

# Development of POE Learning Model-Based Booklet for Elementary School

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## ABSTRACT

The purpose of this research is to produce a Predict-Observe-Explain (POE) learning model-based booklet that is valid, practical, and interesting as teaching material for 4th-grade students in Bendo 1 Elementary School Blitar City, Indonesia. This study uses the ADDIE research model. The results showed the POE learning model-based booklet with a reinforcement of curiosity was very valid (93%) according to material experts, instructional materials experts, linguists, and teachers, booklets as well as very practical (93.2%) and very interesting (92.7%) according to students. So, it can be concluded that the POE-based booklet for Elementary School with a reinforcement of curiosity is very suitable to be used.

**Keywords:** booklet, POE learning model, elementary school

## 1. INTRODUCTION

Quality education is one of the most important factors for building human resources. In Law Number 20 years 2003 Regarding the National Education System Article 1 Paragraph 1, written education is a conscious and planned effort to create an atmosphere of learning and the learning process so that students actively develop their potential to have religious-spiritual strength, self-control, personality, intelligence, noble character, and skills that are needed himself, society, nation, and state. This means that the quality of human resources is determined by the quality of education. In other words, education is not only educating students to be intelligent human beings, but also of noble character.

Character education is a strategy in cultivating culture and national character so that students have noble morals. Character education can be integrated into learning activities in every subject, one of which is science (Muslich, 2011: 86). Integrating characters in the science learning process can provide a nurturant effect in character development, including the character of curiosity. Curiosity is an attitude and action that always seeks to know more deeply and extends to what is learned, seen, and heard (Mustari, 2017). Meanwhile, according to Wisudawati and Sulistyowati (2017) curiosity is an effort made to answer something that students want to know both from inside and outside themselves.

Science in elementary schools should open opportunities for students to be able to nurture their

curiosity naturally, one of which is by experimenting. Science needs to be studied through experimental activities so that students can discover the knowledge they are learning by themselves (Samatowa, 2010). One learning model that is believed to be able to develop the critical thinking skills of students in experimental activities is the POE (Predict-Observe-Explain) learning model (Winahyu and Kartini, 2013). Predict-Observe-Explain (POE) learning model invites students to make predictions of a problem, then prove predictions through experiments, and explain the results of their observations. The activity of experimenting is expected to stimulate the development of curiosity of students.

The results of interviews with class IVB teachers at SD Bendo 1 Blitar City on December 10, 2019, stated that the experimental activities provided an interesting learning experience, increased motivation, and increased the curiosity of students. This is following the results of the student characteristics questionnaire which showed 80% of grade 4 students stated that science learning carried out by experiment can increase their curiosity. However, teachers have never implemented POE-based learning. Teacher experimental activities are only carried out according to the experimental guidelines in the theme book. Meanwhile, based on the results of observations, it shows that the experimental guidelines in the theme book are still simple and have a less attractive appearance.

One type of interesting teaching material is a booklet. Booklets are printed media in the form of small books to convey material concisely and attractively. An interesting booklet is expected to increase the interest and learning

outcomes of students (Fauziyah, 2017). Of course, the use of booklets is adjusted to the character of the material being studied by students.

In semester 2, theme 7, there is one of the basic competencies (KD) of IPA content, namely KD 3.3 to identify types of forces, including muscle force, electric force, magnetic force, gravitational force, and friction force and KD 4.3 demonstrates benefits in daily life -day, for example, muscle force, electric force, magnetic force, gravitational force, and friction force. KD contains material forces that need to be learned through experimental activities so that the concepts can be embedded in students. Therefore, it is necessary to develop a science piloting guideline especially in KD, which is a POE-based booklet.

**2. METHOD**

This research method uses development research with the ADDIE model. According to Rusdi (2018), the ADDIE model consists of five steps, namely Analysis, Design, Development, Implementation, and Evaluation. The location of research at SDN Bendo 1 Blitar City, Indonesia, through small groups (6 class IVA students) and field trials (24 class IVB students). Types of data are quantitative data and qualitative data. Quantitative data were obtained from the results of validation questionnaires (material experts, teaching material experts, and linguists) and questionnaire results of practicality (users/teachers) and attractiveness (students).

While qualitative data is obtained from suggestions from material experts, teaching materials experts, linguists, users, and students. Quantitative data were analyzed using quantitative analysis techniques. Questionnaires for experts and users using the scores Likert scale, while the student questionnaire used the Guttman scale score. The data that has been obtained is then processed using the following Akbar (2015) validation formula refer to Equation (1).

$$V - ah \text{ atau } V - pg = \frac{Tse}{Tsh} \times 100 \% \tag{1}$$

Information for validation formula, namely V-ah for validity expert result, V-pg for user validity that is teacher and student, Tse for total score achieved, and Tsh for total score expected. Furthermore, the results of these calculations are interpreted and categorized according to Akbar (2015) categorization criteria as in Table 1.

**Table 1 Criteria for Categorization of Validity, Practicality, and Interesting**

Score (%)	Validity Category	Information
85 – 100	Very valid / practical / interesting	Can be used without revision
70 – 85	Quite valid / practical / interesting	Can be used, but needs minor revisions
50 – 70	Less valid / practical / interesting	Can be used with major revisions
01 – 50	Not valid / practical / interesting	Should not be used

Based on the criteria of Table 1 above, POE-based booklets can be declared valid, practical, and attractive if they reach a minimum value of 70.01%. If the value is less than or equal to 70.00%, it is necessary to revise it based on the advice of material experts, teaching materials experts, linguists, teachers, and students.

**3. RESULT**

The results obtained are presented in the table of product validation results by material experts, teaching materials experts, linguists, users/teachers, and student response data to the practicality and attractiveness of the product. Based on the results of product validation by teaching material experts, the score was 94.4% with a very valid category, so it can be used without revision. As for the advice of teaching materials experts, namely the front and back cover background is made more integrated, the book subtitles are enlarged so that they are easy to read, the cover illustration is adjusted to the material force, the layout is tidied up, the type and size of the letters are changed so as not to give a full impression, and adjust the illustration to the context of the discussion.

**Table 2 Result of Product Validity, Practicality, and Interesting**

Number	Aspect	Percentage of Validation Ratings (%)					
		Validity			Practicality	Interesting	
		Expert Theory	Material Expert Teach	Expert Language	User (Teacher)	Testing Ex. Small	Testing Field
1.	Content eligibility	100	-	-	100	100	97.9
2.	Serving Feasibility	91.6	-	-	83.3	83.3	85.4
3.	Language Eligibility	-	-	89.5	100	83.3	95.8
4.	Graphic Feasibility	-	94.4	-	100	100	100
5.	POE implementation	91.6	-	-	83.3	88.8	91.6
6.	Character Stimulus (Curiosity)	100	-	-	75	94.4	87.5
Average		97.9	94.4	89.5	90.3	91.6	93.0
Validity Category		Very Valid	Very Valid	Very Valid	Very Practical	Very interesting	Very interesting
Information		No Revision	No Revision	No Revision	No Revision	No Revision	No Revision

Based on the results of product validation by linguists, the score is 89.5% with a very valid category, so it can be used without revision. The linguist's advice is to simplify sentences according to the language of students and improve typing writing. Based on the results of the practicality of the product by the user, the value is 90.3% with the very practical category, so it can be used without revision.

As for user suggestions, the booklet product is good, only for clarity of instructions so that it is easier to understand and replace you know or not chapter 4 magnetic force, previously about magnets, you should not be close to electronic objects, replaced by material about the compass. The teacher also adds to the implementation of learning so that students are always guided, so that they can find learning concepts correctly.

Based on the data on the response of students to product attractiveness, it can be seen in small group trials that 91.6% of product attractiveness is obtained with a very attractive category so that the product can be used without revision. In the field trial, 93.0% product attractiveness was obtained with a very attractive category so that the product could be used without revision.

While qualitative data in the form of suggestions from students in small group trials, namely booklets need to clarify instructions and questions to make it easier to understand. Furthermore, the suggestions of students on field trials are very interesting booklets, very good booklets, and everyone should try, booklets are very interesting to understand and they like it, booklets allow them to, and they love understanding books.

## **4. DISCUSSION**

### ***4.1 The validity of POE-based Booklet***

The validity of the POE-based booklet with the strengthening of the character of curiosity in grade IV SDN Bendo 1 Blitar City was assessed by material experts, teaching material experts, and linguists. Validity includes six aspects of assessment, namely content feasibility, presentation feasibility, language feasibility, graphic feasibility, POE implementation, and curiosity character stimulation. The material expert validates four aspects of the assessment, namely content feasibility, presentation feasibility, POE implementation, and curiosity character stimulation.

Teaching material experts validate the feasibility of graphic aspects, including physical booklets, booklet covers, booklet contents. Linguists validate the feasibility of language aspects including language appropriateness and communication. The evaluation of material experts reached 97.9%, teaching materials experts 94.4%, and language experts 89.5%. So that the mean value of validation is 93, 9% with a very valid category with

product test decisions can be used without revision. The explanation of the aspects of the validation assessment is as follows.

The eligibility of the content is in the very valid category with a value of 100% based on the material expert's assessment. The content feasibility aspect consists of two assessment indicators, namely the suitability of the material and the accuracy of the material. In the material suitability indicator, the booklet is following KD, indicators, and learning objectives. The booklet also meets the material accuracy indicators, where the material in the booklet is presented coherently, precisely, and does not cause misconceptions, to build students' concepts.

Feasibility content is the following product specifications. The material in the booklet contains experimental activities that can increase the curiosity of students. So that through the experimental activities carried out, students can build learning concepts. This matter following Putri (2019) that the experimental method experiments can help students find the concepts they are learning. So that the concept obtained by students is not the result of memorization but the result of students' understanding of experimental activities.

Presentation feasibility reaches 91.6% with a very valid category based on material expert judgment. The presentation feasibility aspect consists of three indicators, namely the presentation technique, the presentation of learning, and the completeness of the presentation. The presentation technique in the booklet is presented with clear work steps, following the flow of inductive thinking, with each chapter of the booklet: problem presentation, prediction, observation, data analysis, explanation, conclusion, and evaluation. Presentation of student-centered learning booklets, emphasizes process skills, and stimulates students to think critically. Completeness of the presentation of the booklet includes an introductory section (consisting of cover, introduction, and table of contents, section) content section (consisting of basic competencies, learning allocation, concept maps, instructions for using booklets, and presentation of material).

The revision of presentation feasibility was carried out based on the advice of material experts, namely improving the experimental steps with simpler sentences and not too long. This is following Utami's opinion (2018) that the material must be presented concisely and use language that is easy for students to understand. So those revisions are carried out by improving the experimental steps with concise language. After the revision was carried out, it resulted in an eligibility presentation booklet following the specifications. The developed booklet contains material: (a) definition of force, (b) various forces, including muscle force, electric force, magnetic force, gravity force, and friction force, and (c) the benefits of the force. Booklets are presented

with instructions for experimental activities that are clear and easily understood by students. So that students can learn well.

The feasibility of the language is in a very valid category with a value of 89.5% based on the linguist's assessment. The feasibility of this language is quite good where previously Prastutiana (2018) developed a POE-oriented module getting a score of 80% based on linguists. Aspects of language eligibility consist of two assessments, namely language suitability and communicative. The language in the booklet is following the level of thinking development and social and emotional development of students. Language corresponds to the level of thinking development because the language is simple and easy to understand, the choice of words is appropriate, and sentences are not confusing.

Language is also under the level of social and emotional development, because language is suitable for students, creates a sense of pleasure to learn, and can describe concepts. The language in the booklet is also communicative because it fulfills indicators, namely language comprehension, the accuracy of language rules, and the use of terms. Booklets fulfill language understanding because they use language commonly used by students, are interesting, clear, right on target, and do not cause multiple meanings. The booklet also meets the accuracy of language rules, because it uses standard words, sentences according to EYD, and the writing is no typo. The use of terms in the booklet is also the following terms commonly used in science, consistent, and makes it easy to understand.

In the aspect of language feasibility, improvements were made based on the advice of linguists. Booklet revised with sentences following the language of students so that they are easy to understand, especially in the experimental and data analysis steps. The booklet also revised the use of typos (typos) and sentences that were still inaccurate, so as not to make it difficult for students. This is following the opinion of Muslich (2010) that the material must be presented in attractive, clear, targeted language and does not cause multiple meanings.

After the revision is done, produce a booklet that matches the specifications. Booklets use language following the development of learners and are communicative. The language in the booklet is simple and easy to understand. The booklet is following Muzdalifah's opinion (2018) that booklet contains information written in concise and easy to understand the language in a short time.

The eligibility of the graphic is very valid with a value of 94.4% based on the assessment of the teaching material expert. The aspect of graphic feasibility consists of three assessments, namely the physical booklet, booklet cover, and booklet content. The physical booklet, which is A5 size (148x210 mm), with good paper quality,

and neatly and firmly bound. The booklet covers match layout indicators, typography, and illustrations. The booklet cover layout is appropriate because the front and back cover designs look united, the illustrations and typography are proportional, balanced, and in tune, and the colors, illustrations, and typography are harmonious and related. Booklet cover typography uses attractive, easy-to-read fonts, and the color of the book title contrasts with the background and can inform the material. Booklet cover illustrations can reflect the contents of the booklet, describe POE learning, and have the appropriate shape, color, size, and object proportion.

The contents of the booklet also correspond to the layout indicators, typography, and illustrations. The layout of the content of the booklet is proportional, consistent, and does not interfere with understanding. The typography of the content of the booklet is attractive and easy to read, the hierarchy of the title is consistent and makes it easy to understand, and the type, size, and spacing of the letters are appropriate. The illustration of the content of the booklet is easy to understand, the shape, color, size, and proportion are appropriate, and the overall illustration is harmonious. the title hierarchy is consistent and easy to understand, and the type, size, and spacing of the letters are appropriate.

The illustration of the booklet content is easy to understand, the shape, color, size, and proportion are appropriate, and the overall illustration is harmonious. the title hierarchy is consistent and easy to understand, and the type, size, and spacing of the letters are appropriate. The illustration of the content of the booklet is easy to understand, the shape, color, size, and proportion are appropriate, and the overall illustration is harmonious.

In the aspect of the feasibility of the graph, a revision was made based on the advice given by the teaching material expert on the cover and contents of the booklet. Booklet cover improvements, namely the design of the front cover, back, and back cover made with the same background image to make it more integrated. This is following the opinion of Muslich (2010) that the design of the face, back, and back skin is a complete unit. Furthermore, the font size of the cover subtitles is enlarged to 15 pt so that it is easy to read.

Revisions were also made to the booklet's front cover illustration so that it fits the material of force, as follows: (a) a picture of a child riding a bicycle represents an event of muscle force, which also represents; (b) the frictional force that occurs between the bicycle tire and the ground; (c) the drawing of a utility pole shows the electric force; (d) the compass image in the column name represents the magnetic force; and (e) the force of gravity is indicated by a hot air balloon. On the back cover of the booklet, an explanation of POE learning steps is also added to make it easier for students.

Next, preparing the contents of the booklet is done by tidying up the layout, namely template on the header and footer is minimized, and uses a shape that does not give a full impression. The type and size of the letters were changed, where the previous font used, namely Book Antiqua 11 pt, gave a full impression on the page, then it was replaced with Maiandra GD 12 pt so that the display was tidier and easier to read. Furthermore, the illustrations in the contents of the booklet are adjusted to the context of the discussion. For example, in predicting activities, illustrations are made with pictures of curious children and writing tools to predict. This is following the opinion of Muslich (2010) that illustrations/pictures serve to clarify the material so that it can increase the understanding and understanding of students.

Meanwhile, the introduction to the problem at the beginning of the chapter is made with images that match the material and events that are close to the daily lives of students. Introduction to chapter 1 the definition of force, namely the events of opening and closing windows. Introduction to chapter 2 muscle force, namely pedaling a rickshaw. Introduction to chapter 3 electric force, namely the turning on the lights. Introduction to chapter 4 magnetic forces, namely magnetic pencil cases that can close tightly. Introduction to chapter 5 the force of gravity, namely parachutists. Introduction to chapter 6 friction forces, namely bicycle tires made of grooves.

After the revision was carried out, it resulted in an eligibility graphic booklet following the specifications. Booklet has Good quality paper with a clean cover and contents, appropriate typography, and attractive illustrations. Booklets are also easy to carry because they are following Prastowo (2016), that books used for grade 4 SD can be A5 size with vertical side binding (portrait).

POE implementation reached 91.6% in the very valid category based on material expert judgment. The POE implementation aspect consists of three indicators, namely predict, observe, and explain. In the booklet there are activities to predict (predict) where there is an introduction to the problem, there is an order to make predictions, and there are orders to make observations. Activities to observe in the booklet include observation, data analysis, and connecting concepts with problems. Meanwhile, explain activities in the form of explaining the results of observations and analysis, writing down the information obtained, and writing conclusions.

In the implementation of POE, it was improved according to the advice of material experts, namely the predicted activity, namely the introduction to the problem is summarized into one problem and is equipped with a picture. Based on these suggestions, the booklet was revised by selecting the problems that were closest to students and equipped with pictures to make it more interesting. This is according to opinion Muslich (2010) states that the material in the book presents contextual problems that are familiar, interesting, and useful for

students. The next material expert's suggestion is to improve the command sentence connecting the concept with the problem. The commands must be easily understood by students so that they can relate the concept to the problems in their environment.

After the revision is done, produce a booklet that matches the specifications. Booklets can practice prediction, observation, and explain to students. This is following the opinion of Winahyu and Kartini (2013) that the POE learning model provides opportunities for students to predict symptoms in the environment for logical reasons, prove the existence of predictions through experiments, and explain findings based on scientific observations.

The curiosity character stimulus reached 91.6% with a very valid category based on the material expert's assessment. The stimulus aspect of the curious character consists of three indicators, namely active thinking, active observation, and interesting, challenging and satisfying learning. Booklets can stimulate students to actively think because the activities in the booklets can activate thinking, create curiosity, and raise students' questions. The success of the active observing indicator is that activities can enable students to observe, learn directly, and find answers. Furthermore, the activities in the booklet are interesting so that students learn further. Activities can make students challenged to learn.

Revisions were made to improve the booklet as suggested. Booklet revised by adding more pictures and made with activities that are easy for students to do. This is following the opinion of Yuliana, et al (2019) that booklets with attractive and informative designs can arouse students' curiosity so that students can easily understand what is being said. After revisions, produce booklets that match the specifications. The booklet is equipped with reinforcement of the character of curiosity that makes students think actively, actively observes, is interested, challenged, and satisfied with their learning activities.

#### ***4.2 The practicality of POE-based Booklet***

The practicality of the POE-based booklet with the strengthening of the character of curiosity in grade IV SDN Bendo 1 Blitar City is assessed by teachers as users. Practicality reaches 90.3% in the very practical category with product test decisions that can be used without revision. This practicality is quite good compared to previous research by Muzdalifah (2018) who developed a mathematics booklet based on the unity of science with a value of 79.45% which is in the practical category. Practicality includes six aspects of assessment, namely content feasibility, presentation feasibility, language feasibility, graphic feasibility, POE implementation, and curiosity character stimulation. The indicators of practicality assessment aspects by users are following the

product validity indicators. The explanation of the aspects of practicality assessment is as follows.

The eligibility of the content is included in the very practical category with a value of 100% based on expert user assessment. Feasibility content is the following product specifications. The material in the booklet is following KD 3.3 identifies the types of forces, including muscle force, electric force, magnetic force, gravitational force, and friction force, and KD 4.3 demonstrates benefits in everyday life, for example, muscle force, electric force, magnetic force, gravitational force, and friction. This is following the opinion of Utami (2018) that the booklet must contain sufficient material to achieve the expected competence.

Presentation feasibility reaches 83.3% with a fairly practical category. The teacher's suggestion is to improve the experimental step instructions so that students can easily understand them. then changing the material in chapter 4 magnetic force, previously about magnets not being close to electronic objects was changed to about the compass. This is because the material about the compass needs to be studied by students. After the revision was made, it resulted in an eligibility presentation booklet following the specifications. The developed booklet contains Theory the force presented centered on students, emphasizing process skills (predicting, observing, and explaining), and stimulating students to think critically. This is following the feasibility presentation of the material according to Muslich (2010), which is student-centered, can develop process skills, and foster critical thinking.

The eligibility of the language is included in the very practical category with a value of 100% based on user ratings. Booklet following product specifications. Booklets use language that is communicative and appropriate to students. Booklet following the opinion of Abidin (2016) that the use of language is adjusted to the level of language mastery of students. Graphic eligibility is included in the very practical category with a value of 100% based on user ratings. These results are quite good seeing the development of number sense-based booklets by Rohmah (2019) reaching 90% based on media experts and 97.3% based on users. Appropriateness graphic booklet is the following product specifications. Booklets have an attractive display to increase the curiosity of students.

The POE implementation achieved a score of 83.3% with a fairly practical category. Teachers give advice towards the implementation of learning, namely students must be well guided during learning so that they can find knowledge correctly and not cause misconceptions. This is following what Widyaningrum, et al. (2014: 105) states that the teacher as a facilitator must be able to help students interact with their environment as well as possible.

After the revision is done, produce a booklet that matches the specifications. The booklet contains experimental activities according to the POE learning steps. The booklet is following Abidin's opinion (2016) that the learning stages should be carried out based on certain model stages. Booklets are compiled using the POE learning model, where this learning model can improve students' critical thinking skills. Learners practice not easy to believe in the results of the predictions so that they always try to find answers through observation and sharp analysis in testing the correctness of the answers they get. Then students can also practice connecting the concepts obtained with problems in the surrounding environment. Students can also improve their ability to explain and conclude learning. Of course, in the implementation of learning, students are guided by the teacher as a facilitator.

The curiosity character's stimulus reached 75% with a fairly practical category. In the implementation of learning, the teacher gives suggestions to pay attention to differences in the ability of students to predict, observe, and explain, so that the curiosity of each student's learning is different. Therefore, in the implementation of learning carried out by paying attention to these differences by dividing students where each group has students who have high, medium, and low abilities so that they can help each other.

### **4.3 The Interest of POE-based Booklet**

The interest of POE-based booklets with the strengthening of the character of curiosity in class IV SDN Bendo 1 Blitar City was assessed based on a student questionnaire reaching 93.0% in the very attractive category with product test decisions (without revision). The interest of the product is based on six assessment aspects, namely content feasibility, presentation feasibility, language feasibility, graphic feasibility, POE implementation, and curiosity character stimulation. The aspect of content feasibility, namely the presentation, is very pleasant and liked by students. The aspect of presentation feasibility is clear and easy to understand instructions to make students understand the material. The aspect of language eligibility is clear and easy to understand language. The aspects of the feasibility of graphics are attractive, good booklet covers, good letters and illustrations, and practical and easy to carry. Booklet developed following the specifications. The POE implementation aspect is students can predict (predict), observe (observe), and explain (explain) well. While the stimulus aspect is the character of curiosity, namely students interested and wondering, trying to find knowledge on their own, and satisfied/happy because of acquiring knowledge independently.

Students also provide suggestions for product improvements. Suggestions for small group trials are to improve experiment step instructions and refine the

question sentence. This suggestion is related to the feasibility aspect of the presentation. Previously there were still instructions that were not understood by students, especially in the experimental step, so revisions were made by simplifying sentences using pictures. Likewise, with the question section, students have difficulty understanding questions on data analysis, it needs to be revised with simpler sentences so that students no longer have difficulty finding learning concepts independently. Meanwhile, in the field trial, the comments and suggestions of students were: booklet very interesting, booklets are great and all must try, booklets are very interesting to understand and I love it, booklets make it easy for me to be, and I love to understand books. Based on these comments and suggestions, it can be seen that the booklet is good and does not need improvement.

Product withdrawals are the following specifications. The booklet contains predictive activities, observations, and explanations of experiments with strengthening the character of curiosity in material with activities that are interesting, fun, and easily understood by students. Booklets are following Fauziyah's opinion (2017) that booklets can support material understanding and provide interesting learning nuances. Broadly speaking, when conducting small group trials, students' responses were very positive to the booklet products being developed. Students are enthusiastic and happy to do the activities in the booklet. Students also give positive responses to the booklets, it's just that the booklets need to clarify the instructions and questions in them so that children understand more easily.

In the field trial, the response of students was very enthusiastic in following the learning in the POE-based booklet by strengthening the character of curiosity. When learning they carry out experimental activities with enthusiasm, although at first students still have difficulty writing predictions, observing results, data analysis, and making experimental conclusions. This difficulty can be overcome by providing examples to students. After being given an example, students can carry out experimental activities well. This is following the findings of Winahyu, et al (2017) that students who have difficulty writing questions about the experiment being carried out, can finally write the questions well after being given an example.

In the learning process, students enthusiastically carry out experimental activities. Various questions arise from students about the experiments they are doing. asking questions is an indicator of the character of curiosity (in Fauzi, et al, 2017). All students are excited to find answers to their curiosity. The activities in the booklet are very interesting so that they can practice the ability to predict, observe, and explain. Students also work together to find concepts. It's just that during the activity explained that there are still students who are embarrassed to express their opinions, so it is necessary

to give motivation to them to dare to appear in front of the class. After learning is complete, it is found that students' understanding of the material has increased, students can also answer the evaluation in the booklet correctly.

## 5. CONCLUSION

Based on the discussion, it can be concluded that this research and development resulted in a product in the form of a POE-based booklet that is very valid, very practical, and very interesting. The product validity is 93% based on the average assessment by material experts, teaching materials experts, linguists, and users. The practicality of the product is 93.2% based on students. Meanwhile, product attractiveness was 92.7% based on students. So the POE-based booklet product is said to be very valid, very practical, and very interesting so that it can be used in learning.

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