

# Development of Interactive Multimedia Indonesian Language Teaching Material Based on Problem-Based Learning (PBL) in Elementary Schools

Fitra Ramadani<sup>1</sup>, Desyandri<sup>2</sup>, Elfia Sukma<sup>3</sup>, Yeni Erita<sup>4</sup>

<sup>1</sup> Universitas Negeri Padang, Padang, Indonesia; [fitramadani21@student.unp.ac.id](mailto:fitramadani21@student.unp.ac.id)

<sup>2</sup> Universitas Negeri Padang, Padang, Indonesia; [desyandri@fip.unp.ac.id](mailto:desyandri@fip.unp.ac.id)

<sup>3</sup> Universitas Negeri Padang, Padang, Indonesia; [elfiasukma105@gmail.com](mailto:elfiasukma105@gmail.com)

<sup>4</sup> Universitas Negeri Padang, Padang, Indonesia; [yenierita@fip.unp.ac.id](mailto:yenierita@fip.unp.ac.id)

---

## ARTICLE INFO

### Keywords:

Interactive Multimedia;  
Articulate Storyline 3;  
Google Form;  
Problem-based Learning

### Article history:

Received 2023-11-15

Revised 2023-12-01

Accepted 2024-06-30

## ABSTRACT

Contemporary education necessitates innovative teaching strategies and the integration of digital technologies. Current observations indicate that the learning process remains one-way, lacking student engagement. Thus, there is a pressing need for technological advancements in learning media, mainly Indonesian language instruction. This research endeavours to develop interactive multimedia teaching materials based on the Problem-Based Learning approach, utilizing the Articulate Storyline 3 application in combination with Google Forms for elementary schools. Following the ADDIE development model, the research employs various data collection methods, including observation sheets, validation instruments, interview questionnaires, practicality assessments, open evaluation questionnaires, and evaluation tests (Pretest and Posttest), which are then analyzed descriptively, qualitatively, and quantitatively. This research was conducted in 3 elementary schools in Padang City. The product validity test results obtained an overall average score of 95.38 in the very valid category. The results of the practicality test for teacher and student responses received an average score of 92.05 and 96.59 in the very practical category. The effectiveness test results are effective, with an average N-Gain Score of 0.81. This interactive multimedia meets the characteristics of interesting learning multimedia, is easy to operate, and is very suitable for meeting students' needs.

*This is an open access article under the [CC BY-NC-SA](https://creativecommons.org/licenses/by-nc-sa/4.0/) license.*



## Corresponding Author:

Fitra Ramadani

Universitas Negeri Padang, Padang, Indonesia; [fitramadani21@student.unp.ac.id](mailto:fitramadani21@student.unp.ac.id)

---

## 1. INTRODUCTION

Education involves the dynamic interaction among students, educators, and learning materials. In the learning process, educators must have strategies so that students can achieve goals in obtaining optimal learning outcomes. The implementation of education must be carried out by the National

Education System (Oktavi & Taufina, 2020). Leveraging technology can facilitate the creation of digital teaching resources. Digital teaching materials are digitalized books with engaging elements like text, images, audio, animations, and videos (Mastroleo, 2020; Tambunan, Siregar, & Susanti, 2020). Digital teaching materials are prepared based on the principles of developing teaching materials, including needs analysis, design development, implementation, assessment, evaluation, validation, and quality assurance. A teaching material design is developed in stages, namely determining the learning strategy and learning media (Prananda, Wardana, & Darniyanti, 2021).

Learning Indonesian is one of the subjects that can involve students directly in acquiring knowledge, thereby generating curiosity in students. Currently, Indonesian language teaching methods are still monotonous and conventional. This causes students not to be able to develop their curiosity fully. In class IV, Indonesian language learning, one of the materials that will be discussed is traffic sign symbols. Material about traffic signs is very important because students are invited to understand and know about traffic sign symbols (Abbas et al., 2020). If this material is not taught well, it could impact students' understanding of traffic rules and road safety. A lack of knowledge of traffic sign symbols can create a risk of misinterpretation in the future when on the road.

Based on the results of observations during face-to-face learning at Elementary School Pembangunan Laboratorium UNP, Public Elementary School 26 Air Tawar Timur, and Public Elementary School 33 Kalumbuk, Padang City, it is known that the face-to-face learning process is still running in one direction and is centred on teachers who mostly deliver material using the lecture method. At the same time, students only listen to what the teacher says. From the results of these observations, it is also known that students are less interested in participating in the learning process, and most students have difficulty understanding the material using the media the teacher uses.

The factor causing this problem is that teachers do not use interactive learning media that integrate sophisticated technology that can support the learning process. Apart from that, teachers do not provide opportunities for students to carry out independent learning, starting from observing a problem and training students to analyze, experiment, process information, collaborate, conclude, and communicate from an object or event object (Rahmadani & Taufina, 2020).

Based on the problems and needs of students in the learning process, researchers can offer a solution to develop teaching materials based on 21st-century learning models using technology in their application to improve student learning outcomes. Learning outcomes are a person's abilities after learning (Sari and Sukma, 2021). Learning outcomes play an important role in learning because they inform teachers about students' progress in achieving learning goals in the subsequent teaching and learning process (Tasya and Abadi, 2019).

Based on research conducted by (Apriati, Mulawarman, and Ilyas, 2021) entitled "Development of Interactive Multimedia-Based Listening Teaching Materials in Thematic Lessons with the Theme "The Beauty of Togetherness" for Class IV Elementary School Students" states that student learning outcomes show positive development and can be improved by teachers developing listening teaching materials in the form of interactive multimedia.

Interactive multimedia is a computer program that functions as a learning medium in the classroom and contains digital content that combines audio, reading, images, video, and animation to create a coherent whole (Agustina and Desyandri, 2022). Interactive multimedia is a learning tool that can generate interaction between students and subjects so that they influence each other (Aulia et al., 2023). Interactive multimedia can also optimize the student-centred learning process (Diyana et al., 2020). Apart from that, the teacher's interactive media learning flow can run in 2 directions; for example, students can share feedback for a teacher's success in delivering the material (Nahdiah et al., 2023). The basics used to design interactive multimedia in learning for class IV students are that learning combines several media components such as text, colour, design graphics, animation, audio, video and quizzes. Applications that can be applied to support the creation of interactive multimedia are Articulate Storyline 3 and Google Form.

*Articulate Storyline 3* in learning is a learning media animation software that assists teachers in delivering knowledge to make students interested in the teaching being carried out and increase students' interest in education (Agustina and Elan, 2021). Articulate Storyline 3 serves as a valuable authoring tool, facilitating the creation of interactive educational content by seamlessly integrating various media elements such as text, graphics, images, sound, animation, and video (Amiroh, 2019) so that its use is entirely interactive and exciting, students with an auditory or visual learning type can learn well and have fun (Ridho and Didah, 2023). The interactive learning media Articulate Storyline 3 aims to be an alternative learning media that can create a new and interesting learning atmosphere and can help teachers convey material that is difficult to explain (Fadilah and Erita, 2021).

Based on this, it can be inferred that Articulate Storyline 3 has the potential for crafting interactive multimedia instructional resources within the self-directed curriculum at elementary schools. This assertion finds backing in studies indicating that using Articulate Storyline 3 within independent curriculum education enhances student engagement in the classroom compared to traditional media methods. Integrating Articulate Storyline 3 and Google Form is integral in creating these interactive multimedia teaching materials.

*Google Forms* is an application service from Google that teachers can use as a learning medium to create questions and attendance lists with automatic saving (Adzkiya and Suryaman, 2021). Google Form serves various purposes in the field of education, including a) Offering online practice assignments or tests through the website page, b) Gathering opinions from different individuals via the website page, c) Collecting diverse data from both students and teachers through the website page, d) Developing an online registration form for schools, e) Distributing questionnaires to people online (Parinata and Puspaningtyas, 2021).

The use of Google Forms in learning is based on previous research by (Parinata and Puspaningtyas, 2021) entitled "Optimizing the Use of Google Forms in Mathematics Learning". The research findings indicated that the outcomes of the indicators yielded 54% unfavourable and 57% favourable results in optimizing the online platform Google Forms. This suggests that as an online medium, Google Forms serves as a significantly valuable resource in addressing challenges related to online learning (e-learning). Another statement from (Aini et al., 2021) in their research entitled "Using Google Forms as a Learning Media in Building Volume Material at Pubic Elementary School 1 Kwagean" stated that there was an increase in learning outcomes using Google Forms as a learning media with success percentage in cycle I of 45% and an increase in cycle II, the rate of success reached 86 %.

Based on this information, it can be interpreted that Articulate Storyline 3 and Google Form are suitable and can be applied as interactive multimedia teaching materials in independent curriculum learning. The combination of Articulate Storyline 3 and Google Form based on the Problem-Based Learning (PBL) model is the latest in this research as a differentiator from previous research.

Learning models are significant to use in learning, especially in the independent curriculum, which is one of the important components applied to students in the learning process. The Problem-Based Learning (PBL) model employs an approach where students engage with authentic, real-world problems in a structured and open manner. This serves as a context for students to cultivate problem-solving and critical thinking skills, fostering the construction of new knowledge (Novelita and Darmansyah, 2022). The Problem-Based Learning (PBL) model, which encourages students' active learning, is also by the Independent Curriculum concept, which develops one's ability to become a lifelong learner (Mawarsari and Wardani, 2022).

Several research results support the idea that using the problem-based learning (PBL) model in elementary schools is possible. Among them is research conducted by (Novelita and Darmansyah, 2022) with the title "Increasing Activities and Learning Outcomes of the Independent Curriculum Using the Problem-Based Learning (PBL) Model in Class IV Elementary Schools". According to the research findings, there was a 24% rise in student learning engagement and a 15% improvement in learning outcomes. This demonstrates the effectiveness of the Problem-Based Learning (PBL) model in enhancing both the activity levels and academic achievements of fourth-grade students at SDN 23 Malabur.

Next, research has been carried out by Mawarsari entitled "The Effect of Implementing the Problem-Based Learning Model on Numeracy Skills in the Independent Curriculum for Grade 1 Elementary School Students". This research adopts an experimental approach employing a pre-experimental design with a single-group pretest-posttest conducted in a first-grade elementary school. The research outcomes indicate that the application of the Problem-Based Learning (PBL) model significantly influences the numeracy abilities of first-grade students at Public Elementary School Kesongo 01 Tuntang, as evidenced by the results of hypothesis testing using the Paired Sample T-test, where the significance value is  $0.000 < 0.05$ .

Based on the explanation of the problem and the information above, the researcher wants to make an effort as a solution to overcome the problems found in the field, where this effort is also appropriate in responding to the challenges and demands of 21st-century learning. Therefore, the researcher wants to conduct research titled "Development of Interactive Multimedia Indonesian Language Teaching Material Based on Problem-Based Learning (PBL) in Elementary Schools".

## 2. METHODS

The type of research used in this research is development research. Development research simplifies research and development (R&D) (Oktavia and Desyandri, 2021). The educational research and development approach in this research was utilized to produce Interactive Multimedia Indonesian Language Teaching Materials Based on the Problem-Based Learning (PBL) Model for Class IV Elementary Schools. This development research uses the ADDIE model. The implementation of the ADDIE development model involves a sequence of stages, which include Analysis, Design, Development, Implementation, and Evaluation (Roza and Desyandri, 2021).

### 2.1 Analysis stage

The stage where the researcher carries out a needs analysis by collecting information through interviews, observations, and questionnaires analyzing the needs of teachers and students to obtain information related to the problems experienced by the school to be studied and solutions to solving the problems from the school.

### 2.2 Design stage

The design stage is planning or designing the product you want to develop. Interactive multimedia Indonesian language teaching materials are designed using the Articulate Storyline 3 application, a combination of Google Forms, which can be saved on computers, laptops, and cellphones, making it easy for teachers and students to use.

### 2.3 Development stage

At this stage, a feasibility test of the product is carried out by validating the product, which is being developed with validators who are media, material, and language experts (Y. Arisanti & Adnan, 2021). The steps taken at this development stage are as follows: 1. Validation Stage, where the developed product will be validated by a validator of teaching materials and modules using a validation sheet instrument. Input and suggestions from validators of teaching materials and modules are used to revise or improve products. After receiving validation from the validators, data analysis is then carried out from the results of the validation sheet instrument so that it is known whether the product being developed is valid or invalid. 2. Revision Stage is the stage where the researcher makes revisions or improvements to the development product based on the results of the instrument in the form of a validation sheet, which has been given suggestions, input, and criticism from the validator. 3. Focus Group Discussion (FGD). FGD is a discussion method carried out by teachers and researchers that includes information about the use of media developed by researchers during learning. This FGD aims to discuss and obtain feedback from teachers regarding the operation of the media created by researchers. The results of data validation and reviews from validators of teaching materials and

modules and FGD participants are processed to obtain product-related information so that the quality and suitability of interactive learning multimedia are known.

#### 2.4 Implementation stage

This stage is carried out after obtaining validity results declared appropriate by the validator, and the product has been revised according to suggestions and input. This implementation stage consists of 2 stages: small-group testing and large-group testing. The implementation stage tested the practicality of interactive multimedia Indonesian language teaching materials based on the Elementary School Problem-Based Learning (PBL) model.

#### 2.5 Evaluation stage

This stage is related to the product assessment results that have developed in the form of formative and summative evaluations. Formative evaluation is carried out while the program is in progress, namely when collecting data at each stage that has been passed (Desyandri, 2018). This evaluation explains the quality results of the product that has developed and whether improvements have been made to the product being developed or not (Arisanti and Adnan, 2021). Meanwhile, an assessment conducted after the program aims to evaluate its influence on student learning outcomes and the overall quality of the learning experience (Desyandri, 2018).

The subjects in this research consisted of teaching material validators (3 material experts, one media expert, and one language expert), teaching module validators (3 experts), FGD participants (3 teachers and nine experts), and three implementing Elementary Schools, namely, Elementary School Pembangunan Laboratorium UNP North Padang District, Public Elementary School 26 Air Tawar Timur, North Padang District (Group IV) which consists of 20 students, Public Elementary School 33 Kalumbuk, Kuranji District (Group IV) which consists of 18 students. The object of this research is learning media in interactive multimedia based on Articulate Storyline 3 combined with Google Form in Indonesian language learning for Class IV Elementary School Chapter 3 Look around, Traffic Theme.

The data collection methods used in this research are observation sheets, validation instrument interview questionnaires, practicality questionnaires, open evaluation questionnaires, and evaluation tests in the form of (pretest and post-test) which aim to find out whether student learning outcomes have improved or not at the same time. To find out whether the learning media used is effective. The instrument used to validate teaching materials is a validation sheet to see the teaching materials' validity. The validation sheet for teaching materials comprises three components: media validation, material validation, and language validation. The material validation tool assesses the compatibility of interactive multimedia designed to align with the adapted curriculum. The media validation tool evaluates interactive multimedia design, considering the suitability of typography, layout, images, and colours employed in educational media. The linguistic validation tool addresses the linguistic aspects of interactive multimedia, ensuring that it is easily understandable for students. The measurement scale uses a 5 (five) scale, namely, 1 = very poor, 2 = not good, 3 = fair, 4 = good, and 5 = very good.

**Table 1.** Teaching Material Instrument

Rated aspect	Assessment Score			
	4	3	2	1
<b>A. Eligibility of Content (Material)</b>				
1	Teaching materials are designed according to learning outcomes			
2	Teaching materials display information regarding learning outcomes, learning objectives, and learning topics.			
3	Teaching materials have supporting information regarding the material taught.			
4	Teaching materials provide tests in the form of material exercises for students.			
5	The designed teaching materials contain work instructions.			
6	Teaching materials are designed according to student's needs.			

- 7 Teaching materials are designed according to the demands of learning problems.
- 8 The truth of the teaching materials with the substance of the learning materials
- 9 Teaching materials can become a medium that bridges communication in effective learning between students and their educators.
- 10 Suitability of teaching materials to moral and social values
- 11 The designed teaching materials contain learning components or steps that use the PBL model.
- 12 Teaching materials have assessments in them.

---

#### **B. Grammar**

---

- 13 Teaching materials that are easy to read (readability aspect)
- 14 The information contained in teaching materials is clear and easy to understand
- 15 Teaching materials comply with reasonable and correct Indonesian language rules.
- 16 Teaching materials can use effective and efficient language (short and clear).
- 17 The writing style in teaching materials is communicative and semi-formal.

---

#### **C. Presentation**

---

- 18 Clarity of learning outcomes could be found in teaching materials
- 19 Systematic ordering of presentations in teaching materials
- 20 Teaching materials can motivate and attract students' attention.
- 21 Teaching materials can enable students to interact.
- 22 Teaching materials present complete information.

---

#### **D. Graphics**

---

- 23 The writing on the display of teaching materials uses varied types of writing and proportional sizes.
  - 24 The layout of teaching materials is arranged neatly.
  - 25 Teaching materials use various supporting elements, such as animated image recordings.
  - 26 Design the appearance of teaching materials that are attractive and unconventional or monotonous.
  - 27 The layout of the teaching materials is arranged neatly.
- 

Meanwhile, the instrument used in validating teaching modules is the validation sheet. A validation sheet is created based on the variables assessed in the teaching module. The variables evaluated in the teaching module contain general information, core components, selection of learning material methods and details of learning steps with demonstration method steps, selection of learning resources, and assessment. Each variable assessed in the teaching module has several appropriate indicators. Evaluation of the validity score of the teaching module uses the impulse buying scale. The assessment of each variable given for the favourable statement indicator is 4 = very suitable, 3 = suitable, 2 = less suitable, 1 = not suitable, and 0 = very unsuitable.

**Table 2.** Teaching Module Instruments

No	Variable	Indicator	Score				
			4	3	2	1	0
1	General information	Include module identity: name of author, institution, subject, topic, and primary material. Include initial competencies Includes Pancasila student profiles Facilities and infrastructure Target students Learning models and methods					
2	Core components	Learning activity objectives (CP) Learning objectives Learning objective flow (ATP)					
3	Selection of learning materials	By the ATP that will be achieved Teaching materials are appropriate to everyday life.					
4	Methods and details of learning steps with demonstration method steps	Learning activities consist of preliminary activities, core activities, and closing activities Learning activities follow the steps of the demonstration method. Learning activities increase student participation in learning. Learning activities help to improve students' memory.					
5	Selection of learning resources	By learning material According to the demonstration method used To the needs of students and related to the environment					
6	Evaluation	Questions can measure the achievement of learning goals The difficulty level of the questions is tiered from easy to more challenging.					

Furthermore, the practicality instrument consists of a student response questionnaire regarding the practicality of the independent curriculum learning material media and a teacher response questionnaire regarding the suitability of the independent curriculum learning media developed. The practicality assessment tool for student and teacher responses was designed to assess the media design's feasibility based on the gathered data. The two questionnaires are filled in after the learning process is complete. The instrument grid consists of the practicality of use, time efficiency, suitability of illustrations, language, and evaluation.

In this research, qualitative and quantitative analysis are used. The qualitative descriptive analysis approach examines and handles data derived from validator assessments, focus group discussion outcomes, and responses gathered from open evaluation questionnaires. This includes feedback, critiques, and suggestions or input for interactive multimedia learning. Meanwhile, the quantitative descriptive analysis method is used to process data obtained from validity instruments, practicality, and evaluation tests (Pretest and Posttest), which are data in the form of numbers or scores.

The scores obtained for each assessment aspect will be added to the validation aspect, and the average will be calculated. The mean score for the validation outcomes will be calculated by dividing

the total validation score by the number of elements assessed, employing a specific formula (Sunarto, 2015) as follows:

$$x = \frac{\sum xi}{n}$$

Information:

- X : Average validation score
- $\sum xi$  : Total score from validation results
- n : Number of aspects assessed

To determine the validation scoring presentation, researchers used the following formula:

$$\frac{\text{Average Validation Score}}{\text{Maximum Score}} \times 100\% = \text{Final Presentation}$$

**Table 3.** Guidelines for Categorizing Validation Test Results

Intervals	Category	Information
81-100%	Very Valid	Very valid; no need for revision
61-80%	Valid	Valid needs minor revision
41-60%	Fairly Valid	Valid can be used with moderate revision
21-40%	Less Valid	Needs major revision
1-20%	Invalid	It cannot be used

In the practical aspect, the final score from the questionnaire is analyzed using the formula:

$$NA = \frac{PS}{SM} \times 100 \%$$

Description:

- NA = Final Value
- PS = Temporary Gain
- BC = Maximum Score

The practicality assessment criteria are analyzed and concluded as follows:

**Table 4.** Guidelines for Categorizing Practicality Test Results

Percentage (%)	Category
76% - 100 %	Very Practical
51% - 75%	Practical
36% - 50%	Quite Practical
<35%	Less Practical

Subsequently, a test on the effectiveness of the media was conducted to identify variations in student learning outcomes before and following the utilization of Articulate Storyline 3 media, incorporating a combination of Google Forms with the N-Gain score test. The N-Gain score assesses the developed product's efficacy in enhancing student learning outcomes, gauged by the disparity between the initial and final test results. In analyzing the effectiveness of the pretest and posttest results using the N-Gain Score with the following formula:

$$N - Gain = \frac{Spost - Spre}{Smaks - Spre} \times 100$$

Information :

- Spost = Posttest score
- Spre = Pretest score
- Smax = Ideal maximum score (100)

The calculation results using the formula interpreted into the N-Gain value criteria categories are shown in the following table:

**Table 5.** N-Gain Score Assessment Criteria

N-Gain Value	Category
$n\text{-gain} \geq 0.7$	Tall
$0.7 > n\text{-gain} \geq 0.3$	Currently
$n\text{-gain} < 0.3$	Low

The results obtained are in the form of percentages. Then, the results of this calculation are compared with the effectiveness assessment criteria, which can be seen in the following table:

**Table 6.** Learning Effectiveness Criteria

Percentage	Category
< 40	Ineffective
40 – 54	Less effective
55- 74	Effective enough
> 75	Effective

### 3. FINDINGS AND DISCUSSION

Interactive multimedia development aims to help students understand learning material and inspire them to learn enthusiastically. Apart from that, this can also motivate teachers to create more creative learning media.

#### 3.1 Analysis Stage

The development of interactive multimedia-based Indonesian language teaching materials based on elementary school Problem-Based Learning (PBL) in the Indonesian language subject CHAPTER 3 Look Around Theme Traffic pays attention to analysis, namely:

##### 3.1.1 Needs Analysis

The requirements analysis was conducted at three elementary schools, namely in class IV at UNP Laboratory Development Elementary School, Public Elementary School 26 Air Tawar Timur, and Public Elementary School 33 Kalumbuk, Padang City. The information that the researchers obtained from the preliminary study was that in learning, the teachers only used printed books from publishers and worksheets that the school had provided without any variations using technology. Even in schools, there are facilities and infrastructure that teachers can use to vary teaching methods, such as InFocus and available internet networks, but the facilities and infrastructure provided have not been utilized optimally.

##### 3.1.2 Curriculum Analysis

At the curriculum analysis stage, there are several steps taken as follows: (1) Determining Learning Outcomes, (2) Analyzing Learning Objectives and developing them, (3) Creating interactive multimedia Indonesian language teaching materials based on Elementary School Problem-Based Learning (PBL), (4) Calculating allocation of time needed to apply the product to the independent learning curriculum learning. (5) Develop a class IV teaching module for the Indonesian language subject in the CHAPTER 3 Look Around Traffic Theme. The teaching materials developed are adapted to curriculum analysis mapping as a basis for developing interactive multimedia Indonesian language teaching materials based on the Problem-Based Learning (PBL) model.

##### 3.1.3 Analysis of Student Characteristics

This research was carried out in class IV of UNP Laboratory Development Elementary School, Public Elementary School 26 Air Tawar Timur, and Public Elementary School 33 Kalumbuk, Padang City, in the 2023/2024 academic year. There are 58 students from these three schools. The researchers carried out the UNP Laboratory Development Elementary School for the small group test. In contrast, the researchers carried out Public Elementary School 26 Air Tawar Timur and Public Elementary School

33 Kalumbuk for the large group test. The researchers obtained information from the fourth-grade teachers of each school. The results that researchers got through observation, interviews, teacher questionnaires, and student questionnaires:

- 1) Students are interested in teaching materials that have an attractive appearance.
- 2) Students are interested in teaching materials that present pictures, videos, and animations.
- 3) Students enjoy learning using teaching materials that can be used on laptops or cellphones or focused in class.

Based on the conclusions of the evaluation of the three aspects above, the design of teaching materials is carried out by what has been obtained at the analysis stage.

### 3.2 Design Stage

At this stage, teaching materials are designed based on each data analysis in the preliminary study. Interactive multimedia Indonesian language teaching materials are designed using the Articulate Storyline 3 application in combination with Google Form, which can be saved on a computer, laptop, or flash disk. Which means teachers and students can use it. At this stage, it is carried out by preparing a framework for the media that will be developed, namely 1) Cover page, 2) Menu page, 3) Core Competencies, 4) Basic Competencies, 5) Indicators, 6) Learning Objectives, 7) Materials, 8) Quizzes.

### 3.3 Development Stage

At this stage, the activities validate the teaching materials developed and the teaching modules as a reference for the teacher to present the material. Next, a Focus Group Discussion (FGD) was held to add input for improvements to teaching materials from teachers. Discussions in the FGD related to how to operate the teaching materials that had been designed. At the end of the meeting, a validation questionnaire was distributed, as well as suggestions, comments and input for improving the teaching materials. Then, the researchers revised teaching materials according to suggestions or feedback from FGD participants.

#### 3.3.1 Validation of Teaching Materials

Interactive multimedia Indonesian language teaching materials based on the Problem-Based Learning (PBL) model using the Articulate Storyline 3 application combined with Google Form in class IV elementary schools were validated by experts in their respective fields. The teaching materials developed were validated by five validators, including four validators from universities and one from an elementary school who validated three aspects. This includes validators for material, language, and presentation/graphics aspects, each providing an assessment and suggestions for improvements to teaching materials.

**Table 7.** Validation Results of Teaching Materials

Rated aspect	Validation Value	Category
Eligibility of Content (Material)	94.58	Very Valid
Grammar	98.00	Very Valid
Presentation	94.00	Very Valid
Graphics	96.25	Very Valid
Average	95.38	Very Valid

The validation results on the material aspect (feasibility of content) received an average score of 94.58, which is very valid. Furthermore, an average score of 98.00 was obtained in the very valid category in the language validation. In the presentation aspect, the average score was 94.00, included in the very valid category. The final validation in the graphic aspect was obtained an average score of 96.25, which was included in the very valid. From the validation test results on the four aspects above, an average value of 95.38 was obtained, which is in the very valid category. Overall, the validation test of Indonesian language teaching materials with interactive multimedia based on the Problem-Based Learning (PBL) model using the Articulate Storyline 3 application combined with Google Form in class

IV elementary school is in the very valid range. The following is a display of interactive multimedia based on Articulate Storyline 3 combined with Google Form.



Figure 1. Main Page Image



Figure 2. Developer Profile Page



Figure 3. Image Button Instructions Page



Figure 4. Attendance Page



Figure 4. Image Login Page



Figure 6. Menu Page

### 3.3.2 Validation of Teaching Modules

The teaching module is validated by three higher education validators, each of whom provides assessments and suggestions for improvements to the teaching module. The evaluation is carried out on six aspects: general information, core components, selection of learning materials, methods and details of learning steps using demonstration methods, selection of learning resources, and assessment.

Table 8. Teaching Module Validation Results

Rated aspect	Validation Value	Category
General information	98.61	Very Valid
Core Components	94.45	Very Valid
Material Selection	91.67	Very Valid
Learning Methods and Details	97.92	Very Valid
Selection of Learning Resources	94.45	Very Valid
Evaluation	87.5	Very Valid
Average	95.42	Very Valid

The validation results obtained in the general information aspect, with an average value of 98.61, were very valid. In the core component aspect, an average score of 94.45 was obtained in the very valid category. In the material selection aspect, the average score was 91.67, including the very valid category. In the aspects of methods and details of learning, an average score of 91.67 was obtained, including the very valid category. In the aspect of selecting learning resources, with an average score of 94.45, which is in the very valid category and the assessment aspect, with an average score of 87.50, which is in the very valid category, and the overall assessment aspect, the validation results of the teaching module are in the average category. The average value is 95.42, which is in the very valid category range.

### 3.3.2 Focus Group Discussion (FGD)

In this research, FGD was conducted to provide teachers with an understanding of the teaching materials that have been designed and to validate the teaching materials. This activity was carried out at one of the elementary schools, namely Public Elementary School 26 Air Tawar Timur, attended by 12 teachers as participants and researchers as presenters. The FGD discussed operational methods for using teaching materials designed to be used in learning. At the end of the lesson, a validation questionnaire was distributed to the 12 teachers who participated in the FGD. Validation was carried out on four aspects: material, language, presentation, and graphics.

**Table 9.** Focus Group Discussion Results

Rated aspect	Validation Value	Category
Eligibility of Content (Material)	96.87	Very Valid
Grammar	94.16	Very Valid
Presentation	97.08	Very Valid
Graphics	98.43	Very Valid
Average	96.50	Very Valid

The validation results for the material aspect obtained an average score of 96.87, which was in the very valid category. An average score of 94.16 was in the very valid category for the language aspect. For the presentation aspect, the average score was 97.08, and for the graphic aspect, an average value of 98.43 was obtained. Overall, the validation test for teaching materials using the PBL model based on the Articulate Storyline 3 application combined with Google Form is in the very valid category with an overall average score of 90.95 and is suitable for implementation in learning.

### 3.4 Implementation Stage

Teaching materials declared valid and ready to be implemented or applied to two schools, Public Elementary School 26 Air Tawar Timur and Public Elementary School 33 Kalumbuk. In the implementation stage, students use laptops and cell phones for teaching materials. Meanwhile, as the implementer of this research, the teacher displays teaching materials using a computer and projector in front of the class.

Upon the conclusion of utilizing instructional materials, the researchers administered questionnaires to both teachers and students to gauge their feedback on the materials employed. The questionnaires presented to teachers and students encompassed five facets, comprising questions on practicality (4 questions), time efficiency (1 question), appropriateness of illustrations (1 question), language considerations (2 questions), and evaluation (3 questions)

Apart from the questionnaire, students are also given questions. Giving questions aims to measure the effectiveness of teaching materials after use. There are 30 questions prepared consisting of 25 multiple-choice (PG) questions and five fill-in-the-blank questions. The questions designed include questions regarding the Indonesian language subject CHAPTER 3 Look Around the Traffic Theme. The questions chosen are guided by operational verbs appropriate for the HOTS question level so that students do not just do the questions they do but understand the meaning of the questions and answers.

### 3.5 Evaluation Stage

The data obtained from the implementation stage is evaluated to see the practicality and effectiveness of the teaching materials after use.

#### 3.5.1 Practicality Evaluation

The following are the results of a questionnaire evaluation of the practicality of teachers' responses to interactive multimedia Indonesian language teaching materials based on the Problem-Based Learning (PBL) model;

**Table 10.** Recapitulation Results of Student Response Questionnaires

No	Statement Indicator	Statement Items	Teacher Assessment Results		Average	The Value of Practicality	Category
			G1	G2			
1	The practicality of using teaching materials	Helping teachers expand learning alternatives	3	4	3.5	87.5	Very Practical
		It makes easier for teachers to present real context in learning	4	4	4	100	Very Practical
		Teaching materials make it easier for teachers to attract students' interest in learning	4	4	4	100	Very Practical
		Teaching materials have a practical size and are easy for teachers to read	4	4	4	100	Very Practical
2	Time efficiency of Suitability of illustration	Learning time becomes more effective	3	4	3.5	87.5	Very Practical
		Images in teaching materials make it easier for teachers to help students understand the material	4	4	4	100	Very Practical
3	Language	The language used in teaching materials is by EBI	4	3	3.5	87.5	Very Practical
		The presentation of sentences is easy for teachers to understand	4	3	3.5	87.5	Very Practical
4	Evaluation	Questions in teaching materials are appropriate to students' abilities	3	4	3.5	87.5	Very Practical
		Questions in teaching materials are by the Independent Learning Curriculum	3	4	3.5	87.5	Very Practical
		Questions in teaching materials are by CP (Learning Outcomes)	3	4	3.5	87.5	Very Practical
Total Average					3.68		Very Practical
Mean Total Practicality Score						92.05	Very Practical

Based on the table above, it can be seen that the average total practicality score was obtained with a value of 92.05. It can be concluded that after the trial was carried out and teacher response questionnaires were distributed regarding interactive multimedia Indonesian language teaching materials based on the Problem-Based Learning (PBL) model for elementary schools, it was included in the efficient category. Apart from distributing questionnaires to teachers, researchers also distributed questionnaires to students, who are the main actors in learning. The following are the results of recapitulating the response questionnaire given to students.

**Table 11.** Recapitulation Results of Student Response Questionnaires

<b>Instrument</b>	<b>The Value of Practicality</b>	<b>Information</b>	
<b>The practicality of using teaching materials</b>			
1	Helping students expand learning alternatives	95.39	Very Practical
2	Make it easier for students to understand the learning material	98.03	Very Practical
3	Teaching materials make me study hard.	97.37	Very Practical
4	Teaching materials have a practical size and are easy for students to read	96.71	Very Practical
Average Evaluation of the Practicality of Using Teaching Materials		95.39	Very Practical
<b>Time efficiency</b>			
5	Learning doesn't take a long time	92.76	Very Practical
Average Time Efficiency Evaluation		92.76	Very Practical
<b>Suitability of illustration</b>			
6	The pictures in the teaching materials make it easier for me to understand the material	97.37	Very Practical
Average Evaluation of Illustration Suitability		97.37	Very Practical
<b>Language</b>			
7	The language used in teaching materials is the vocabulary I have	95.39	Very Practical
8	I understand the presentation of the sentences easily	98.03	Very Practical
Language Evaluation Average		96.71	Very Practical
<b>Evaluation</b>			
9	The questions in the teaching materials are according to my abilities	98.03	Very Practical
10	The questions in the teaching materials are easy for me to understand	96.71	Very Practical
11	The questions in the teaching materials did not make it difficult for me to fill them out.	96.71	Very Practical
Average Evaluation Aspects		97.15	Very Practical
<b>Overall Aspect Average</b>		<b>96.59</b>	<b>Very Practical</b>

The results obtained after the questionnaire were filled out by students with details on the practical aspect of using teaching materials, with an average of 95.39, which is very practical. In the time efficiency aspect, the average value was 92.76, which is included in the very practical category. In the aspect of suitability of illustrations, an average score of 97.37 was obtained which was in the very practical category, in the language aspect an average score was obtained of 96.71 which was in the very practical category and the evaluation aspect, an average score of 97.15 was obtained which was in the very practical range. After testing teaching materials on 38 students, the average overall aspect obtained a score of 96.59, which is included in the very practical category.

### a. Effectiveness Evaluation

After evaluating the practicality questionnaire of teachers and students, an effectiveness test was carried out using pretest and posttest scores from the evaluation questions completed by students from the two research schools. The Maximum Completeness Criteria (KKM) at the two schools applies the number 80, meaning that if students score  $\geq 80$ , they can be declared successful on that topic. The following is a recapitulation table for each school regarding student learning outcomes, which can be used as a reference to see whether the teaching materials developed are effective for application in the learning process.

**Table 12.** Recapitulation of Student Learning Outcome Values

No	School name	Number of Students	Average value	KKM
1	SDN 26 Air Tawar Timur	20	93.2	80
2	SDN 33 Kalumbuk	18	90.67	80
Amount		38	183.87	
Average			91.94	80

Based on the table of student learning outcomes, the cognitive scores of class IV students in the Indonesian language subject in CHAPTER 3, Look Around the Traffic Theme, are obtained with details that class IV students of SDN 26 Air Tawar Timur got an overall average score of 93.2 and class IV students SDN 33 Kalumbuk received an overall average score of 90.67. The average for the two schools is 91.94, so it can be concluded that interactive multimedia Indonesian language teaching materials based on the Elementary School Problem-Based Learning (PBL) model are effectively used in the learning process.

### b. N-Gain Score

The following is data on the Pretest and Posttest results for both schools based on the N-Gain Score results, which can be seen in the table below:

**Table 13.** Pretest and Posttest Recapitulation and Analysis Results

No	School name	Pretest	Posttest	N-Gain Score	Category	N-Gain Score (%)	Category
1	SDN 26 Air Tawar Timur	65.6	93.2	0.84	Tall	83.78	Effective
2	SDN 33 Kalumbuk	63.22	90.67	0.77	Tall	76.61	Effective
Amount		128.82	183.87	1.61		160.39	
Average		64.41	91.94	0.81	Tall	80.20	Effective

Table 13 shows evident improvement in student learning outcomes observed from the pre-utilization of the developed interactive multimedia Indonesian teaching materials based on the Problem-Based Learning (PBL) model to the post-utilization phase. For the results obtained before using the pretest, the average value was 64.41, while after using the posttest, the average value was 91.94 in the high category. Meanwhile, an average value of 0.81 was obtained for the N-Gain score with a percentage of 80.20%. This implies that the Indonesian language teaching materials incorporate interactive multimedia based on the Problem-Based Learning (PBL) model, which demonstrates the effectiveness of enhancing student learning outcomes.

## Discussion

In this research, the product produced is interactive multimedia Indonesian language teaching materials based on Problem-Based Learning (PBL) using the Articulate Storyline 3 application in combination with Google Form for fourth-grade elementary school students with the material

CHAPTER 3 "Look Around, Traffic Theme." Based on observations, this interactive multimedia teaching material makes it easier for fourth-grade elementary school students to understand the material independently and with guidance, increasing enthusiasm for learning and improving student learning outcomes. These results are supported by research (Naziroh et al., 2021), which states that interactive multimedia can help students understand the material more realistically to improve their learning outcomes.

The findings of this research show that the results of the validity test of teaching materials are in the very valid category after going through three stages of validation by expert validators, teachers & and Focus Group Discussion (FGD) participants, and small product trial groups. Combining Articulate Storyline 3 with Google Forms makes teaching materials even better. With the Google form, attendance and evaluation can be carried out well, making it easier for students to use and more manageable for teachers to assess and monitor student learning activities. The appearance of this teaching material is designed to be very attractive. The material presented is coherent in language that is easy for students to understand. These results are supported by research (Salwani & Ariani, 2021) who obtained valid results for the validity test of the development of Articulate Storyline 3-based learning media with material validity test results of 82%, language validity test results of 93% and media validity test results of 100%.

This research's findings show that the practicality test results are in the very practical category, with teacher and student response questionnaires producing average scores of 92.05 and 96.59. Using Articulate Storyline 3 in combination with Google Form provides practicality in attendance and evaluation. Apart from that, this media is very easy to operate, can be used on mobile phones or computers, is easy to install, and has a small memory size, so it is practical for use in the learning process. These results are supported by research (Pratiwi et al., 2023) who also got the same results, namely a media practicality assessment by the teacher of 98.52 on interactive multimedia based on the PjBL model with environmental problem orientation in grade V elementary school ecosystem material using the Articulate Storyline 3 application.

The findings of this research show that the results of the effectiveness test are in the high and effective category. Student learning outcomes have increased from a pretest average of 64.41 to a posttest of 91.94, with an N-Gain Score of 0.81 and a percentage of 80.20%. Problem-based learning-based teaching materials using the Articulate Storyline 3 application combined with Google Form make learning more interesting, increase student motivation to be actively involved in the learning process, and improve student learning outcomes effectively. These results are supported by research (Mufidah & Khori, 2021), which states that the qualification level of effectiveness of the Articulate Storyline learning media product in improving student learning outcomes meets high criteria.

Implementing PBL-based interactive multimedia teaching materials with Articulate Storyline 3 and Google Form has improved the quality of Indonesian language learning in fourth-grade elementary schools. This teaching material has positive implications for students' understanding and mastery of the material. Teachers can use this teaching material as a guide for designing more innovative learning that is responsive to technological developments, thereby improving the overall quality of learning. Apart from that, the product of teaching materials based on Articulate Storyline 3 in combination with Google Forms can also be applied to other subjects or at various school levels. However, this research still has limitations because teaching materials have only been implemented in two schools. Further research with a larger sample could provide a more comprehensive picture. As a suggestion for further research, it is recommended to dig deeper into certain aspects that may not have been fully covered in this study. A more in-depth analysis of specific variables or factors influencing learning effectiveness could be a focal point for future research.

#### 4. CONCLUSION

Interactive Indonesian multimedia teaching materials based on Problem-Based Learning (PBL) using the Articulate Storyline 3 application and Google Form have been successfully developed and implemented in two elementary schools. The results of this teaching material's validity, practicality, and effectiveness test show very good, valid, practical, and effective results. However, researchers admit that this research has limitations, especially regarding the generalization of results because it was only tested in two schools. Therefore, further research involving a more representative sample could provide a broader picture. As a suggestion, it is recommended to continue to develop and perfect this teaching material by considering input from various parties, such as teachers and students, to improve the quality of Indonesian language learning in elementary schools more broadly.

#### REFERENCES

- Adzkiya, D. S., & Suryaman, M. (2021). Penggunaan Media Pembelajaran Google Site dalam Pembelajaran Bahasa Inggris Kelas V SD. *Educate: Jurnal Teknologi Pendidikan*, 6(2), 20–31. <https://doi.org/10.32832/educate.v6i2.4891>
- Agustina, U., & Elan, E. (2021). Pengaruh Media Pembelajaran Articulate Storyline Pada Materi Keragaman Budaya Terhadap Minat Belajar Siswa Kelas V SDN Sindangheula 02. *Js (Jurnal Sekolah)*, 5(3), 165–169. <https://doi.org/10.24114/js.v5i3.26827>
- Agustina, Y., & Desyandri, D. (2022). Pengembangan Bahan Ajar Multimedia Interaktif Macromedia Flash 8 Berbasis Pendekatan Steam Pada Pembelajaran Tematik .... *VOX EDUKASI: Jurnal Ilmiah Ilmu Pendidikan*, 13(2), 294–308.
- Aini, A. Z., Fatmawati, P., & Isfihana, E. (2021). Penggunaan Google Form Sebagai Media Pembelajaran Pada Materi Volume Bangun Ruang SDN 1 Kwagean. *Prosiding Sendika*, 7(2), 530–536.
- Akbar, S. (2013). *Instrumen Perangkat Pembelajaran*. PT Remaja Rosdakarya.
- Amiroh. (2019). *Mahir Membuat Media Interaktif Articulate Storyline*. Cipta Artha Media.
- Apriati, L., Mulawarman, W. G., & Ilyas, M. (2021). Pengembangan Bahan Ajar Menyimak Berbasis Multimedia Interaktif pada Pelajaran Tematik dengan Tema “Indahnya Kebersamaan” untuk Siswa Kelas IV Sekolah Dasar. *Diglosia: Jurnal Kajian Bahasa, Sastra, Dan Pengajarannya*, 4(1), 13–22. <https://doi.org/10.30872/diglosia.v4i1.73>
- Arisanti, Y., & Adnan, M. F. (2021a). Pengembangan Multimedia Interaktif Berbasis Software Macromedia Flash 8 untuk Meningkatkan Motivasi dan Hasil Belajar Peserta Didik Sekolah Dasar. *Jurnal Basicedu*, 5(4), 2122–2132.
- Aulia, D., Firman, & Desyandri. (2023). Pengaruh Multimedia Interaktif Berbasis Canva Terhadap Kemampuan Membaca Permulaan Siswa Sekolah Dasar. *Alpen: Jurnal Pendidikan Dasar*, 7(1), 32–41.
- Desyandri, V. D. (2018). *Pengembangan Bahan Ajar Tematik Terpadu di Kelas V Sekolah Dasar Menggunakan Identifikasi Masalah*. 163–174. <https://doi.org/10.31227/osf.io/h86jp>
- Diyana, T. N., Supriana, E., & Kusairi, S. (2020). Pengembangan multimedia interaktif topik prinsip Archimedes untuk mengoptimalkan student centered learning. *Jurnal Inovasi Teknologi Pendidikan*, 6(2), 171–182. <https://doi.org/10.21831/jitp.v6i2.27672>
- Fadilah, S. N., & Erita, Y. (2021). Pengembangan Media Pembelajaran Interaktif Menggunakan Aplikasi Articulate Storyline pada Pembelajaran Tematik Terpadu Kelas V Sekolah Dasar Keywords: Instructional Media, Articulate Storyline. *Journal of Basic Education Studies*, 4(1), 3173–3186.
- Mastroleo. (2020). Initial testing of a computer-based simulation training module to support clinicians' acquisition of CBT skills for substance use disorder treatment. *Journal of Substance Abuse Treatment*, 114.
- Mawarsari, N., & Wardani, K. W. (2022). Pengaruh Penerapan Model Problem Based Learning terhadap Kemampuan Numerasi pada Kurikulum Merdeka Peserta Didik Kelas 1 Sekolah Dasar. *JIIP -*

- Jurnal Ilmiah Ilmu Pendidikan*, 5(12), 5461–5465. <https://doi.org/10.54371/jiip.v5i12.1177>
- Mufidah, E., & Khori, N. (2021). Pengembangan Media Pembelajaran Articulate Storyline untuk Meningkatkan Hasil Belajar Siswa Sekolah Dasar di Masa Pandemi Covid 19. *Ibtida'*, 2(2), 124–132. <https://doi.org/10.37850/ibtida.v2i2.214>
- Nahdiah, U., Sunaryo, H., & Susiani, R. (2023). Peningkatan Hasil Belajar Materi Perubahan Energi Melalui Model Problem Based Learning Didukung Media Multimedia Interaktif Pada Kelas IV SD Negeri Cangkringan Nganjuk. *Pendas: Jurnal Ilmiah Pendidikan Dasar*, 8(1), 1925–1938.
- Nasril, U., & Desyandri. (2023). Pengembangan Multimedia Interaktif Articulate Storyline 3 Berbasis Project Based Learning ( PjBL ) di Kelas IV Sekolah Dasar. *Journal of Practice Learning and Educational Development*, 3(1), 77–88. <https://doi.org/10.58737/jpled.v3i1.97>
- Nazhiroh, S. A., Jazeri, M., & Maunah, B. (2021). Pengembangan Multimedia Interaktif E-Komik dalam Meningkatkan Hasil Belajar Bahasa Jawa. *Jurnal Ilmiah Profesi Pendidikan*, 6(3), 405–411. <https://doi.org/10.29303/jipp.v6i3.193>
- Novelita, N., & Darmansyah. (2022). Peningkatan Aktivitas Dan Hasil Belajar Kurikulum Merdeka Menggunakan Model Problem Based Learning (PBL) Di Kelas IV Sekolah Dasar. *Didaktik :Jurnal Ilmiah PGSD FKIP Universitas Mandiri*, 08(02), 1538–1550. <https://doi.org/10.56304/s0040363622080021>
- Oktavi, W., & Taufina, T. (2020). Penerapan Model Problem Based Learning (PBL) dalam Pembelajaran Tematik Terpadu di Kelas V Sekolah Dasar Oktavia. ... *Pembelajaran Inovasi, Jurnal Ilmiah ...*, 8(6), 78–88. <http://ejournal.unp.ac.id/students/index.php/pgsd/article/view/9057>
- Oktavia, N., & Desyandri, D. (2021). Validitas dan Praktikalitas Pengembangan Multimedia Interaktif Berbasis Macromedia Flash 8 Pada Pembelajaran Tematik di Kelas IV Sekolah Dasar Kota Padang. *Jurnal Inovasi Pendidikan Dan Pembelajaran Sekolah Dasar*, 4(2), 58. <https://doi.org/10.24036/jippsd.v4i2.112704>
- Parinata, D., & Puspaningtyas, N. D. (2021). Optimalisasi Penggunaan Google Form terhadap Pembelajaran Matematika. *Mathema: Jurnal Pendidikan Matematika*, 3(1), 56–65. <https://doi.org/10.33365/jm.v3i1.1008>
- Prananda, G., Wardana, A., & Darniyanti, Y. (2021). Pengembangan Media Video Pembelajaran Tema 6 Subtema 2 Untuk Siswa Kelas SD Negeri 17 Pasar Masurai 1. *Jurnal Dharma PGSD*, 1(1), 38–45. <https://ejournal.undhari.ac.id/index.php/judha/article/view/104>
- Pratiwi, K. I. A., Margunayasa, I. G., & Trisna, G. A. P. S. (2023). Project-Based Learning Interactive Multimedia with Orientation of Environmental Problems Assisted by Articulate Storyline 3 for Grade V Elementary Schools. *Journal of Education Technology*, 7(2), 332–342. <https://doi.org/10.23887/jet.v7i2.59615>
- Rahmadani, R., & Taufina, T. (2020). Pengembangan Multimedia Interaktif Berbasis Model Problem Based Learning (PBL) Bagi Siswa Sekolah Dasar. *Jurnal Basicedu*, 4(4), 938–946. <https://doi.org/10.31004/basicedu.v4i4.465>
- Ridho, H., & Didah, N. (2023). Media Pembelajaran Interaktif Articulate Storyline Terhadap Motivasi Belajar Pembelajaran Bahasa Indonesia. *Pena Literasi*, 6(1), 54–64.
- Roza, N. A., & Desyandri. (2021). Pengembangan Multimedia Interaktif Berbasis Macromedia Flash Pada Pembelajaran Tematik Terpadu Kelas Iv Sekolah Dasar. *Jurnal Pendidikan Tambusai*, 6(1), 4817–4825. <https://doi.org/10.24114/sejgsd.v11i3.27213>
- Salwani, R., & Ariani, Y. (2021). Pengembangan Media Pembelajaran Tema 3 Subtema 3 Berbasis Articulate Storyline 3 di Kelas VA SDIT Mutiara Kota Pariaman. *Jurnal Pendidikan Tambusai*, 5(1), 409–415. <https://jptam.org/index.php/jptam/article/view/963>
- Sari, D. P., & Sukma, E. (2021). Peningkatan Hasil Belajar Tematik Terpadu Menggunakan Model Cooperative Learning Tipe Team Assisted Individualized ( TAI ) untuk Siswa Sekolah Dasar. 4(1), 1027–1040.
- Sunarto, R. (2015). *Pengantar Statistika Untuk Penelitian Pendidikan, Sosial, Ekonomi, Komunikasi, dan Bisnis*. Cetakan Ke-4. Alfabeta.
- Tambunan, L. R., Siregar, N. A. R., & Susanti, S. (2020). Implementasi E-book Berbasis Smartphone

pada Materi Polinomial di Kelas XI SMA Negeri 4 Tanjungpinang. *Jurnal Anugerah*.  
Tasya, N., & Abadi, A. P. (2019). Faktor Penyebab Rendahnya Hasil Belajar Siswa. *Sesiomedika*, 660–662.