

Artificial Intelligence Learning Media in Metacognitive Learning to Improve Students' Listening and Speaking Skills

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ABSTRAK. Penelitian ini dilatarbelakangi oleh rendahnya keterampilan menyimak dan berbicara bahasa bali siswa dan kurang optimalnya pemanfaatan media pembelajaran dalam kegiatan pembelajaran. Tujuan penelitian ini adalah untuk menganalisis media pembelajaran yang dapat meningkatkan keterampilan menyimak dan keterampilan berbicara bahasa bali siswa kelas V sekolah dasar. Penelitian ini menggunakan model ADDIE. Subjek dalam penelitian ini yakni siswa kelas V sebanyak 24. Metode pengumpulan data yaitu angket/kuesioner, observasi, dan tes. Instrumen yang dipergunakan untuk mengumpulkan data yaitu pedoman observasi, lembar rating scale, lembar tes, lembar dan angket/kuisisioner. Uji coba produk melibatkan siswa kelas V SDN 1 Poh Bergong yang berjumlah 24 siswa. Data dari hasil pre-test dan post-test dianalisis menggunakan uji t dengan sampel berkolerasi untuk mengetahui efektivitas produk. Hasil penelitian ini menunjukkan bahwa media artificial intelligence mesatua bali yang dikembangkan bersifat valid ditinjau dari hasil penilaian ahli, praktis ditinjau dari hasil penilaian praktisi dan efektif ditinjau dari hasil uji coba terhadap siswa. Implikasi penelitian ini yakni menjadi referensi dan bacaan bagi guru dan pembaca dalam menerapkan penggunaan AI dalam proses pembelajaran.

ABSTRACT. This research is motivated by the low listening and speaking skills of Balinese students and the suboptimal use of learning media in learning activities. The purpose of this study is to analyse learning media that can improve the listening and speaking skills of Balinese fifth-grade elementary school students. This study uses the ADDIE model. The subjects in this study were 24 fifth-grade students. Data collection methods were questionnaires, observations, and tests. The instruments used to collect data were observation guidelines, rating scale sheets, test sheets, and questionnaires. The product trial involved 24 fifth-grade students of SDN 1 Poh Bergong. Data from the pre-test and post-test were analysed using a t-test for correlated samples to determine the product's effectiveness. The results of this study indicate that the developed artificial intelligence media *mesatua bali* is valid according to expert assessment results, practical according to practitioner assessment results, and effective according to student trial results. The implications of this research are to serve as a reference and reading for teachers and readers on implementing AI in the learning process.

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1. INTRODUCTION

Language skills learning is crucial in schools, aiming to improve students' language skills for various purposes, needs, and situations (Rahmat et al., 2025; Suryandewi & Suniasih, 2022). The ultimate goal of language skills learning is to achieve complete language competence for students. Listening, as the first language skill, plays a crucial role in the development of other language skills (Ndruru, 2022; Rahmawati & Rohim, 2020). Listening skills are crucial in elementary schools because they help develop students' communication, understanding, and cognitive skills. Therefore, listening skills are an important foundation in children's educational development at the elementary school level. As teachers and parents of students, collaboration is needed to help students develop strong listening skills from an early age (Ndruru, 2022; Oktavia & Jupri, 2022).

Listening is not just about hearing; it also requires understanding the content of the conversation the speaker delivers. Students with good listening skills will easily understand what they hear and usually absorb more information than those with low listening skills (Khaliq et al., 2020; Massitoh, 2021). Therefore, listening skills are critical. The percentages are: writing 9%, reading 16%, speaking 30%, and listening 45%. In other words, good listening skills are among the factors that determine effective learning (Massitoh, 2021; Munthe et al., 2023). Listening not only hones

language skills but also sharpens analytical skills. Therefore, this statement suggests that listening can hone students' analytical skills regarding the material presented during the learning process (Anjelina & Tarmini, 2022; Dewi, 2020).

The results of interviews with fifth-grade homeroom teachers regarding efforts to develop students' listening and speaking skills in the Balinese language subject include optimising learning by occasionally implementing innovative models, such as the lecture model with *mesatua*. Based on the implementation of these efforts, students' listening skills in the *mesatua* still appear lacking. This is supported by the results of the initial test of fifth-grade students' listening skills in Balinese-language local content. The listening skills of elementary school students at SD Negeri 1 Poh Bergong are generally at the lowest level, with the average score of students who have not yet reached the Minimum Competency (KKM) in the initial listening test being 72%. Based on this, teacher innovation is needed to adjust learning components that bridge the characteristics of students at the concrete operational stage and develop students' listening skills. One aspect of the learning process for a teacher is the learning media component that can transfer broad, abstract concepts of *mesatua* material using an approach that improves students' listening skills (Anjelina & Tarmini, 2022; Nikmah et al., 2020).

Given students' high interest in using video and audio media, learning media that can improve students' listening and speaking skills in Balinese *mesatua* material can be implemented, thereby increasing the percentage of students achieving satisfactory learning outcomes. The homeroom teacher of grade V explained in an interview with the questionnaire that the teacher is more dominant in conventional learning, which uses only the teacher's books and student books as learning resources. The teacher also explained that learning Balinese *mesatua* always focuses only on the teacher and seems monotonous. In learning Balinese *mesatua*, after being given questions to understand the *satua*'s content, students' scores remain relatively low; they often forget what the teacher has said about the story of a Balinese *satua*. In learning, students still stutter in pronouncing Balinese vocabulary. Students tend to use a mixed language between Balinese and Indonesian (Aufa et al., 2020; Basri et al., 2023).

Considering the aforementioned issues, it is necessary to develop a Balinese language learning medium for older adult learners that provides a more authentic learning experience, thereby improving their listening and speaking skills. One such development medium currently in widespread use is Artificial Intelligence (Nita et al., 2023; Rahadiantino et al., 2022). In this rapidly evolving digital era, Artificial Intelligence (AI) has become a key technology shaping many aspects of human life. With the help of Artificial Intelligence technology, insights around us can be visualised in digital (virtual) form (Maulid, 2024; Sidabutar & Munthe, 2022). Information about objects and the surrounding environment can be modified into an Artificial Intelligence system, which can then be displayed on a real-world screen in real time as if the information were real (Amandha et al., 2023; Permana & Putri, 2020).

In this study, the media that can be developed is Artificial Intelligence-assisted media with Canva-AI. This artificial intelligence application creates a more engaging and interactive presentation by serving as the media carrier for Balinese *satua*. Based on Artificial Intelligence, it was developed into a learning media that tells the story of Balinese *satua*, so that in each lesson, students are stimulated to listen and understand when answering evaluation questions (Amalia et al., 2024; Maufidhoh & Maghfirah, 2023). This learning can be accessed anytime, anywhere, without an internet connection. This study tests the development of artificial intelligence media in metacognitive learning with Canva-assisted metacognitive learning strategies on students' listening and speaking skills in Balinese (Ansori et al., 2021; Nurishlah & Samadi, 2023). Learning Balinese *mesatua* is not just memorising stories; it requires listening and speaking skills, as well as a good understanding, to solve problems encountered and to connect the knowledge gained to new problems related to their previous knowledge. With this, students can rely on artificial intelligence media to more easily understand the learning material provided by applying metacognitive learning (Ninawati et al., 2022; Permana & Putri, 2020).

The purpose of this study is to analyse the effectiveness of Artificial Intelligence (AI) learning media in metacognitive learning of Balinese *Mesatua* material to improve the listening and speaking skills of fifth-grade elementary school students. This research is expected to serve as a reference and reading material for teachers and readers on implementing AI in the learning process, thereby making learning more engaging and motivating for students.

2. METHOD

This type of research is development research using the ADDIE (Analysis, Design, Development, Implementation, Evaluation) model. The research design used is a one-group pretest-posttest design. At the analysis stage, several analyses are carried out, including curriculum analysis, needs analysis, and student characteristics analysis. The design stage involves creating digital artificial intelligence learning media in Canva, with artificial intelligence as the main component. In addition, at this stage, media feasibility instruments, student response instruments, teacher response instruments, and media effectiveness instruments are also prepared. During the development stage, validation, revision, and student response collection activities are conducted. The development of products or media adjusted based on results from the two validation stages will then be implemented in the field. The application of learning media designs in real-world settings is a continuous process to ensure a product's effectiveness. The evaluation stage includes formative and summative evaluations. Formative evaluations are conducted at each stage of media development to collect data. In contrast, summative evaluations are conducted at the end of the program to assess the media's effectiveness.

The subjects of this study were 24 fifth-grade students. The data collection methods and instruments used in this study were questionnaires, tests, and observations. To ensure the validity of the rating scale test and observation instruments, the researchers took several steps, including compiling an instrument outline, conducting a pilot test with the supervising lecturer, designing the instruments, and conducting a content validity test. The instrument outline used is shown in Table 1, Table 2, Table 3, and Table 4.

Table 1. Grid of Material Expert Validation Instruments

No.	Indicators	Sub-Indicators
1.	Curriculum Suitability	The suitability of the material presented with the Learning Outcomes (CP) The suitability of the material with the Learning Objectives (TP) The suitability of the learning material with the Learning Objective Achievement Indicators (IKTP)
2.	Material Suitability	The clarity and depth of the material presented The suitability of the material presented in the media with the scope of the Balinese Mesatua learning material in grade V The material presented in the media contains concepts that are easy for students to understand The material presented in the media stimulates students' critical thinking skills The attractiveness of the material presented in the media
3.	Language Assessment	The suitability of the sentence structure used The suitability of the language used to student development
4.	Evaluation	The suitability of the questions with the material and learning objectives The availability of instructions for answering the questions

Table 2. Media Expert Validation Instrument Grid

No	Aspect	Indicators
1.	Media Display	The attractiveness and completeness of the media display or design The attractiveness of the video The harmony of the video and component layout The attractiveness of the presented images The suitability of the AI design The suitability of the AI layout
2	Media Eligibility	Media Suitability to Learning Objectives (TP) Media suitability to student characteristics. The accuracy of the material presented in the media. Media suitability to development objectives.
3	Ease of Use	Ease of use of the media. Media durability after use.

Table 3. Student Response Sheet Grid

No	Aspect	Indicators
1.	Learning Design Operational	The material is easy to understand with the help of learning media. Practice questions in the media are relevant to the material presented. Student learning independence with the help of media. Interesting learning with the help of media.
2	Visual Communication Learning Design	Systematic, coherent, logical, and clear flow. Clarity of discussion, examples, and exercises. Suitability of the number of exercises to the amount of material presented.
3	Operational	Use of fonts in the media is easy to read. Suitability of image size, color, and resolution in the media. Language used in the media is easy to understand.

Table 4. Listening Skills Instrument Grid

No	Listening Skills Stage Indicators	Question Criteria/Indicators
1.	Retelling the story	1.1 Retell the story in its entirety using your own words 1.2 Answer questions about story details.
2.	Understanding the story	2.1 Name the main and supporting characters in the story. 2.2 Explain the relationships between characters.

No	Listening Skills Stage Indicators	Question Criteria/Indicators
3.	Demonstrating or imitating the movements in the story	3.1 Critically evaluate the characters' actions and motivations 3.2 Assess the story's strengths and weaknesses
4.	Increasing knowledge	4.1 Rewrite important quotes or dialogue from the story. 4.2 Paraphrase quotes relevant to specific parts of the story
5.	Drawing lessons or insights from the story	5.1 Paraphrase messages relevant to specific parts of the story

Instrument Validity Analysis The content validity of the effectiveness instrument was tested using the content validity ratio (CVR) approach. After identifying each questionnaire item using the CVR, the validity and overall value were determined using the CVI (content validity index). The data analysis techniques used were descriptive, qualitative, quantitative, and inferential. Inferential statistical analysis was used to determine the effectiveness of the artificial intelligence learning media product *Mesatua Bali* on students' listening and speaking skills using a pretest and posttest. Before conducting the hypothesis test (t-test), prerequisite tests (normality and homogeneity) were performed. The scores for students' listening and speaking skills before and after the implementation of the learning media were compared. Suppose the significance value is <0.05 or the calculated F_{value} is $> F_{\text{table}}$. In that case, H_0 is rejected, indicating a significant difference between the groups.

3. RESULT AND DISCUSSION

Result

This development research produced a product in the form of artificial intelligence media *Mesatua Bali*. The model used to develop this media is the ADDIE model, which consists of the following stages: analysis, design/planning, development, implementation, and evaluation. Before the artificial intelligence media *Mesatua Bali* was developed, the analysis stage involved conducting interviews with the school, analysing the curriculum, studying student characteristics, and reviewing the learning media used. The purpose of this interview was to obtain data on product development needs, including problems faced by students and teachers, the availability of learning materials and media, the competencies students have achieved, an analysis of student characteristics, and the media students need and expect as users. The main problem faced by students and teachers at SD Negeri 1 Poh Bergong is the availability of learning media, especially for Balinese, which remains limited to school books. Regarding this problem, the development of media to enhance students' listening and speaking skills in Balinese through metacognitive learning is considered highly necessary in light of the 21st-century learning landscape.

In the design phase, activities were carried out to design artificial intelligence learning media using Canva artificial intelligence, which was the main component designed in digital form. In addition, at this stage, media feasibility instruments, student response instruments, teacher response instruments, and media effectiveness instruments were also developed. During the development phase, validation, revision, and student response-gathering activities were carried out. The product or media development, adjusted based on results from two validation phases, will then be implemented in the field. The appearance of the media generated at this stage is shown in Figure 1.

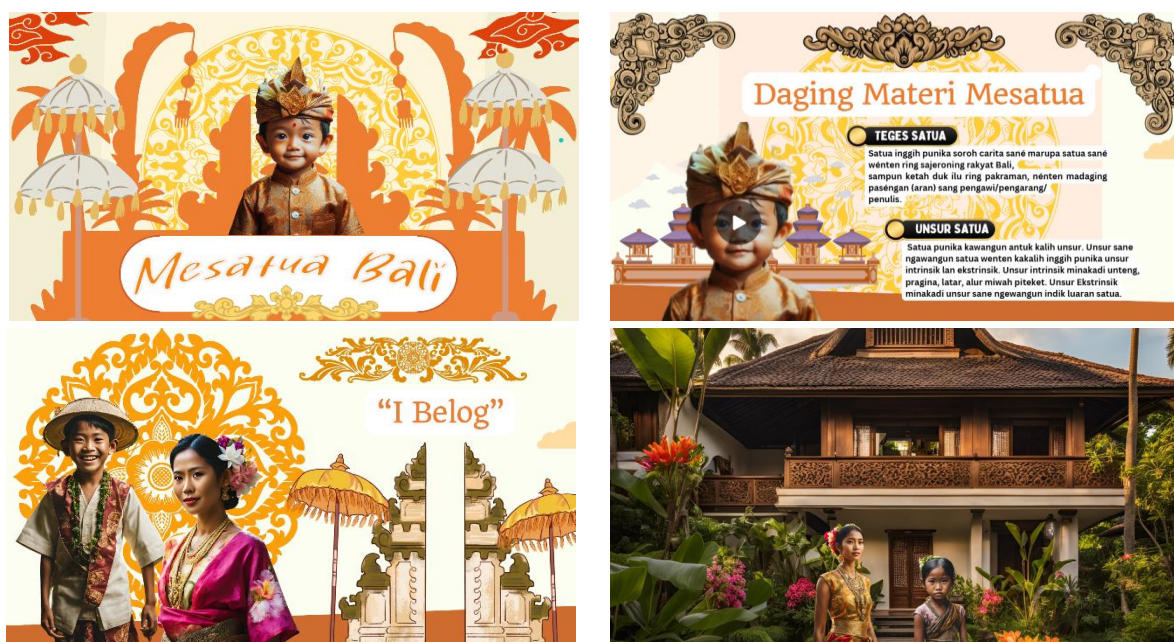


Figure 1. Display of Artificial Intelligence Media *Mesatua Bali*

The application of learning media design in real-world settings is a continuous process to ensure a product's effectiveness. In this study, the method was to apply a treatment condition to an experimental group and compare the results with a control group that was not subjected to the treatment. This stage aims to determine the effectiveness of the artificial intelligence media *Mesatua Bali* in metacognitive learning, which will be developed for listening and speaking skills among fifth-grade elementary school students. The validity testing of this development research is reviewed from two main aspects, namely testing the validity of the media according to learning material experts and testing the validity of the media according to learning media experts.

Based on the analysis, the assessment by material experts yielded an average score of 1. In contrast, media experts yielded an average score of 1. Based on the Aiken validation criteria, if the average value (V) is ≥ 0.8 , the product is included in the "High Validity" category. Therefore, it can be concluded that the artificial intelligence media *Mesatua Bali* is very suitable for use, both in terms of content and media. The practicality test in this development research is reviewed from the perspective of students as users of the artificial intelligence media *Mesatua Bali*. This test involved 24 students of SD Negeri 1 Poh Bergong. This trial process was carried out simultaneously. Based on the data obtained, the student's response to the artificial intelligence media *Mesatua Bali* achieved 90% and falls within the 90-100% range on a five-point scale. Based on this, the student response is in an excellent range.

The media effectiveness test was conducted through a pre-experiment with a one-group pre-test-post-test design. Before conducting a correlated t-test, prerequisite tests must be carried out: a normality test for data distribution and a homogeneity-of-variance test. Based on the results of the normality test for listening skills, carried out using IBM SPSS Statistics 26 for Windows, the significance value in the Kolmogorov-Smirnov column for the pre-test data was 0.200, and for the post-test data, 0.025. The significance values (Shapiro-Wilk) for the pre-test and post-test data were 0.330 and 0.088, respectively. Based on these results, it can be seen that the Sig. Value is > 0.05 for all data groups. So both data groups are normally distributed. Based on the results of the normality test analysis conducted to test speaking skills using the IBM SPSS Statistics 26 for Windows program, it shows a significance value in the Kolmogorov-Smirnov column of pre-test data of 0.161 and post-test data of 0.025 and a significance value (Shapiro-Wilk) of pre-test data of 0.195 and post-test data of 0.055. Based on these results, it can be seen that the Sig. Value is > 0.05 for all data groups. So both data groups are normally distributed.

The results of the homogeneity test of the variance of the effectiveness test data in this study using the IBM SPSS Statistics 26 for Windows program, showed that the significance value (Based on Mean) was 0.062. Based on these results, it can be seen that the Sig. value is > 0.05 , so it can be concluded that the variance of the data is homogeneous. The results of the homogeneity test of the variance of the effectiveness test data in this study using the IBM SPSS Statistics 26 for Windows program, showed that the significance value (Based on Mean) was 0.649. Based on these results, it can be seen that the Sig. value is > 0.05 , so it can be concluded that the variance of the data is homogeneous.

All prerequisites for the Paired Sample t-test/Correlated Sample t-test have been met, so the analysis can be used to test the hypothesis in this study. The results of the hypothesis testing were carried out using the Paired Sample t-test/Correlated Sample t-test. Based on the analysis using IBM SPSS Statistics 26 for Windows, a significance value (Sig. 2-tailed) of 0.001 was obtained. This value indicates that Sig. < 0.05 , so it can be concluded that H_0 is rejected and H_a is accepted. In other words, there is a significant difference between the listening skills and Balinese speaking skills of fifth-grade elementary school students before and after participating in learning using the *Mesatua Bali* artificial intelligence video. Thus, the use of the *Mesatua Bali* artificial intelligence video is efficacious in improving the listening skills and Balinese speaking skills of fifth-grade elementary school students.

The evaluation phase includes formative and summative evaluations. Formative evaluations are conducted at each stage of media development to collect data. In contrast, summative evaluations are conducted at the end of the program to assess the media's effectiveness. This evaluation also includes reflection on overall development activities and the drawing of conclusions regarding the media's effectiveness, to refine the *Mesatua Bali* artificial intelligence learning media to be developed.

Discussion

This research presents a design that serves as an initial overview of product development and as a reference for creating the artificial intelligence (AI) *Mesatua Bali*. Metacognitive learning is believed to make learning more meaningful and deepen student understanding. According to Piaget's theory of cognitive development, children aged 7 to 11 are in the concrete operational stage, where they begin to develop the ability to think logically about concrete objects and events, but still struggle to understand abstract concepts (Tresnawati, 2021; Wiweka et al., 2021). Therefore, in learning, it is important to provide direct, real-life experiences so students can connect the material to their own world. Artificial intelligence (AI) *Mesatua Bali* is well-suited to helping students understand concepts relevant to their daily lives.

The application of AI in learning is also consistent with previous research, such as the study titled "Implementation of Artificial Intelligence Learning for Elementary School Students in Batu City, Malang, East Java." The purpose of this study is to provide an understanding and explain the usefulness of Artificial Intelligence as a learning medium for students in the digital era (Aryani & Rodiyana, 2021; Rahmawati & Rohim, 2020). The results of this study encourage students and educators to support the existence of a learning system as a better educational outcome through the use and application of appropriate technology. The similarity between this study and the current study is that both discuss the use and application of AI technology as a learning medium in the digital era. This indicates that learning media

that utilise AI videos can be effective in attracting students' attention, increasing their engagement with learning materials, and supporting better understanding of the topics being taught (Ndruru, 2022; Oktavia & Jupri, 2022).

The validity of the Balinese Mesatua artificial intelligence media is tested for its suitability in supporting learning. The validity of the Balinese Mesatua artificial intelligence media is measured through a judges' test involving material experts and media experts. Based on Edgar Dale's Cone of Experience theory, learning media serve as tools to create meaningful learning for students. Learning media includes everything that can be used to convey messages from the sender to the recipient. Videos contain materials, examples, and evaluations. The material includes the definition of satua, its characteristics, elements, examples of Balinese satua, and several practice questions (Khaliq et al., 2020; Massitoh, 2021). With the media validity test, the Balinese Mesatua artificial intelligence video is expected to be closer to authentic experiences and more effective in helping students understand Balinese language material in an engaging, easy-to-understand way.

The practicality of the *Mesatua Bali* artificial intelligence media was tested on students. The practicality test applied to students aimed to determine whether the media could be used easily, without causing technical obstacles or difficulties for both students and teachers during the learning process. In line with Piaget's theory, which emphasises the importance of teaching that facilitates conceptual understanding, this AI media was designed to be easily accessible and usable by fifth-grade elementary school students (Dewi, 2020; Munthe et al., 2023). Fourth, the effectiveness of the *Mesatua Bali* artificial intelligence media in improving students' understanding of Balinese language material was examined. The Cone of Experience theory emphasises that more realistic, interactive learning experiences are more effective at improving students' skills. In this case, the *Mesatua Bali* artificial intelligence media can increase student motivation and engagement in learning (Anjelina & Tarmini, 2022; Nikmah et al., 2020). By providing relevant and engaging contexts, such as integrating Balinese language with AI, students not only learn Balinese but also do so in diverse ways (Larosa & Iskandar, 2021; Rayhan et al., 2023). Through interactive media activities, students can develop their listening and speaking skills in Balinese.

This research is expected to make a significant contribution to the advancement of education. Theoretically, this research shows that the use of artificial intelligence media *Mesatua Bali* in Balinese language learning can be effective in developing listening and speaking skills. This is supported by various previous studies discussed in Chapter II. In addition, this research plays an important role in training teachers and students to use technology in learning in the 21st century. The limitation of this research is that the artificial intelligence media focuses only on the material *Mesatua Bali* in the Balinese language subject for grade V elementary school, so extending it to other topics will require further adjustments.

4. CONCLUSION

Based on the research results, the use of artificial intelligence (AI) media, *Mesatua Bali*, is efficacious in improving Balinese listening and speaking skills. These findings can inform the design of learning media tailored to students' needs and characteristics, and aligned with current developments. This study also provides a positive perspective on smartphone use in educational contexts. The findings can serve as a basis for developing similar learning products to improve the quality of education and serve as a reference for further research..

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