

CHAPTER IV

RESULTS AND DISCUSSION

4.1 Research Findings

Based on learning observations in the classroom, the implementation of Project-Based Learning (PjBL) steps can be compared to the 4D development stages. In the Define stage, learning activities begin by opening the lesson with a challenging question. Challenging questions during the research process, for example, in Project 1: Have you ever seen flowers or plants in your home environment? How does their growth process occur? In Project 2: Have you ever seen others' posts or statuses on social media about good or bad things (wise or unwise)? In Project 3: Do you have any learning methods or strategies? In Project 4 Have you ever seen rain falling? How does it happen? This activity helps teacher and researcher identify students' learning needs, particularly limitations in vocabulary and sentence structure understanding, while motivating them with contexts close to real life. Next, in the Design stage, teacher and students design the project by explaining the objectives, steps, and expected outcomes (planning the project). The observation results show that students begin to understand the flow of project activities that are in line with the reading material, so that the initial design of reading material can be formulated more accurately.

The next stage is Develop, which is realized through the implementation of project activity schedule and teacher supervision. At this stage, students carried out projects such as explaining the plants or flowers they have brought, then linking them to the reading text. Teacher and researcher observe student participation, understanding of reading material, and interactions among students, which are then used as the basis for revising and improving the reading material. Finally, in the Disseminate stage, the activity concludes with a joint evaluation and reflection (evaluation). Teacher and students review the progress of the project used PjBL model checklist, while researcher record students' responses regarding the readability, engagement, relevance, and ease of use of reading material. The observation results indicate that students are more enthusiastic when the project is linked to real

life experiences, so the developed products are considered practical, engaging, and suitable for use reading comprehension material utilizing project-based learning model.

This research was conducted in one cycle consisting of four meetings. Each stage of the activity was designed by combining the steps of Classroom Action Research (CAR) (planning, acting, observing, and reflecting), the 4D model stages (Define, Design, Develop, Disseminate), and the stages of Project-Based Learning described in Chapter II. Thus, the research activity was not only focused on the implementation of classroom actions, but also paid attention to the process of developing reading material and systematically applying the learning model. This Classroom Action Research (CAR) was implemented in class XI MIA 2 as the pilot class, since this class was designated for testing and refining the product after the small tryout before it was disseminated to a larger group.

1. Planning

At this stage, researcher conducted an analysis of student needs in accordance with the Define stage in the 4D model. Researcher identified the main problems in reading learning, particularly related to Explanation text, which included limited vocabulary, difficulty understanding sentence structure, and low student participation. Next, the researcher designed teaching materials in the form of Reading Material Based on Project-Based Learning Model, as well final evaluation and questionnaires. This stage also includes the preparation of PjBL implementation strategies, starting from the essential question to reflection.

2. Acting

The action stage is the implementation of a learning design that is in line with the Develop stage in the 4D model. The researcher conducted the learning process over four sessions. In the first session, students were introduced to essential questions and the

context of the project they would be working on. The second session focused on project design and information gathering through reading the Explanation text. The third session was directed towards collaborative project product development, where students presented their understanding of the text. The fourth session was a moment for project results presentation and joint reflection. The entire process followed the PjBL stages, which emphasized active student involvement in understanding the reading content while producing.

3. Observing

In line with the Develop stage of the 4D model, researcher conducted observations during the learning process. Observations were made on student activities, involvement in group discussions, participation in project completion, and responses to the reading material developed. In addition, researcher also collected data through final evaluation results and students response questionnaires to assess the effectiveness of the product.

4. Reflecting

The reflection stage is conducted after the entire learning sequence in one cycle is completed. This reflection aligns with the Disseminate stage of the 4D model, where researcher evaluates the results of the product implementation. Test results showed an improvement in students' reading comprehension, while the questionnaire indicated positive responses to Reading Material Based on PjBL Model. Based on this reflection, the researcher concluded that the development of Reading Material Based on Project-Based Learning in Explanation Text learning can enhance student engagement and their reading comprehension.

4.1.1. Final Evaluation

To evaluate the practicality of the developed product, the final evaluation was administered at the end of the dissemination stage. The final evaluation was designed in the form of 10 multiple choice questions that directly referred to the Explanation Text material contained in Reading Material Based on Project-Based Learning Model. The items were constructed to measure students' reading comprehension, particularly their ability to identify the main idea, supporting details, language features, and logical sequence of the text. The test was administered to 28 students (XI MIA 2) after they had completed the learning process using the developed material. The purpose of this test was to obtain quantitative data on students' comprehension achievement, which would serve as evidence of the product's practicality.

Table 4.1 Students Final Evaluation Results in Class MIA 2

Students Initial	Score (0-100)	Status (≥ 70 =KKM)
AKZW	80	Achieved
ARSZ	70	Achieved
AWW	90	Achieved
AMW	70	Achieved
AKFW	80	Achieved
ADW	90	Achieved
BG	80	Achieved
CW	90	Achieved
DPG	70	Achieved
EBSW	80	Achieved
EG	70	Achieved
HW	100	Achieved
JG	80	Achieved
JNW	90	Achieved
KW	80	Achieved
LSW	90	Achieved
MYG	70	Achieved
MJMG	70	Achieved
NG	90	Achieved
RSW	80	Achieved
RAN	70	Achieved
RDNW	80	Achieved
SG	90	Achieved
SAW	100	Achieved
TTBG	80	Achieved
VCG	90	Achieved
WDG	70	Achieved
YW	90	Achieved

Table 4.2 Distribution of Final Evaluation Score in Class XI MIA 2

Score Category	Frequency	Percentage
70	8	28.57%
80	9	32.14%
90	9	32.14%
100	2	7.14%
Total	28	100%

Table 4.3 Summary of Final Evaluation Statistics

Indicator	Score
Number of Students (N)	28
Minimum Score	70
Maximum Score	100
Mean	81.79%
Median	80
KKM	70
Number of Students Achieved	28
Percentage	100%

$$\begin{aligned}\text{Percentage} &= \frac{\text{Number of Students Achieved}}{\text{Number of Students}} \times 100\% \\ &= \frac{28}{28} \times 100 = 100\%\end{aligned}$$

$$\text{Mean} = \frac{\sum X}{N} = \frac{2.290}{28} = 81.79\%$$

From the tabulated data, it can be seen that the majority of students obtained scores above 80, which means that most of them exceeded Minimum mastery criteria (*KKM*) set at 70. The average score achieved by class XI MIA 2 is 81.79%, with the highest score being 100 and the lowest score being 70. This finding reinforces the practicality of the developed product, where students are not only able to answer questions accurately but also demonstrate more active engagement in the learning process. Thus, the implementation of the developed reading material can be considered successful in helping class XI MIA 2 students improve their understanding of Explanation Text.

In the Disseminate stage, researcher conducted product trials in class XI MIA 1, with a total of 22 students. This stage aims to assess the practicality of Reading Material Based on Project-Based Learning Model when applied in a broader context. Thus, the dissemination stage not only

evaluates the success of the product in small or main trial classes but also ensures that the developed reading material can be implemented outside the initial research classroom. The learning process was still carried out using the previously designed PjBL stages, with a focus on student involvement in understanding Explanation Text through the given projects. After the learning series was completed, students were given a final evaluation in the form of multiple choice questions related to the Explanation Text material to measure their understanding. The following are the final evaluation results for students in class XI MIA 1 at the dissemination stage:

Table 4.4 Students' Final Evaluation Results in Class XI MIA 1

Students Initial	Score (0-100)	Status (≥ 70 =KKM)
ANBZ	80	Achieved
ACH	70	Achieved
APG	90	Achieved
CPZ	100	Achieved
ESG	80	Achieved
EW	90	Achieved
FW	70	Achieved
GMG	80	Achieved
HHJDPG	90	Achieved
IKAW	100	Achieved
JG	80	Achieved
JG	90	Achieved
JG	70	Achieved
KG	80	Achieved
MKFZ	90	Achieved
PFMH	100	Achieved
RZ	80	Achieved
RSPG	70	Achieved
STZ	90	Achieved
SPW	80	Achieved
SG	100	Achieved
YG	90	Achieved

Table 4.5 Distribution of Final Evaluation Score in Class XI MIA 1

Score Category	Frequency	Percentage
70	4	18.18%
80	7	31.82%
90	7	31.82%
100	4	18.18%
Total	22	100%

Table 4.6 Summary of Final Evaluation Statistics in Class XI MIA 1

Indicator	Score
Number of Students (N)	22
Minimum Score	70
Maximum Score	100
Mean	85.0%
Median	85
KKM	70
Number of Students Achieved	22
Percentage	100%

$$\text{Percentage} = \frac{\text{Number of Students Achieved}}{\text{Number of Students}} \times 100\%$$

$$= \frac{22}{22} \times 100 = 100\%$$

$$\text{Mean} = \frac{\sum X}{N} = \frac{1.870}{22} = 85\%$$

Based on the results of the calculations in table 4.15, it is known that all students in class XI MIA 1 successfully achieved the minimum mastery criteria (*KKM*) set, which are 70. This indicates that the Reading Material Based on Project-Based Learning Model developed can be practically applied in other school contexts. The score distribution in table 4.16 shows that most students achieved scores in the 80 and 90 categories (31.82% each), while students with perfect scores (100) accounted for 18.18%, and students with the minimum score (70) also accounted for 18.18%. Thus, student achievement tends to be evenly distributed, not concentrated on specific scores, but still showing a positive tendency above the completion standard.

In addition, statistical calculations in table 4.17 show that the average (mean) score of students is 85.0, while the median score is 85. The similarity between the average and median scores indicates a relatively balanced data distribution (not too skewed towards low or high scores). The fact that all students (100%) met *KKM* further reinforces that the developed reading material is practical in enhancing students' reading comprehension, particularly in the Explanation Text material. Therefore, it

can be concluded that the dissemination phase successfully demonstrated reading material based on PjBL model is not only effective in the initial pilot class but also relevant and can be effectively applied in other classes with varying student numbers.

Interviews with students and teacher were conducted to obtain information on why these difficulties occurred in the implementation of Project-Based Learning. Difficulties in understanding English reading texts, especially due to limited vocabulary. This makes students have to use the dictionary frequently, so the process of understanding the text becomes slow. In addition, students stated that they were more motivated to follow projects that were interesting, relevant to their daily life, and involved elements of creativity. Students also find it easier to understand the text if the topic is interesting, uses familiar vocabulary, and is supported by media such as pictures or clear project instructions.

The results show that there are some difficulties in the implementation of Project-Based Learning for reading comprehension. Below is the table of difficulties in implementing project-based learning model for reading comprehension.

Table 4.7 Difficulty Points in Implementing PjBL Model

No	Difficulty Points	Description
1	Lack of Vocabulary Mastery	Learners' vocabulary is still limited, 78% of students said they had difficulty comprehending English text due to unfamiliar vocabulary. Learners have difficulty understanding English reading texts that contain unfamiliar vocabulary such as tremor, temblor, and seismic waves.
2	Difficulty in Understanding Sentence Structure	Learners are unable to comprehend long and complex sentences, which makes it difficult for them to comprehend the overall meaning of the paragraph. 75% students said have difficulty comprehending text that has complex sentence structures.
3	Lack of Students Participation	Learners showed passivity and lack of engagement in project-based activities. 89% students said found easier to comprehend learning materials through group work.

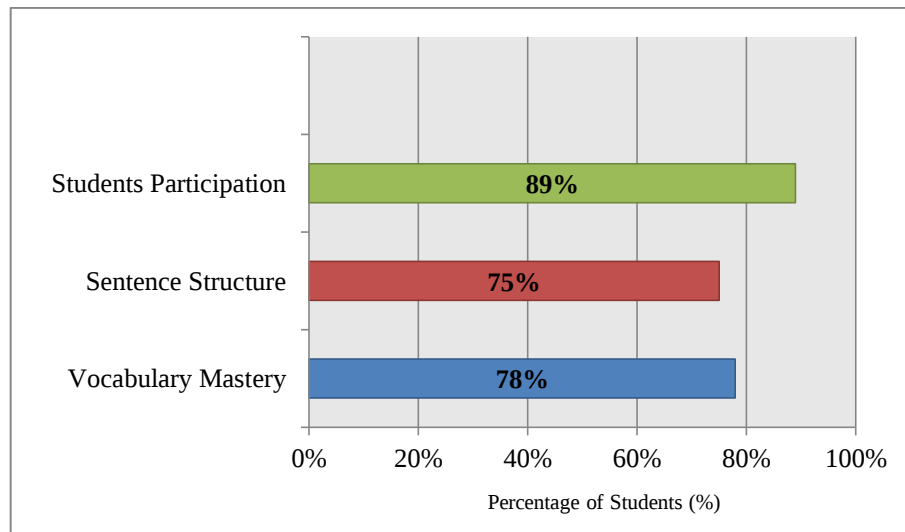


Figure 4.1 Difficulty Points in Implementing PjBL Model

In terms of reading comprehension, it was found that most students still have difficulties in understanding English reading texts. This difficulty is evident when students are faced with texts that contain unfamiliar vocabulary or lack of vocabulary mastery so that students have difficulty in understanding the sentence structure. As a result, students tend to be unable to identify information in the text, analyze the content, or develop ideas based on the information obtained. This shows that students' reading comprehension skills still need to be improved.

Based on the data, in one of the learning activities to read an explanation text entitled “Earthquakes”, students were asked to read and understand the content of the reading before working on a project to make an info-graphic about the process of earthquakes; it was found that some students had difficulty in understanding terms such as “tremor or temblor” and “seismic wave”. The difficulties experienced were not only limited to vocabulary mastery, but also learners' inability to relate the meaning of the vocabulary to the overall context of the paragraph. When asked to re-express the content of the text orally or write down the main idea of a particular paragraph, most learners gave irrelevant answers, or were even unable to give an answer. This supported by the responses given by one learner who stated that she did not understand the text because “there are too many words I have never heard”. Another learner said that “the sentences are long and hard to understand”.

These statements show that in addition to limited vocabulary, complicated sentence structure is also a factor causing difficulties in understanding the text.

This is strongly supported by the results of the learners' needs analysis, it was found that in the first question item, “Do you struggle to comprehend English texts because of unfamiliar words?” 22 out of 28 students (78% agreed). This finding indicates that limited vocabulary acquisition is one of the main factors that cause difficulties in understanding English texts. This strengthens the assumption that the lack of vocabulary mastery is a significant obstacle in the project-based learning process, especially in developing students' reading comprehension. Thus, the aspect of vocabulary mastery needs to be a concern in the development of reading materials that support the successful implementation of the project-based learning model.

Difficulty in understanding texts that contain long and complex sentence structures is the second difficulty experienced by learners which is strongly supported by the results of the learners' needs analysis, in the second question item, 'Do you have difficulty comprehending texts that have complex sentence structures?', data obtained that 21 out of 28 students, or 75%, agreed. Another difficulty identified in the implementation of project-based learning is the low active participation and engagement of students during the learning process. This condition indicates that most students are not fully familiar with the collaborative and student-centered learning environment, which is the main characteristic of the Project-Based Learning (PjBL) model. This lack of engagement had an impact on the effectiveness of group work, the process of sharing ideas, and interaction between students, all of which play an important role in the development of reading comprehension in the context of PjBL. There are 25 out of 28 students (89%) stated that they found it easier to comprehend learning material through group work, as indicated in the questionnaire results on the item 'easier to comprehend learning material through group work'. This finding reinforces the importance of implementing a collaborative approach in supporting the achievement of project-based

learning objectives. Moreover below is the table of cause's difficulties in implementing project-based learning model for reading comprehension.

Table 4.8 Causes Difficulty Points in Implementing PjBL Model

No	Difficulty Aspect	Description
1	Teaching Model	One of the main challenges in implementing the PjBL model lies in the alignment between learning materials and project tasks, especially in terms of time efficiency. Teacher find it difficult to manage the scope of projects so they do not consume excessive instructional time. This is supported by student responses, in which 96% stated they feel more motivated when learning is contextualized and involves engaging activities.
2	Teaching Media & Resources	The instructional materials currently used lack variety in text types, supporting visuals, and enrichment exercises that are essential to the success of PjBL. According to the results, 92% of students acknowledged that visual media significantly help them in comprehending reading materials.

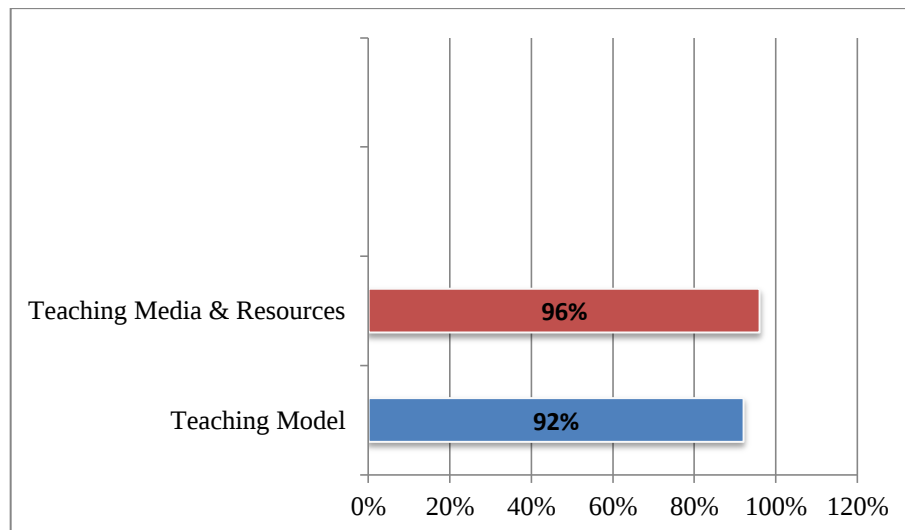


Figure 4.2 Causes Difficulty Points in Implementing PjBL Model

The learning model applied by teacher still tends to be teacher-centered, where learning activities are dominated by the lecture method with few variations of activities that encourage active student involvement. This condition has an impact on students' low participation in the learning process, where students look passive and show less activeness in class activities. This finding is reinforced by the results of the learners' needs analysis, which showed that 27 out of 28 students (96%) agreed with the statement 'they are motivated by contextualized learning and engaging activity.' This indicates that students are more motivated by contextualized learning and engaging

activities. This indicates that students are more motivated when learning is contextually relevant and involves engaging activities, which also indicates the need to implement a more student-centered learning model to increase their participation and engagement.

Based on interviews with teacher, it is known that the implementation of the Project-Based Learning (PjBL) model requires more complex preparation compared to conventional learning methods, especially in balancing the content of the material and the project given so that it does not require too much time. In addition, students' involvement in the project also varies; some students show an active and enthusiastic attitude, while others tend to be passive due to lack of confidence or limited ability. Teacher also expressed the need for additional media and learning resources that are visual and relevant to students' lives to support reading comprehension through meaningful project activities. This is reinforced by the results of the learners' needs analysis which showed that 26 out of 28 students (92%) stated that visual media helped them in understanding the reading material during learning. From the aspect of media and learning resources, it was found that learning facilities that support the implementation of the PjBL model are still very limited. This limitation has the potential to become a serious obstacle in the optimal implementation of PjBL in the classroom environment, thus strengthening the urgency of developing reading material that are in accordance with the characteristics of project-based learning model.

The development the Eleventh Graders' Reading Comprehension Material Utilizing Project-Based Learning Model was systematically carried out with development using the four-D (4D) model (Define, Design, Develop and Disseminate).

4.1.2 Define

This stage the researcher carried out identifies and analyzes the needs of learners and formulates product development objectives. At this stage, researcher conducts a needs analysis and analyzes the characteristics of

learners as a basis for designing learning material that is appropriate and relevant to field conditions.

The researcher identified several issues related to students' difficulties in reading comprehension activities. These preliminary findings became the basis for conducting needs analysis aimed at identifying students' needs and interests in learning reading, particularly through the implementation of Project-Based Learning (PjBL). To support this process, the researcher distributed questionnaire to classes XI MIA 2 there are 10 choice questions (yes/no) with a total of 28 students. The items were constructed based on the information that emerged during the observation and interviews phases. The purpose of the questionnaire was to gather more specific data related to students' difficulty and interest in project-based activities. The results of this needs analysis were then used to design and develop reading comprehension material utilizing Project-Based Learning model, aligning with students' actual needs and learning characteristics. The results of the questionnaire distributed to students are described in the table 4.11.

Table 4.9 Tabulation of Students Needs Analysis Questionnaire

No	Students Initial	Question									
		1	2	3	4	5	6	7	8	9	10
1	AKZW	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
2	ARSZ	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
3	AWW	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	AMW	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
5	AKFW	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6	ADW	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No
7	BG	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
8	CW	No	No	Yes	No	Yes	Yes	No	No	Yes	Yes
9	DPG	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
10	EBSW	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
11	EG	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12	HW	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
13	JG	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
14	JNW	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
15	KW	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes
16	LSW	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
17	MYG	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
18	MJMG	No	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes
19	NG	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
20	RSW	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

21	RAN	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
22	RDNW	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
23	SG	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
24	SAW	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
25	TTBG	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
26	VCG	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
27	WDG	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
28	YW	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No
Number of Response		22	21	24	26	20	27	25	26	25	26
		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		6	7	4	2	8	1	3	2	3	2
		No	No	No	No	No	No	No	No	No	No

The percentage was used to determine number of response with total students within question items:

$$\text{Percentage} = \frac{\text{Number of Response}}{\text{Total Number of Students}} \times 100\%$$

Table 4.10 Conversion of Students Needs Analysis Questionnaire Results

Question Number (Percentage)	Number of Response		Total Students
	Yes	No	
No. 1 (%)	78.6%	21.4%	28
No. 2 (%)	75.0%	25.0%	28
No. 3 (%)	85.7%	14.3%	28
No. 4 (%)	92.9%	7.1%	28
No. 5 (%)	71.4%	28.6%	28
No. 6 (%)	96.4%	3.6%	28
No. 7 (%)	89.3%	10.7%	28
No. 8 (%)	92.9%	7.1%	28
No. 9 (%)	89.3%	10.7%	28
No. 10 (%)	92.9%	7.1%	28

Table 4.11 Results of Students Needs Analysis Questionnaire

No	Question	Students Response (%)	
		Yes	No
1	Do you struggle to comprehend English texts because of unfamiliar vocabulary?	78.6%	21.4%
2	Do you have difficulty comprehending texts that have complex sentence structures?	75.0%	25.0%
3	Do you use a dictionary when reading English texts?	85.7%	14.3%
4	Do you think an interesting topic makes it easier for you to comprehend the text?	92.9%	7.1%
5	Are you less motivated when learning is centered on teacher explanation?	71.4%	28.6%
6	Are you motivated by contextualized learning and engaging creativity?	96.4%	3.6%

7	Do you find it easier to comprehend learning materials through group work?	89.3%	10.7%
8	Do visual media such as pictures help you comprehend the reading material?	92.9%	7.1%
9	Do you enjoy having the opportunity to express your ideas during group discussions?	89.3%	10.7%
10	Related to the previous question, do you need to use reading material that involve project-based activities?	92.9%	7.1%

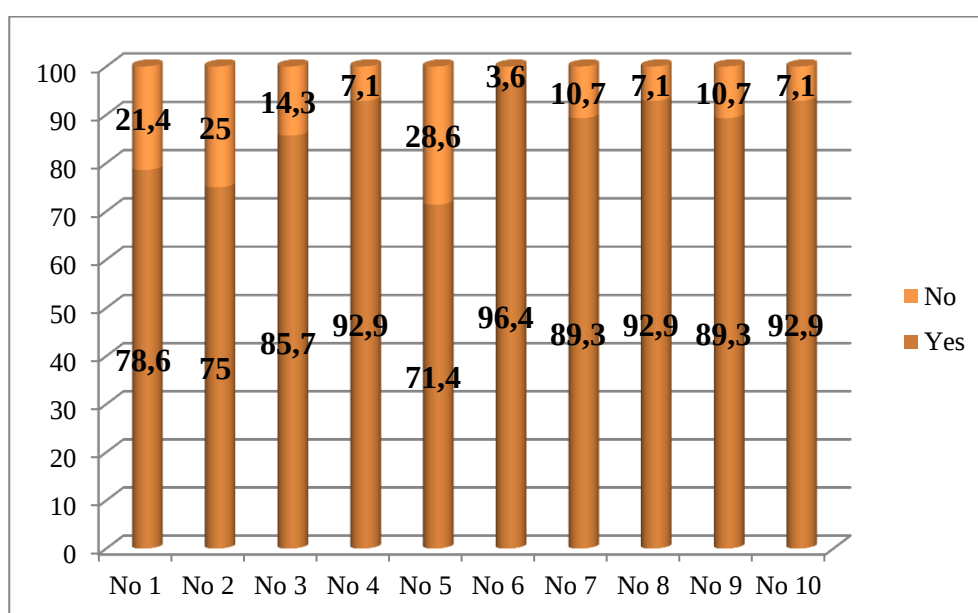


Figure 4.3 Results the Students Needs Analysis Questionnaire

The Results of need analysis questionnaire filled out by 28 showed that difficulties in understanding the text (item 1 and 2) were quite high, with more than 75% of students admitting difficulties in terms of vocabulary and complex sentence structures. This indicates the need for reading material that facilitates students' reading comprehension of the topic being studied. A total of 85.7% of students used a dictionary, indicating that they were actively trying to understand the reading, but still needed additional help in the process. Almost all students (92.9%) stated that interesting topics facilitate comprehension, and more than 96% felt motivated if learning involved creativity. This reinforces the need for more interactive learning approaches that are relevant to their lives. The majority of students also showed a preference for group work or discussion (89.3%) and was very open to the use of visual media (92.9%). Lastly, 92.9% of students agreed that they needed project-based reading material, indicating students' readiness and desire to be actively involved in the learning process.

a. Initial Final Analysis

At this stage was conducted through observation and interviews with teacher and students of grade XI of SMA Negeri 1 Moro'o, which showed that students had difficulties in comprehending English reading texts, especially due to limited vocabulary and complex sentence structures. In addition, the dominant teacher centered learning model makes students less motivated and passive in learning activities.

b. Learner Analysis

At this point was strengthened by distributing a needs analysis questionnaire to 28 students of class XI MIA 2, which consisted of 10 dichotomous questions (yes/no). The results of the questionnaire showed that more than 75% of the students admitted to having difficulties in understanding the text due to vocabulary and sentence structure, and have a strong preference for learning that involves projects, group work, visual media, and creativity.

c. Concept Analysis

At this level is carried out by determining the material (Explanation Text) which has been adjusted regularly with the Basic Competencies (KD) listed in the teaching module, in this material students are expected to understand scientific processes or natural/social phenomena and be able to explain why or how something happens.

d. Formulating of Learning Objectives

The researcher then formulated learning objectives that are aligned with the curriculum and the characteristics of the learners. The formulated learning objectives include students are able to comprehend social function, text structure, and language features of explanation text through collaborative and contextual project-based activities. This define stage becomes the main foundation in developing the eleventh graders' reading comprehension material based on project-based learning model that suit the needs and conditions of students in the field.

4.1.3 Design

The Design stage is the second stage in the 4D development model (Define, Design, Develop, Disseminate) after the Define stage. At this stage, the main focus is to design and formulate the initial form of development product, namely Reading Material Based on Project-Based Learning Model on explanation text material for class XI MIA 2 SMA Negeri 1 Moro'o students. This design aims to produce an initial prototype of reading material that is relevant, interesting, and effective to use in the learning process. This stage is very important because it is the basis for determining the quality and direction of overall product development. The framework of reading material based on project-based learning model, which consists of:

- 1) Opening Section: This section includes the front cover of reading material (explanation text), preface, table of contents, and learning objectives.
- 2) Content Section: This section is filled with material on explanation text. Contains learning materials, exercises, project activity, and PjBL model checklist.
- 3) Closing Section: This section includes the bibliography of the product.

The first step taken by researcher at this stage is to determine the learning objectives that must be achieved by students. These learning objectives are prepared based on the basic competencies applicable in the 2013 Curriculum for upper secondary education. The formulation of these learning objectives aims to enable students to understand, analyze and apply the concepts contained in explanation text. Students are expected to understand the content of the text and be able to construct their understanding through collaborative and contextualized project activities. Researcher designs the product or reading material with the main topic of Explanation Text. This product design is made using the Canva application with an attractive visual display in the hope that it can increase

student learning motivation and help comprehending the material more easily and pleasantly.

The structure of the developed reading material includes several components. These components start from the Cover Page, Preface, Table of Contents, Learning Objectives, Learning Material, Project Activity and Bibliography. The learning material consists of several important sub-topics, namely the definition, social function, generic structure, and language features of explanation text. The content of the material is complemented by four examples of explanation texts that are relevant to the context of life and other subjects, namely about Earthquakes, Photosynthesis, Digestive Process, and Tsunami. Each example is accompanied by relevant illustrative images, a list vocabularies classification of text structures, classification of language features, exercises designed to measure students' comprehending of the content of the text.

4.1.4 Develop

The development steps that have been taken by the researcher during the development stage are as follows:

4.1.4.1 Creation of Reading Material

In this stage, the researcher begins to compile reading material based on PjBL model, starting with designing the material for explanation text. The components of creating this reading material can be explained as follows:

1. Opening Section

In the opening section, the product design is made using the Canva application with an attractive visual display in the hope that it can increase student learning motivation and help comprehending the material more easily and pleasantly.

The researcher utilized the features and elements available in Canva application by using the available font options with Intro Rust font style to attract students' attention while maintaining readability. The paper size used in making this cover is A4 size (21 x 29.7 cm), which is adjusted to

the standard printing of learning documents in schools. By utilizing Canva as an easily accessible design platform, the researcher can produce a cover that is attractive, functional, and in accordance with the characteristics of high school students.

A visual design of the product with the title “READING MATERIAL BASED ON PROJECT-BASED LEARNING MODEL”. One of the important parts developed is the cover page. The cover was designed using the Canva application, featuring an illustration of two students walking with books and school bags with a background of city buildings that reflect a modern atmosphere. This design aims to attract students' attention while representing a dynamic learning context that is relevant to the real world. The choice of blue as the dominant color on the cover reflects a calm and academic impression. The results of this cover development are expected to provide a positive first impression for students and increase motivation in using reading material.

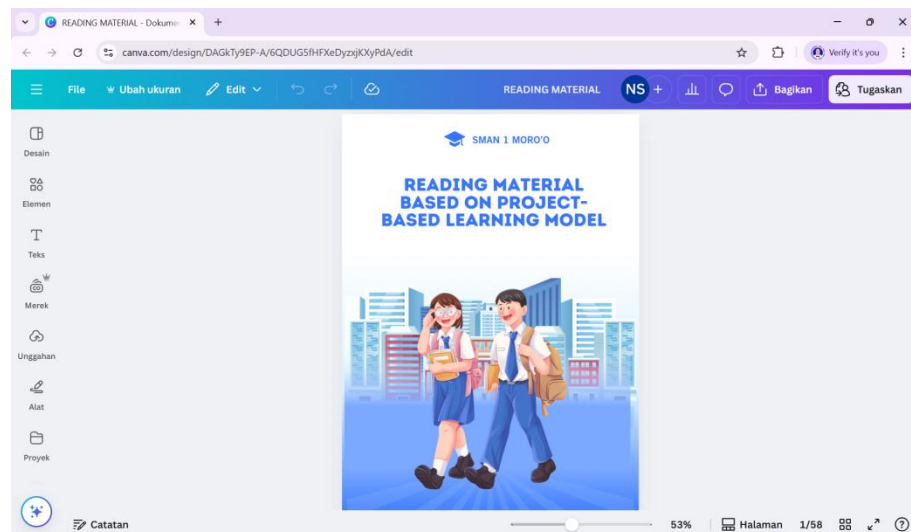


Figure 4.4 Cover Page of Reading Material

The structure of the developed reading material includes several components. These components start from the Cover Page, Foreword, Table of Contents, Learning Objectives, Learning Materials, Project Activities, PjBL Model Checklist, Bibliography, and Back Cover Page.

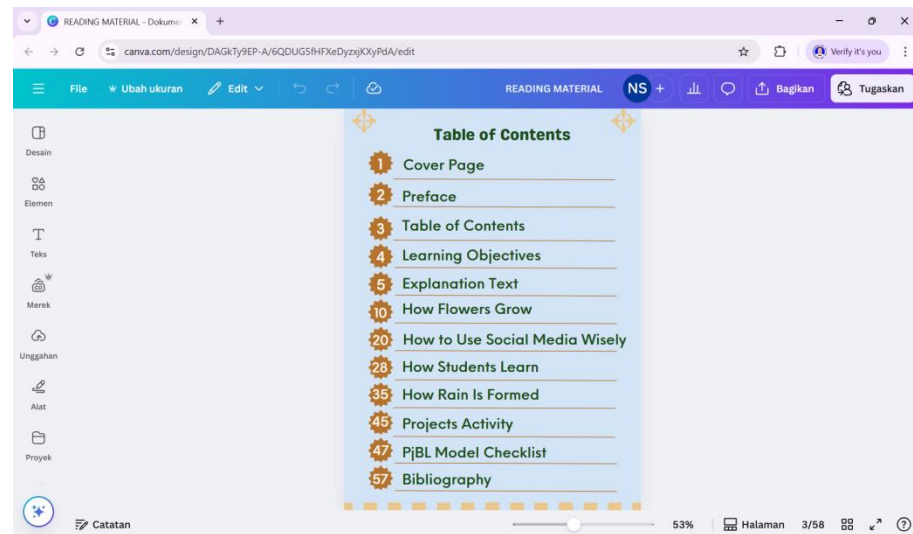


Figure 4.5 Tables of Contents

2. Content Section

The learning material consists of several important sub-topics, namely the definition, social function, generic structure, and language features of explanation text. The content of the material is complemented by four examples of explanation texts that are relevant to the context of life and other subjects, namely about How Flowers Grow, How to Use Social Media Wisely, How Students Learn, and How Rain is Formed. Each example is accompanied by relevant illustrative images, list vocabularies, classification of text structures, classification of language features, exercises designed to support students' comprehending of the content of the text.

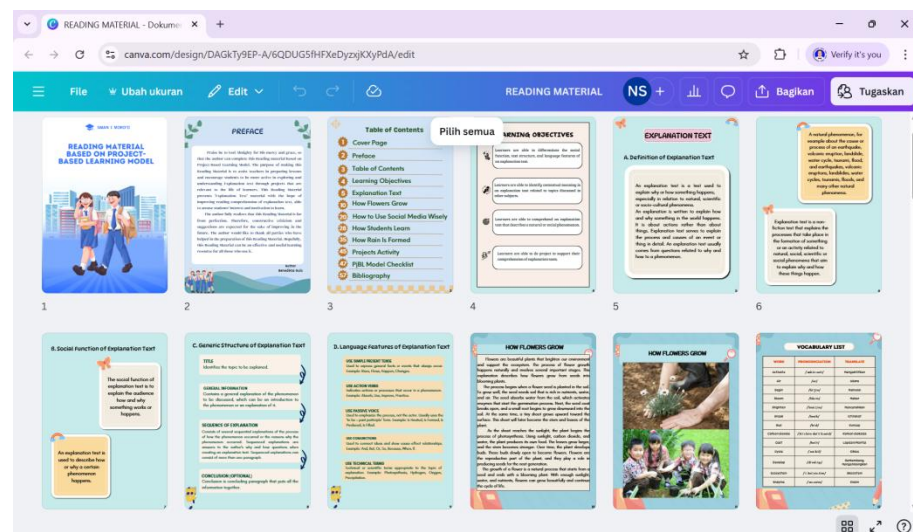


Figure 4.6 Content Display of Reading Material

3. Closing Section

Researcher use the Canva application to design a cover layout that is tailored to the needs and characters of students, the last part there is a bibliography as the final part of the developed reading material.

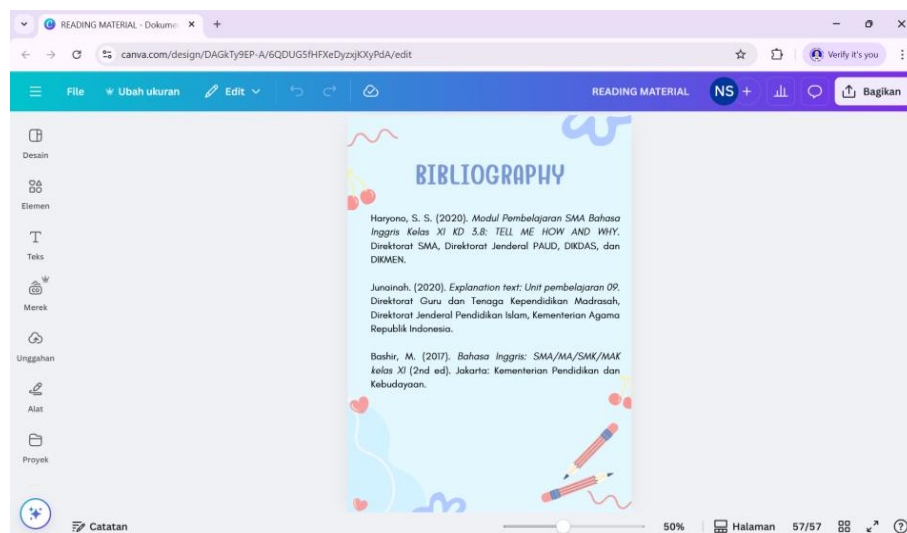


Figure 4.7 Closing Section of Reading Material

4.1.4.2 Expert Validation Results

This stage was conducted after the design stage and was conducted by validators. Validators assessed the material and practicality; the results of expert validation were used as a basis for revising the material. In this case, researcher used suggestions and recommendations from experts. Mr. Trisman Harefa, S.S., M.Pd., an English lecturer at Universitas Nias as a material expert validator and Mr. Munieli Gulo, S.Pd., an English teacher at SMA Negeri 1 Moro'o as a practitioner. The validator's evaluation results provided comments, suggestions and recommendations that will be used as a guide to rewrite and improve the content of the reading material that have been designed.

Feasibility criteria were used in this study to determine the results of data analysis. The numbers are divided into several categories as follows: not feasible, less feasible, feasible enough, feasible, and very feasible. After producing the results of the feasibility percentage calculation, the results can be put into the feasibility category. For the development of reading comprehension materials based on PjBL model, the following is the feasibility classification. The feasibility value of the product made is

calculated using this presentation scale table. This table uses a percentage scale created by Rastavala et al. (2023). The feasibility value of reading comprehension materials products is determined as the lowest or not feasible.

Table 4.12 Percentage of Eligibility Score Interval

No	Percentage Interval	Value
1	< 21%	Not feasible
2	21-40%	Less feasible
3	41-60%	Moderately feasible
4	61-80%	Feasible
5	81-100%	Very Feasible

Source: Adapted from Rastavala et al. (2023).

1. Material Validation Results

The material validation was conducted by Mr. Trisman Harefa, S.S., M.Pd., lecturer of English Education Study Program. The purpose of this validation was to assess the correctness of the Explanation Text material especially in terms of accuracy, clarity, and suitability with the learning objectives. Ten aspects were assessed using four-point scale (Werdiningsih et al., 2019), namely clarity of learning objectives, content completeness, curriculum alignment, and creativity of presentation.

4 = Very Good, 2 = Less,
3 = Good, 1 = Very Less.

The result of the validation is shown in the following table:

Table 4.13 Result of the Subject Matter Expert Validation

No	Aspect	Score (1-4)	
		Before Revision	After Revision
1	Clarity of Learning Objectives	3	4
2	Readability and Language Clarity	2	4
3	Content Completeness	2	4
4	Content Structure and Flow	2	4
5	Clarity of Examples and Illustrations	2	4
6	Curriculum Alignment	2	4
7	Interactivity and Student Engagement	2	4
8	Relevance to Real Life	2	3
9	Concept Understanding Ease	2	4
10	Creativity in Presentation	2	3
Total Score		21	38
Score (%)		53%	95%
Category		Moderately Feasible	Very Feasible

Source: Adapted from Minto, T. L. (2024).

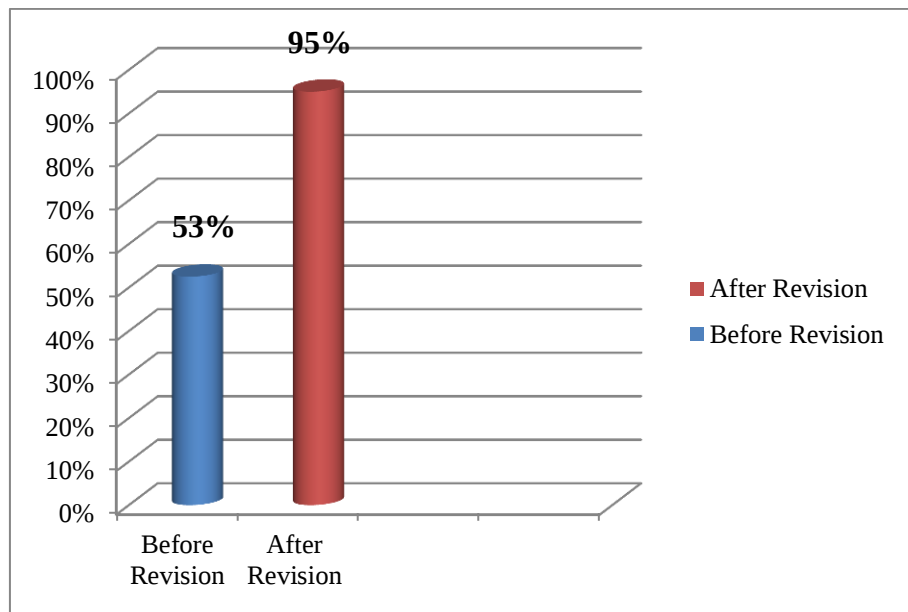


Figure 4.8 Result of the Subject Matter Expert Validation

According to the results of the assessment by material experts presented in table 4.6, the average assessment can be calculated of revision I & II as follows:

$$\text{Mean} = \Sigma X / N$$

Where: ΣX = Total Score

N = Number of items

Before Revision

Total Score : $3 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 = 21$

Maximum Score : $10 \times 4 = 40$

$$\text{Percentage} = \frac{\text{Total Score}}{\text{Maximum Score}} \times 100\% = \frac{21}{40} \times 100\% = 53\%$$

$$\text{Mean} = \frac{\Sigma X}{N} = \frac{21}{10} = 2.1$$

After Revision

Total Score : $4 + 4 + 4 + 4 + 4 + 4 + 4 + 3 + 4 + 3 = 38$

Maximum Score : $10 \times 4 = 40$

$$\text{Percentage} = \frac{\text{Total Score}}{\text{Maximum Score}} \times 100\% = \frac{38}{40} \times 100\% = 95\%$$

$$\text{Mean} = \frac{\Sigma X}{N} = \frac{38}{10} = 3.8$$

The initial validation results showed that the material expert gave a total score of 21 out of a maximum score of 40, with a feasibility percentage of 53% and an average score of 2.1. Based on the score interpretation guide, the reading material are categorized in the “moderately feasible” level or feasible with improvement. In this validation process, the validator provided some important notes for product improvement. Firstly, the text examples presented are considered less relevant to students' real life, so they need to be replaced or adjusted to be more contextual and meaningful to learners. Secondly, the vocabulary list has not been equipped with pronunciation, even though this aspect is important to help students improve their reading comprehension. Third, the pictures or illustrations used were not in accordance with the content of the second sample text, so they needed to be replaced to be more representative and support students' understanding of the reading content. Based on this input, the researcher then made revisions to the highlighted parts to improve the quality and feasibility of reading material before proceeding to the next validation stage.

The second time validation by the material expert gave a total score of 38 out of a maximum score of 40. This score resulted in a percentage of 95% and an average score of 3.8. Based on the interpretation guide, the material is categorized as very feasible. The focus of the expert assessment was on the relevance and accuracy of the content, suitability to the curriculum, clarity of learning objectives, and logical structure. The expert

was of the opinion that the materials were ready for dissemination because they met the expected content standards and provided clear learning objectives for students.

2. Practitioner Validation Results

Practitioner validation was carried out by Munieli Gulo, S.Pd., who is an English teacher at SMA Negeri 1 Moro'o. The validation phase was meant to identify the practicability and eligibility of using reading comprehension materials based on project-based learning model in an actual classroom environment. The aspects being checked were relevance of the content, effectiveness in teaching, ease of use, and suitability to the learning needs of the students. All ten aspects were scored using a four-point scale (Werdiningsih et al., 2019).

4 = Very Good,

3 = Good,

2 = Less,

1 = Very Less.

The result of the validation is shown in the following table:

Table 4.14 Results of the Practitioner Expert Validation

No	Aspect	Score (1-4)
1	Clarity of Learning Objectives	4
2	Content Relevance	4
3	Appropriateness of the Project-Based Learning Model	4
4	Ease of Implementation in Learning	3
5	Readability and Clarity of Language	4
6	Exercise and Activity Effectiveness	3
7	Attractiveness and Creativity	4
8	Clarity of Instructions	4
9	Compliance with the 2013 Curriculum	4
10	Impact on Students' Learning Independence	4
Total Score		38
Score (%)		95%
Category		Very Feasible

Source: Adapted from Minto, T. L. (2024).

According to the results of the assessment by practitioner presented in table 4.14, the average assessment can be calculated of results of the practitioner expert validation as follows:

$$\text{Mean} = \Sigma X / N$$

Where: ΣX = Total Score

N = Number of items

Total Score : $4 + 4 + 4 + 3 + 4 + 3 + 4 + 4 + 4 + 4 = 38$

Maximum Score : $10 \times 4 = 40$

$$\text{Percentage} = \frac{\text{Total Score}}{\text{Maximum Score}} \times 100\% = \frac{38}{40} \times 100\% = 95\%$$

$$\text{Mean} = \frac{\sum X}{N} = \frac{38}{10} = 3.8$$

Based on the results of the validation conducted by the expert practitioner, Mr. Munieli Gulo, S.Pd., an English teacher at SMA Negeri 1 Moro'o, obtained a total score of 38 out of a maximum score of 40. This score results in a feasibility percentage of 95% with an average score of 3.8, which is categorized in the "very feasible" value. These results indicate that reading material based on project-based learning model developed are considered very feasible for use in classroom learning. This assessment includes ten aspects, including clarity of learning objectives, content relevance, acceptability of the PjBL model, ease of use, language readability, and effectiveness of exercises and activities. Although most aspects obtained the maximum score, there were two aspects that obtained a score of 3, namely in the aspect of ease of implementation in learning and the effectiveness of exercises and activities. In general, validation from practitioners reinforces that the development product is in accordance with the needs of students and the characteristics of learning in the field.

4.1.4.3 Product Revision

The purpose of validation by material experts and practitioners is to determine the assessment of teaching material products that have been produced. From the results of data analysis, it is known that there is a need for revisions to the product. Material expert validator and practitioner expert validator provide comments and ideas for each statement on the validation sheet, which are then used to make product changes. The

following are some product adjustments from the validation that has been completed, the validators provide suggestions and input as follows:

Table 4.15 Comparison of Development

Revision Item	Before Revision	The Result of Revision
Examples	The examples given are less relevance to real life learners'	The examples relevance to real life learners'
Illustration	Images or illustrations do not match the second example	Images or illustrations are in accordance with the second example
Vocabularies	No vocabularies pronunciation in the vocabularies list table	There are vocabularies pronunciation in the vocabularies list table

EARTHQUAKES Earthquakes being the most deadly natural hazards strike without any prior warning leaving catastrophe in their wake with terrible loss of human lives as well as economic loss. Technically, an earthquake (also known as tremor, quake or temblor) is a kind of vibration through earth's crust. These powerful movements trigger a rapid release of energy that creates seismic waves that travel through the earth. Earthquakes are usually brief, but may repeat over a long period of time (earth science 2001). Earthquakes are classified as large and small. Large earthquakes usually begin with slight tremors but rapidly take form of violent shock. The vibrations from a large earthquake last for few days known as aftershocks. Small earthquakes are usually slight tremors and do not cause much damage. Large earthquakes are known to take down buildings and cause death and injury (Richter 1955). According to some statistics, there may be an average of 500,000 earthquakes every year but only about 100,000 can be felt and about 100 or so can cause damage each year. Earthquakes are dreaded by everyone.	HOW FLOWERS GROW Flowers are beautiful plants that brighten our environment and support the ecosystem. The process of flower growth happens naturally and involves several important stages. This explanation describes how flowers grow from seeds into blooming plants. The process begins when a flower seed is planted in the soil. To grow well, the seed needs soil that is rich in nutrients, water, and air. The seed absorbs water from the soil, which activates enzymes that start the germination process. Next, the seed coat breaks open, and a small root begins to grow downward into the soil. At the same time, a tiny shoot grows upward toward the surface. This shoot will later become the stem and leaves of the plant. As the shoot reaches the sunlight, the plant begins the process of photosynthesis. Using sunlight, carbon dioxide, and water, the plant produces its own food. The leaves grow larger, and the stem becomes stronger. Over time, the plant develops buds. These buds slowly open to become flowers. Flowers are the reproductive part of the plant, and they play a role in producing seeds for the next generation. The growth of a flower is a natural process that starts from a seed and ends with a blooming plant. With enough sunlight, water, and nutrients, flowers can grow beautifully and continue the cycle of life.
Before Revision	After Revision

Figure 4.9 Example of Explanation Text

This figure 4.9 shows the comparison between the explanation text examples before and after revision. In the initial version, the material expert validator considered that the example text provided was not relevant to students' real life, thus not providing a context close to their experience. In the revision, the sample texts were adjusted to reflect phenomena or events that are more familiar to students' daily life, such as social or scientific topics that they often encounter. This revision was done to increase students' connectivity to the material, which in turn can support reading comprehension more effectively and contextually, in accordance with the Project-Based Learning model.



Figure 4.10 Illustration of Example

This figure 4.10 shows the changes in the visual illustrations that accompany the explanation text. In the initial version, the illustrations used were not appropriate or did not describe the content of the text appropriately. This was criticized by the validators as it could lead to misconceptions or confusion in understanding the content of the text. In the revised version, the pictures are replaced or adjusted to truly reflect the content of the text, so that the visuals support content comprehension and can help students who have a visual learning style to better understand the overall context of the reading.

VOCABULARY LIST		VOCABULARY LIST		
WORD	TRANSLATE	WORD	PRONUNCIATION	TRANSLATE
Air	Udara	Air	/er/	Udara
Atmosphere	Atmosfer, Suasana	Atmosphere	/at.mə.sfɪr/	Atmosfer, Suasana
Become	Menjadi	Become	/bɪˈkʌm/	Menjadi
Change	Berubah	Change	/tʃeɪndʒ/	Berubah
Cloud	Awan	Cloud	/klaʊd/	Awan
Condense	Mengembun	Condense	/kənˈdens/	Mengembun
Consequence	Akibat/Konsekuensi	Consequence	/ˈkɒn.sə.kwəns/	Akibat/Konsekuensi
Droplets	Tetesán	Droplet	/ˈdrɒ.p.lət/	Tetesán
Earth	Bumi	Earth	/ɜːθ/	Bumi
Energy	Energi, Tenaga	Energy	/en.ə.ˈdʒi/	Energi, Tenaga
Evaporate	Menguap	Evaporate	/ɪˈvæp.ə.reɪt/	Menguap
Falls	Jatuh	Falls	/fɔːl/	Jatuh
Filled	Diisi, Terisi, Penuh	Filled	/-fɪld/	Diisi, Terisi, Penuh

Figure 4.11 Vocabulary list of Example Text

This figure shows the appearance of the vocabulary list in reading material before and after revision. Previously, the vocabulary list presented was not equipped with pronunciation information, even though this aspect is very important in language learning, especially to support reading and speaking skills. Based on the material expert validators' suggestions, in the revised version, each vocabulary is accompanied by pronunciation instructions so that students can understand the meaning as well as how to pronounce it correctly. This change strengthens the function of the vocabulary list as a comprehensive learning aid in supporting text comprehension.

4.1.5 Disseminate

At the dissemination stage, researcher disseminate product in the form of Reading Material Based on Project-Based Learning Model. This stage begins with an explanation of the content and structure of the product to students, followed by the implementation of learning using the PjBL model. In its application, students are divided into small groups and given project tasks that are relevant to the learning material. In learning activity of Explanation Text material with the text example 'How Flowers Grow', students are asked to bring real plants or flowers to class. They practice bring the real-life item of flower/plant and explaining the part of the flower/plant and its growth process to support their reading comprehension about the text. At the dissemination stage, researcher disseminates products in the form of Reading Material Based on Project-Based Learning Model. This stage begins with an explanation of the content and structure of the product to students; students are divided into small groups and given project activities that are relevant to the learning material. In the content of the product with the example text "How Flowers Grow", students are asked to bring real plants or flowers to class. They practiced bringing a real flower/plant and explaining the parts of the flower/plant and its growth process to support their understanding of the text. This activity not only strengthens the understanding of the text

content, but also reflects the main feature of PjBL model, which is the active involvement of students in the learning process through contextualized and meaningful direct experience. Thus, the implementation of the product at this dissemination stage supports students' reading comprehension.

Based on the theory regarding the characteristics of the project-based learning (PjBL) model proposed by Santyasa in Dahri (2021), there are four main dimensions that become a reference in assessing the suitability of PjBL implementation, namely content (focus on student ideas), conditions (student independence, effective and efficient time), activities (collaborative group investigations), and results (results or products produced from project activities). The four characteristics become the basis in the preparation of project activities in the products that have been developed; the form of project activities allows students to construct their understanding through active, collaborative, and contextual activities, in accordance with the basic principles of PjBL.

Each project activity includes structured activity indicators (PjBL Model Checklist). This checklist serves as an internal monitoring and evaluation instrument, to ensure that all aspects that characterize PjBL starting from the linkage of content with the project, the suitability of the implementation conditions, student activeness in the activities, to the output of the project have been optimally accommodated in the learning process so that this can help and support students' comprehending in reading and also through meaningful and applicable learning experiences.

To obtain data on student responses to products used in learning activities, researcher distributed questionnaire designed to measure aspects of product feasibility in terms of material, appearance, language, and usefulness in supporting learning. Through this questionnaire, students were asked to provide an objective assessment based on their experience during the disseminate process. The results of this questionnaire are the basis for evaluating the effectiveness of the products developed, as well as a reference in improving reading material to better suit the needs and

characteristics of students. All students used a four-point scale in assessing a series of dimensions of the given assessment (Kusmaryono et al., 2022), as indicated below:

4 = Strongly Agree

3 = Agree

2 = Disagree

1 = Strongly Disagree

Table 4.16 Distribution of Students' Evaluation Scores

No	Aspect	Number of Students per Score			
		4	3	2	1
1	Readability of Content	19	9	0	0
2	Engagement of Content	16	12	0	0
3	Learning Support	13	15	0	0
4	Relevance to Student Needs	14	11	3	0
5	Ease of Use	24	4	0	0
6	Interactivity of Reading material	13	15	0	0
7	Practicality in Usage	17	9	2	0
8	Feasibility in Learning	17	11	0	0

A total of 28 students of class XI MIA 2 from SMA Negeri 1 Moro'o participated in this evaluation. Each student was asked to fill out a questionnaire consisting of eight evaluation aspects in statements in the questionnaire were written in simple language and easily understood by the students and rated using a 4-point Likert scale. Each aspect reflected specific indicators to measure the effectiveness of the Reading Material. The collected responses were then analyzed using mean scores and percentage agreement to determine the students' overall perceptions of each aspect of the material.

$$\text{Percentage} = \frac{\text{Number of Students who answered 3 or 4}}{\text{Total Number of Students}} \times 100\%$$

$$\text{Mean} = \Sigma X / N$$

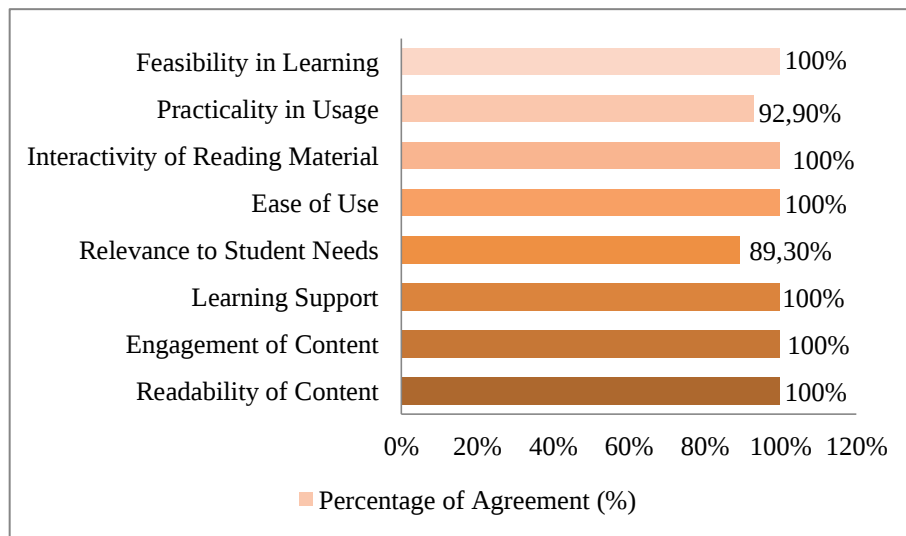
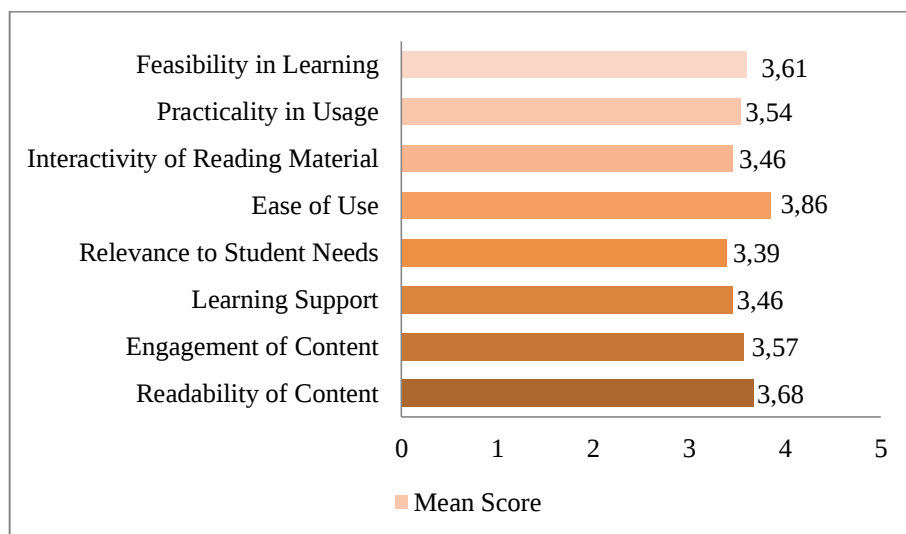
Where:

ΣX = Total score of all students

N = Number of students

Table 4.17 Distribution of Students Response Questionnaire

No	Aspect	Score				Total Students	Total Score	Mean	Percentage of Agree (4 +3)
		4	3	2	1				
1	Readability of Content	19	9	0	0	28	103	3.68	100%
2	Engagement of Content	16	12	0	0	28	100	3.57	100%
3	Learning Support	13	15	0	0	28	97	3.46	100%
4	Relevance to Student Needs	14	11	3	0	28	95	3.39	89.30%
5	Ease of Use	24	4	0	0	28	108	3.86	100%
6	Interactivity of Reading Material	13	15	0	0	28	97	3.46	100%
7	Practicality in Usage	17	9	2	0	28	99	3.54	92.90%
8	Feasibility in Learning	17	11	0	0	28	101	3.61	100%

**Figure 4.12** Students' Agreement Percentage**Figure 4.13** Mean Score per Aspect

Based on the results of distributing questionnaire to 28 students as respondents, quantitative data were obtained regarding students' responses to reading material products developed and implemented in learning activities. This questionnaire instrument is designed to assess eight aspects of readability of content, engagement of content, learning support, relevance to student's Needs, ease of use, interactivity of reading material, practicality in usage, and feasibility in learning. The assessment was conducted using a four-point Likert scale, namely: 4 (strongly agree), 3 (agree), 2 (disagree), and 1 (strongly disagree).

The Ease of Use aspect obtained the highest number of students who chose a score of 4 (strongly agree), namely 24 out of 28 students, with a total approval percentage of 100%. This shows that the reading material developed are considered very easy to use by students. Furthermore, the Readability of Content aspect is in the second position with 19 students choosing strongly agree, also with a total approval percentage of 100%, which indicates that the content of the material is considered very easy to understand.

The Feasibility in Learning and Practicality in Usage aspects each received 17 students at a score of 4, with a percentage agreement of 100% and 92.9% respectively. This indicates that in general in the reading material are considered feasible to use in the learning process and quite practical to implement. The Engagement of Content aspect is in fifth place with 16 students strongly agreeing and a percentage of 100% agreement, which shows that the content is able to attract students' attention and engagement. The Relevance to Student Needs aspect is in sixth position with 14 students choosing a score of 4 and a percentage of 89.3%, the lowest compared to other aspects, but still in the high category. The other two aspects, namely Learning Support and Interactivity of Reading Material, each received 13 students with a score of 4 and a percentage of 100%, indicating that the reading material are considered interactive and support students' learning process very well.

The results of the data analysis showed that the Readability of Content aspect obtained a total score of 103 with an average value ($M=3.68$), and the percentage of positive responses (combined scores of 4 and 3) of 100%. This shows that all students stated that the content was easy to understand. The Engagement of Content aspect received a total score of 100 with a mean ($M=3.57$) and a positive percentage of 100%, which indicates that the material is considered interesting and able to increase student involvement in the learning process.

Furthermore, the Learning Support aspect obtained a total score of 97, with a mean ($M=3.46$) and a positive response percentage of 100%, indicating that reading material support the process of students' understanding of the learning material. In the Relevance to Student Needs aspect, a total score of 95 was obtained with a mean ($M=3.39$), and a percentage of positive responses of 89.3%, indicating that although most students considered the material relevant to their needs, there were a small number of students (10.7%) who considered otherwise.

The Ease of Use aspect received the highest overall score, a total score of 108, with a mean ($M=3.86$) and a positive response percentage of 100%, indicating that the product is considered very easy to use in learning activities. Similarly, the Interactivity of Reading Material aspect obtained a total score of 97, a mean ($M=3.46$), and a positive percentage of 100%, indicating that students considered the learning materials to be quite interactive.

In the Practicality in Usage aspect, a total score of 99 was obtained, with a mean value ($M=3.54$) and a positive response percentage of 92.9%, indicating that most students considered the product practical to use, although there were two students (7.1%) who had different views. Finally, the Feasibility in Learning aspect obtained a total score of 101, with a mean value ($M=3.61$) and a positive response rate of 100%, indicating that students considered the product feasible to use in the learning process.

Overall, the results of data analysis of student responses to reading material products that have been developed and implemented show very

positive results. All aspects of the assessment obtained an average score above 3.3 on a four-point rating scale, and the percentage of positive responses from students reached more than 89%. This achievement reflects that the reading material prepared not only meet the eligibility standards in terms of content, presentation, and student involvement, but are also able to provide meaningful learning experiences and are in accordance with the needs and characteristics of students. Thus, based on student perceptions, this teaching material product can be categorized at the ‘Very Feasible’ value to be used as a reading material, especially in the context of implementing a project-based learning model (PjBL). This finding also indicates that the development approach used in the research has succeeded in creating teaching tools that are effective, interesting and relevant for students reading comprehension.

During the dissemination stage, the revised product was then tested more extensively in class XI MIA 1. This trial aimed to determine the extent to which the product could be applied in a more realistic learning context. After the learning activities were completed, the researcher distributed response questionnaires to students as an evaluation instrument. The questionnaire covered several important aspects, including readability, engagement, learning support, relevance to students’ needs, ease of use, interactivity, practicality, and feasibility of the material. The results of the questionnaire were then tabulated and presented in tables 4.18 and 4.19.

Table 4.18 Distribution of Students’ Evaluation Scores in Class XI MIA 1

No	Aspect	Number of Students per Score			
		4	3	2	1
1	Readability of Content	15	7	0	0
2	Engagement of Content	14	8	0	0
3	Learning Support	13	9	0	0
4	Relevance to Student Needs	12	10	0	0
5	Ease of Use	18	4	0	0
6	Interactivity of Reading material	14	8	0	0
7	Practicality in Usage	15	7	0	0
8	Feasibility in Learning	16	6	0	0

Table 4.19 Distribution of Students Response Questionnaire in Class XI MIA 1

No	Aspect	Score				Total Students	Total Score	Mean	Percentage of Agree (4 +3)
		4	3	2	1				
1	Readability of Content	15	7	0	0	22	81	3.68	100%
2	Engagement of Content	14	8	0	0	22	80	3.64	100%
3	Learning Support	13	9	0	0	22	79	3.59	100%
4	Relevance to Student Needs	12	10	0	0	22	78	3.55	100%
5	Ease of Use	18	4	0	0	22	84	3.82	100%
6	Interactivity of Reading Material	14	8	0	0	22	80	3.64	100%
7	Practicality in Usage	15	7	0	0	22	81	3.68	100%
8	Feasibility in Learning	16	6	0	0	22	82	3.73	100%

In addition to implementing the product in class XI MIA 1, the researcher also involved teachers in evaluating reading material through a teacher response questionnaire. This instrument was used to determine the extent to which teachers as practitioners assessed the feasibility, ease of use, and relevance of the product when applied in a broader learning context. The results of the teacher response questionnaire at this stage showed very positive appreciation, similar to the evaluations in the previous stage. This confirms that the developed product is not only valid and practical during limited pilot testing but remains effective and relevant when used in larger classes. Thus, the presence of the teacher response questionnaire during the dissemination phase provides additional evidence that Reading Material Based on Project-Based Learning Model developed are truly suitable and can be recommended for broader use in SMA Negeri 1 Moro'o.

Table 4.20 Teacher's Questionnaire Results on the Product in Class XI MIA 2

No	Assessment Aspects	Assessment Indicators	Score
1	Readability of Content	The language and text are clear, following the structure of an explanation text.	4
2	Engagement of Content	The material presentation is engaging, with topics relevant to students' lives.	4
3	Learning Support	The material supports the achievement of learning objectives (KD); exercises and projects enhance comprehension.	4
4	Relevance to Student's Needs	The material is appropriate to the students' proficiency level and their learning needs.	3
5	Ease of Use	The instructions and project steps are easy to guide by the teacher.	4

6	Interactivity of Teaching Materials	It contains exercises and project-based activities that actively involve students.	4
7	Practicality in Usage	It is compatible with the allocated learning time and helps the teacher manage the class effectively.	3
8	Feasibility in Learning	The product is feasible to be used as a learning resource based on Project-Based Learning in Grade XI.	4

Total Score : 30

Maximum Score : 32

Percentage : $30/32 \times 100\% = 93,75\%$

Based on the teacher's response questionnaire, Reading Material Based on Project-Based Learning Model obtained a score of 93.75%, which falls into the 'Very Good' category. The teacher (Mr. Munieli Gulo, S.Pd.) gave positive appreciation regarding the readability, engagement, learning support, ease of use, interactivity, and feasibility of the material. Meanwhile, both aspects relevance to students' needs and practicality of use were rated in the 'Good' category. These findings indicate that the developed product is considered appropriate and feasible for classroom implementation. Although these aspects may still be refined, the overall evaluation confirms that the material is of high quality and ready to support the teaching and learning process.

Table 4.21 Teacher's Questionnaire Results on the Product in Class XI MIA 1

No	Assessment Aspects	Assessment Indicators	Score
1	Readability of Content	The language and text are clear, following the structure of an explanation text.	4
2	Engagement of Content	The material presentation is engaging, with topics relevant to students' lives.	4
3	Learning Support	The material supports the achievement of learning objectives (KD); exercises and projects enhance comprehension.	4
4	Relevance to Student's Needs	The material is appropriate to the students' proficiency level and their learning needs.	4
5	Ease of Use	The instructions and project steps are easy to guide by the teacher.	4
6	Interactivity of Teaching Materials	It contains exercises and project-based activities that actively involve students.	4
7	Practicality in Usage	It is compatible with the allocated learning time and helps the teacher manage the class	4

		effectively.	
8	Feasibility in Learning	The product is feasible to be used as a learning resource based on Project-Based Learning in Grade XI.	4

Total Score : 32

Maximum Score : 32

Percentage : $32/32 \times 100\% = 100\%$

Based on the teacher's response questionnaire, Reading Material Based on Project-Based Learning Model obtained a score of 100%, which is categorized as Very Good. The teacher (Mrs. Yuruani Waruwu, S.Pd.) gave entirely positive appreciation on all aspects, including readability, engagement, learning support, ease of use, relevance to students' needs, interactivity, practicality, and feasibility. Since all aspects were rated at the highest point (4), this indicates that the developed product is highly appropriate, practical, and of excellent quality for classroom implementation. These results confirm that the material is fully ready to support and enhance the teaching and learning process without requiring further revision.

4.2 Discussions

The results of this study show that the main challenges faced by students in reading comprehension are closely related to limited vocabulary acquisition, the complexity of the sentence structure in the text, and low student involvement in the learning process. These difficulties indicate the need for a more innovative and participatory learning approach. In this case, Project-Based Learning model is proven to make a positive contribution as an effective pedagogical alternative in overcoming these problems. Through a project-based approach, students are not only actively involved in learning activities, but also get the opportunity to build understanding of reading texts through contextualized and meaningful activities.

To overcome the various difficulties that arise in the implementation of the Project-Based Learning model, especially in students' reading comprehension, this study developed Reading Material Based on Project-

Based Learning Model using the development 4D model (Define, Design, Develop, and Disseminate). The selection of the 4D model is considered relevant because it is able to provide a systematic framework in designing reading material that meet the needs of students and the demands of project-based learning.

At the Define stage, researcher conducted a needs analysis through observation, interviews and distributing questionnaires to students. The results of this process identified the main difficulties students face in reading comprehension, including limited vocabulary, complex sentence structure, and lack of active involvement in the learning process. These findings became the basis for designing materials that not only matched students' abilities, but also stimulated their active engagement.

Furthermore, the Design and Develop stages focused on creating reading material integrated with contextual topics relevant to students' daily lives and supported by structured project activities. These characteristics are consistent with the principles of Project-Based Learning, which emphasize student collaboration, active participation, and the production of meaningful learning outcomes. In the Develop stage, the product underwent a comprehensive validation process conducted by both material experts and educational practitioner to ensure its quality in terms of content accuracy, language clarity, and suitability for classroom implementation. After validation and revision, the product was tested through a small tryout involving six students, aimed at examining its practicality and collecting initial feedback from learners. The results of the tryout showed that all students achieved scores above the Minimum mastery criteria (KKM), and the student response questionnaire indicated highly positive perceptions toward the material. Overall, the product was classified as very feasible with an average score of 95%, confirming that the developed reading material possesses high quality and strong potential to be effectively implemented in teaching learning process.

During the Dissemination stage, classroom implementation of the developed materials provides students with the opportunity to engage in real

project activities. The development the eleventh graders' reading comprehension material utilizing project-based learning model successfully meets the learning needs of students integrating project activity is a learning model that uses real world situations as the initial stage in integrating new knowledge, involves students actively participating in solving problems provided by the teacher and is able to provide more interesting and meaningful learning for students. Project activities not only support reading comprehension. For example, the project of explaining the growth of flowers/plants by bringing real flowers to class demonstrates how meaningful, contextualized and collaborative learning experiences support the interpretation of real world relevant texts thereby support student engagement and understanding in a project-based environment.

In addition to distributing student response questionnaires, the researcher also conducted a final evaluation after the entire learning cycle was completed. This final evaluation was conducted both in the research class (XI MIA 2) and in the broader trial phase (XI MIA 1). The aim was to determine the extent to which the developed product was able to enhance students' reading comprehension after they participated in learning using the Project-Based Learning model. The evaluation instrument consisted of a final test containing multiple choice questions that measured aspects of reading comprehension, such as identifying the main idea, understanding important details, recognizing language features, and identifying the logical sequence in explanation text. The results obtained show that all students in both classes achieved scores above the Minimum mastery criteria (KKM), with scores ranging from 70 to 100. These findings reinforce that the developed product not only received positive feedback from students but was also effective in improving their learning outcomes.

4.2.1 Analysis and Interpretation of Research

This study set out to develop eleventh graders' reading comprehension material utilizing Project-Based Learning model through the 4D procedure. The needs analysis revealed three dominant obstacles in reading: limited

vocabulary mastery (78.6%), difficulty understanding complex sentence structures (75.0%), and low participation/engagement in project-based tasks, students tended to prefer working in groups (89.3%). At the same time, students indicated strong preferences for real life contexts (96.4%) and visual media (92.9%), signaling that contextualized, collaborative, and visual learning supports were crucial for comprehension. These findings guided the development of Reading Material Based on Project-Based Learning Model focused on explanation text and aligned with students' needs.

During Develop, expert validation improved from 53% (moderately feasible) to 95% (very feasible) after revisions; practitioner appraisal also reached 95% (very feasible), confirming readability, relevance, and attractiveness of the product. A small try out ($n = 6$) yielded final evaluation scores 70–100 (mean 85.0, $100\% \geq \text{KKM } 70$) and very positive student responses (average 86.5%, “Very Feasible”). In Disseminate, the revised product was implemented in a larger class (XI MIA 1). Final evaluation results showed scores 70–100 with a mean 81.78, and students in both the try out and dissemination classes met or achieved KKM. Students response questionnaire in the large class indicated 100% agreement (score 3 or 4) across all aspects (readability, engagement, learning support, relevance, ease of use, interactivity, practicality, feasibility) with aspect means ranging from 3.55–3.82. Collectively, the evidence indicates that reading material based on project-based learning model effectively improved comprehension of explanation text and engagement in real classroom conditions.

4.2.2 Research Findings versus Relevant Research

The findings of this study align with previous studies such as those conducted by Lumanauw (2022) and Wiratmo et al. (2022), which concluded that PjBL effectively improves students' reading comprehension and promotes active learning. However, unlike those studies that focused solely on PjBL implementation, this research addressed a different gap: the absence of specifically designed reading materials that integrate PjBL

characteristics, especially for explanation texts. Moreover, this study differs in that it involved systematic product development (through the 4D model), validated by experts, and tested with real classroom implementation to ensure practicality, feasibility, and effectiveness of the product.

4.2.3 Research Findings versus Theory

The findings corroborate the theoretical foundations of PjBL, which emphasize student centered learning, collaboration, authenticity, and knowledge application. Students' positive responses to group work, real life themes, visual supports, and project deliverables reflect the conditions under which deeper comprehension and motivation emerge, as posited in PjBL scholarship (Larmer) and in reading comprehension pedagogy that advocates meaningful, strategy rich exposure to texts (Stoller). Methodologically, employing the 4D model (Thiagarajan) ensured the material iteratively satisfied content accuracy, readability, user practicality, and classroom feasibility mirrored in the stepwise rise of expert/practitioner feasibility ratings and the successful class trials. In short, the classroom evidence validates the theory to practice pathway: when explanation texts are embedded in authentic projects with clear products, and collaboration, students' comprehension improves and participation rises.

4.2.4 Research Findings Implication

Theoretical implication: the study strengthens evidence that contextualized, collaborative, and product-oriented tasks are effective vehicles for developing reading comprehension, adding a material development lens (not just methodological implementation) to PjBL literature. It also illustrates how 4D can operationalize theory into teacher ready resources.

Practical implications:

- a. Teachers can adopt the provided materials to run PjBL cycles on explanation texts, using driving questions, planning sheets, group investigation, and project products to elicit comprehension

strategies (main idea, detail recognition, linguistic features, and logical sequencing).

- b. Schools/curriculum developers may incorporate reading material based on project-based learning model into local programs to boost engagement and outcomes, especially where students prefer real life contexts and visuals.
- c. Future product development can use the validation and response instruments demonstrated here to maintain feasibility ($\geq 95\%$) and classroom practicality, while incrementally broadening text types and assessment formats.

4.2.5 Research Findings Limitation

Although this research has successfully developed and tested reading comprehension material based on the Project-Based Learning model, several limitations should be acknowledged. The study was conducted in a limited scope, involving only 28 students of class XI at SMA Negeri 1 Moro'o, which restricts the generalizability of the findings to wider educational contexts. The final evaluation of learning outcomes relied mainly on multiple choice test and students' response questionnaires, which focused more on cognitive achievement and perceptions. These limitations indicate that while the findings are promising, further studies with larger and more diverse samples, longer implementation periods, varied assessment instruments, and more rigorous experimental designs are necessary to provide stronger and more comprehensive evidence regarding the effectiveness reading comprehension material utilizing project-based learning model and strengthen the findings.