ningsih et al. (2025) who stated that active learning models have a more optimal impact when students are engaged according to their preferences and learning experiences (Ningsih et al., 2025). Thus, learning to listen to persuasive texts cannot be uniformly designed for all students because each individual's learning response is different. On the other hand, the results of this study also show that differences in learning styles do not cause extreme learning outcomes gaps. All students continue to experience improved listening skills during learning using an active model assisted by digital media. This means that the main factor that determines success is not only the learning style, but the quality of the learning activities designed by the teacher (Amelia

et al., 2025). These findings are important because some recent studies have begun to criticize the use of overly rigid learning styles in educational practice (Ezzaim, 2025). Therefore, the results of this study emphasize the importance of diversity of learning strategies rather than grouping students based on certain learning types.

Novelty and Research Contribution

The main novelty of this research lies in the integration of three aspects at once, namely *the Problem-Based Learning* model, *Discovery Learning*, and digital media in learning to listen to persuasive texts by considering the learning styles of junior high school students. Previous research has generally only focused on reading, writing, or general learning outcomes, while studies on persuasive text listening skills are still relatively limited. In addition, most previous studies have tested only one learning model without directly comparing its effectiveness in the context of learning Indonesian. Therefore, this study makes a new contribution by showing how two active learning models work in the context of digital media-based listening skills. This contribution is important because listening skills are now increasingly linked to the ability to understand persuasive messages in the digital space. From the theoretical side, this research strengthens the constructivism approach and active learning in language learning. The findings of the study show that listening skills develop more optimally when students engage in critical thinking, problem-solving, and self-exploration activities. From a practical perspective, the results of the research can be a reference for Indonesian language teachers in choosing the appropriate learning model to improve the listening skills of junior high school students. In addition, this research is also relevant for the development of a digital literacy-based curriculum because it shows that digital media can be used more meaningfully in language learning. Thus, this research not only provides academic contributions, but also practical implications for the world of education.

Research Limitations

Although this study produced significant findings, there are some limitations that need to be considered. First, the number of research samples is still limited to one school, so generalization of research results to a broader context needs to be done carefully. Student characteristics, school culture, and technology facilities at other schools are likely to affect different outcomes. Second, this study only focuses on the skills of listening to persuasive texts so that it has not been able to describe the effectiveness of the learning model on other language skills such as speaking, reading, and writing. Third, the use of learning styles in this study is still based on student perception questionnaires so that the possibility of subjectivity bias remains. In addition, the duration of treatment in the study was relatively limited, so it did not fully show the long-term impact of the use of PBL and *Discovery Learning* assisted by digital media. Follow-up research needs to be carried out with a longer time so that the development of students' listening skills can be observed in more depth. Subsequent research can also develop other variables such as learning motivation, digital literacy, critical thinking skills, or students' communication skills. Thus, the results of future research are expected to provide a more comprehensive picture of the effectiveness of digital media-based language learning at the secondary education level.

4. CONCLUSION

This study shows that Problem-Based Learning (PBL) and Discovery Learning assisted by digital media both improve the ability to listen to persuasive texts of junior high school students. However, PBL produces higher outcomes than Discovery Learning and conventional learning. These advantages show that contextual problems, information exploration, discussion, and reflection integrated in PBL help students understand the content, evaluate arguments, and interpret persuasive

objectives more deeply. The analysis also showed that the learning model, student learning preferences, and interaction were both related to listening achievement. These findings do not place learning preferences as the basis for student labeling, but rather as a consideration for teachers to design activities that are multimodal, flexible, and responsive to the diversity of ways students process information. Practically, PBL assisted by digital media can be prioritized for learning to listen to persuasive texts, while Discovery Learning can be used when learning is directed at discovering the structure and linguistic characteristics of texts.

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