THE DEVELOPMENT OF INQUIRY-METHOD-BASED EXPLANATORY TEXT WITH PISA FRAMEWORK FOR JUNIOR HIGH SCHOOL

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Abstract: Research and development of a module for reading explanatory texts based on inquiry methods and PISA standardized questions has been carried out in class VIII SMP N 52 Palembang. This study aims to produce reading modules that suit the needs of teachers and students. The research method used is development research with the steps of research on the development of the Jolly and Bolitho and Dick, Carey & Carey models which include identification of needs, exploration of material needs, contextual realization, production of materials, expert validation, one to one evaluation, small group and field tests. Data was collected through questionnaires, interviews, validation sheets, and tests. The results showed that the feasibility aspect of content and presentation obtained a percentage of 84% in the very good category, linguistic feasibility obtained a percentage of 90% and was categorized as very good, graphics obtained a percentage of 76% in the good category, validation questions received a percentage of 85% in the very good category. Practicality in the one-to-one evaluation stage and the small group gets a percentage of 80% in the practical category. The effectiveness measured in the field test is 0.49 and is in the medium category. Thus, the product in the form of a module for reading explanatory texts based on inquiry methods and PISA standardized questions can be used in learning explanatory texts.

Keywords: *development; explanation, inquiry; PISA questions; reading module; teaching materials.*

INTRODUCTION

During the COVID-19 pandemic outbreak, all face-to-face learning activities were seized. The only alternative to keep literacy learning was - by using technology as the connective media (Aswan, 2020). For example, the learning activity applied online or limited face-to-face learning (Aminullah *et al*., 2021). Unfortunately, this shift brought various problems dealing with the applied teaching materials.

On the other hand, excellent learning activities occurred by applying interactive learning sources (Marizal & Asri, 2022). Teaching materials become supporting components to realize the teaching objectives (Rahmadani *et al*., 2019). Teaching materials are tools that help convey information, concepts, knowledge and skills (Miftah, 2022). The lack of teachers using learning materials that attract motivation is one of

the factors causing low student abilities (Astuti *et al.*, 2022)

Along with the science development, the learning process paradigm shifts into learner-centered active learning (Muthmainnah, 2021; Pertiwi *et al.*, 2022). Learners have roles both as communicators and message recipients (Indriani *et al.*, 2021). This paradigm aims to realize learners with excellent higher-order thinking skills (Saraswati & Agustika, 2020). The government took the brave decision, via the Ministry of Education and Culture, by issuing four education policy programs to improve and develop the education quality of Indonesia. The programs are familiar with learning freedom (Nusantara *et al.*, 2020). One of them is the Minimum Competency Assessment (MCA) which is useful for preparing students to have 21st-century skills (Mukhlis *et al.,* 2022).

The skills needed for the 21st century are literacy, competence and character (Nudiati & Sudiapermana, 2020). Literacy is not limited to cognitive abilities, but rather more complex abilities which include social skills, linguistics and psychological aspects (Zahra *et al.*, 2023). Literacy ability cannot be separated from one's language skills (Wulanjani & Anggraeni, 2019). Based on the results of PISA, especially Indonesian students, it was stated that students' literacy skills were relatively low (Putri and Zulkardi, 2020; Rawani *et al.*, 2019; Zulkardi *et al.*, 2021). Based on research by Zahra *et al.* (2021) there are 11 literacy activities that students can do to improve their literacy.

The realized development of educational unit quality by teachers includes developing teaching materials, for example, the curriculum instruments (Adam *et al.*, 2022). The developed teaching materials must have a higher-order thinking skill orientation (Zulkardi *et al.*, 2020). This kind of teaching material could train the learners' critical thinking, creativity, collaboration, and communication (Ahonen & Kinnunen, 2018).

A module is a systematically designed teaching material based on the curriculum. The package module is a small learning unit that allows self-directed learning (Sirate & Ramadhana, 2017). Teachers are only a facilitator who directs students if students experience problems while studying independently (Wulandari & Sari, 2021). From the interview results with Masariel, S.Pd, a teacher at Public JHS 52 Palembang, the researchers found the learners could promote self-directed learning. The evidence was the learners' active participation during online learning due to the COVID-19 pandemic. Based on the learners' daily registry, a percentage of 80% of learners participated actively in the learning.

Indonesian language learning, in the 2013 curriculum, aims to train four skills: reading, listening, speaking, and writing (Syofiani *et al.*, 2018). Every aspect of skills is closely related to the other three skills (Wati *et al.*, 2022). However, the real conditions in the field show that learning Indonesian still has many obstacles and reinforcement in the context of books, has not yet referred to improving students' skills (Kesuma, 2020).

The objective is realized in textual-based learning (Wagirun & Bambang, 2019). One of the studied texts for eight graders is explanatory text (Yulisma, 2022). This text explains a certain process in detail. The text is also classified as responsive text (Azkia & Isnandah, 2018). Explanatory text is a text that is made to provide an explanation of how and why something happened (Ardiansyah *et al.*, 2022). Unfortunately, learning the text was found difficult because the learners did not receive effective teaching materials or media (Widyana *et al.*, 2019). Therefore, the researchers chose explanatory text to develop. Therefore, explanatory text was chosen as the material to be developed. The explanatory text will be developed using the context of the pandemic which is an interesting discussion and is a real situation because it impacts all aspects of life (Zulkardi *et al.*, 2020; Sistyawati *et al.,* 2023)

The implementation of the inquiry approach in the explanatory text module was useful during the module and the learning system arrangements. Thus, the produced module could direct and train the learners to think with higher-order thinking skills. Wenning (2010) explains that inquiry has specific features, such as the implementation of pre-activity learning to activate the initial knowledge of the learners, the conceptual understanding facilitation for the learners, the learning objectives, and the process of observing.

In a similar previous study, for example, Puspitasari (2021), found the PISA-based question item instrument. Currently, in this research, the researchers did not only develop question items but also learning activities by implementing the combined inquiry method into a learning module.

METHOD
The research procedure consisted of necessity identification, material necessity exploration, the contextual realization of material production, expert validation, material revision, and formative evaluation.

The research subjects consisted of experts, teachers, and VIII graders of Public JHS 52 Palembang. In the necessity analysis stage, the subjects were teachers and learners. Then, in the one-to-one evaluation, the subjects were three representative learners from the population. In the small group evaluation stage, the research subjects consisted of six learners based on their intelligence levels: low, moderate, and high. In the trial field stage, the researchers involved 32 learners. The subsequent research subjects were experts. The experts had the role to validate and assess the developed teaching materials based on the content and presentation, language validity, and module graphic. Then, the experts assessed the developed question items based on the content, construct, and language aspects.

The researchers collected the data by interviewing, distributing the questionnaire, promoting the test, and applying a validation sheet. The researchers interviewed the Indonesian language teachers of VIII grade. Then, the researchers distributed the questionnaires to the learners. In this case, the type of questionnaire was a closed questionnaire. The applied measuring scale was the Likert scale. The researchers measured the obtained data by dividing the selected respondents' numbers by the total number of respondents. Then, the researchers multiplied the result by 100. The researchers applied the assessment sheet for design validation. In this stage, the experts validated the developed module by using a rating scale. This rating scale would process the data into interpretation with qualitative descriptions (Sugiyono, 2017). Then, the researchers analyzed the test results in terms of normality and t-test with SPSS.

RESULTS AND DISCUSSION
The necessity identification of the teachers
The researchers interviewed the teachers on September 20, 2021, at Public JHS 52 Palembang. In this process, the researchers involved 2 Indonesian language teachers of VIII grade. Here are the questions and the answers to the interview.

From the interview results, the researchers found the seventh graders' characteristics. These learners, the current generation, were interested in new things, especially technological advancement.

They were self-directed and capable of finding information and learning from the Internet. These seventh graders were at the age of exploring their self-identities. This age was the transition from childhood into adulthood. The learners at Public JHS 52 Palembang were similar to typical JHS learners. They were active in the learning process.

Based on the question related to learning within the pandemic situation, the researchers found the learning process was held in a limited manner. The school grouped some learners to study at school and the remaining learners had to study at home via the gadget. This learning process encountered specific challenges for the teachers because they had to manage and apply technology so that learners could learn during the pandemic situation.

Then, dealing with the question of the encountered difficulties, the interviewees explained that learning during the pandemic required the teachers to be technologically creative. Some challenges included a lack of teaching materials to support autonomous learning.

The question dealing with the learners' participation during online learning showed initial challenges to ensuring the learners' presence. The teachers also encountered challenges because some learners did not have gadgets, Internet balance, and many more. However, the teachers could manage the problems and the learning process ran properly. The learners could join the online learning process actively. The evidence was their attendance and the submitted works. Unfortunately, the teachers still encountered some problems, such as in explaining the material. Thus, the teachers needed additional teaching materials to support the textbook.

For the question about the explanatory text, the researchers found the teachers required a longer time to review. The learning was relevant to the learners' life but the learning needed proper teaching to minimize learners' difficulties.

The problems while teaching the explanatory text material seemed to lack detailed teaching material. Since the learning was online, the teachers needed teaching materials for the learners' learning guidelines.

The question about the teaching material development, in the form of a module development with PISA-standardized question items, the teachers argued the questions would be excellent for future learning source references. Then, the questions could facilitate the learning

process for the learners to work on their Minimum Competence Assessment, AKM.

Then, the researchers also found that the developed module should apply modest and understandable language for the eighth graders. Dealing with the material selection, the teachers expected actual topic implementation. Besides that, the module should be detailed with understandable language and PISA-standardized question items to train the learners in preparing for the future Minimum Competence Assessment, AKM.

From the interview results, the researchers concluded the developed module as teaching materials should be based on the learners' criteria and characteristics. The developed module should facilitate the learners to be self-directed learners. The module should also facilitate teachers to achieve the learning objectives and enrich teaching material reference.

With the interview, the teachers expected a detailed module with an actual topic. Thus, the researchers had to develop a detailed module with a relevant and up-to-date topic for the learners. Besides that, the applied language had to be understandable for the learners.

The necessity identification of the learners
The researchers identified the learners' necessities for module development to collect the learners' responses. Some recognized and identified aspects of the learners' necessities were the learners' characteristics, the earners' self-directedness, the expected topic material, the relevant applied learning method for the learners and the expected teaching materials by the learners. The researchers obtained the identifications of the learners' necessities from the analysis of the distributed questionnaire.

The researchers distributed the questionnaire on September 20, 2021, at Public JHS 52 Palembang. The applied questionnaire was a closed-type questionnaire with 7 assessed aspects, consisting of twenty-two items. The researchers distributed the questionnaire to thirty-two learners from the VIII-2 class.

Based on the questionnaire, the researchers found that the learners needed an understandable module containing actual and relevant topics with excellent design. They also expected the implementation of PISA-standardized questions to prepare the learners for future Minimum Competence Assessment, AKM.

The identification results of the teachers, learners, and materials provided the required information to develop the teaching material. The identifying process revealed that online learning trained the learners' self-directedness. During online learning, the learners had to be self-directed and maximize various learning resources. Self-directed learning also positively influenced the learning process. Once the learning process returned to the normal learning process, the learners would be ready to use various learning sources. From this finding, the researchers concluded that the eighth graders could learn by implementing the module.

The learners' self-directedness, according to Piaget, cited by Sugiman *et al.* (2016), met the characteristics of the formal operational stage, for learners aged 11 to 15 years old. Learners at this stage could 1) effectively and innovatively collaborate, 2) combine some analysis methods, 3) think proportionally, and 4) generalize based on a content type. These capabilities describe the learners' intelligence development. From the aspect of age, the learners were at the formal operational stage. Individuals at this stage were aged between 13 and 15 years old. Based on Piaget's theory, JHS learners intellectually could learn autonomously.

The design results
The developed module consisted of an introduction, learning 1, learning 2, evaluation, and closing. The applied language was the Indonesian language with understandable diction for the learners. The dominance of selected colors for this module included blue, green, and orange. The researchers adjusted the colors with the readability so that the color did not intervene in the module.

Table 1. *The module design*

The Module Design	Design Content
Cover	The developed cover of the module
Preface and table of content	Preface and table of content
Introduction	Module Description, Time Allotment, Core Competence, Basic Competence, Indicator, Objective, and Technical Guideline
Learning 1 and Learning 2	Indicators and the Learning Objectives, Material Explanation, Summary, and Exercise
Evaluation	The Direction of Working on the Questions and Question

	Bank
Closing	Glossary and Bibliography

From the questionnaire results and the obtained information, the researchers developed the PISA-standardized questions for explanatory text material. The researchers made the questions into multiple choices, complex multiple choices, short essays, matching question-answers, and true-or-false questions. The researchers prepared 20 question items. The developed questions were useful for the learners' evaluation related to the given material. Here is the table of the designed question.

Table 2. *The question design*

Core Competence	Question Items	Question Forms
3.9	3, 6	Short Essay
	5, 9, 12, 18, 19	Multiple Choice
	4, 7	Complex Multiple Choice
	13	Matching
4.9	1, 17	Matching
	2, 14, 20	Short Essay
	8, 15, 15	Multiple Choice
	10	True-False
	11	Complex Multiple Choice

The module validation results

The researchers validated the module on July 1, 2022, until July 19, 2022. The researchers validated some aspects, such as content, presentation, language, graphics, and question items. In this process, the researchers involved the experts, the lecturers of Language Education at the Postgraduate School Program of Universitas Sriwijaya.

The researchers involved Dra. Hj. Sri Indrawati, M.Pd., Ph.D. to validate this part. In general, the obtained score of the content and presentation validity was 21 out of 25 with a percentage of 84%. This matter indicated the content and material validity of the module were categorized very excellently. The expert also suggested the researchers clarify the developed module structure, to revise the dictions of "*pengertian*" and "*ciri*" into characteristics. Here is the table of the validation result.

For the language aspect, the expert was Dr. Izzah, M.Pd. The results of the validation included judgment and recommendation. The obtained score was 18 out of 20 with a percentage of 90%. From the aspect of the module's readability, the developed module obtained a very

excellent category. The expert suggested the researchers write the dictions carefully.

The researchers involved Dr. Santi Oktariana, S.Pd., M.Pd to validate the graphic aspect. Based on the suggestions and the assessment, the obtained scores were 19 out of 25 with a percentage of 76%. The obtained score indicated an excellent category of the module's graphics. The expert suggested the researchers carefully select the colors and apply the font sizes and types.

After obtaining the validation scores, the researchers calculated the percentage to determine the validity of the developed module. The result showed that the module's validity was very excellent, 84%.

The researchers also revised the figures on the cover based on the experts' suggestions.

Figure 1. *Front cover*

Figure 2. *Back cover*

One-to-one evaluation

The researchers promoted the one-to-one evaluation on August 1, 2022, at Public JHS 52 Palembang. The test involved 3 learners. All learners had different skills, from low, moderate, and high. Here is the recapitulation table of the one-to-one assessment sheet results

Table 3. *The one-to-one evaluation recapitulation*

Number	Criteria	Total Score
1	The information clarity (objective and the material)	11
2	Easy to understand	12
3	The clarity of the learning, question working and exercising, and assessing guidelines	12
4	Language clarity	12
5	Module's direction clarity	13
6	Attractive presentation	12
7	Letter, figure, and color harmony	12
8	Benefits (improving the learning interest and motivation)	12
Total		96
Percentage		80%

The table shows the obtained percentage is 80%, categorized as practical. The learners also shared some comments and suggestions for the developed module. Here are the comments and suggestions.

Table 4. *Comments and suggestions of the learners in one-to-one test*

Number	Initials	Comments and Suggestions
1	MTDI	1. The developed module should have an attractive presentation and color. 2. The studied topics had to be easy to understand. 3. The developed PISA-standardized questions had to enrich the insight and preparation for joining the Minimum Competence Assessment, AKM.
2	IPB	1. The module was easy to understand because of the understandable language. The module also had a glossary for difficult terms. 2. The module also had interesting figures.
3	FA	1. The cover of the module was excellent and attractive.

2. The delivered materials were detailed and could facilitate self-directed learning at home.
3. The applied language was understandable.

Small group evaluation

The researchers promoted the small group evaluation on August 10, 2022, by involving 6 learners. Here are the results.

Table 5. *The small group evaluation recapitulation*

Number	Criteria	Total Score
1	The information clarity (objective and the material)	24
2	Easy to understand	24
3	The clarity of the learning, question working and exercising, and assessing guidelines	25
4	Language clarity	24
5	Module's direction clarity	24
6	Attractive presentation	27
7	Letter, figure, and color harmony	22
8	Benefits (improving the learning interest and motivation)	24
Total		96
Percentage		80%

The table shows the obtained mean is 32.3 with a percentage of 80% based on the distributed assessment for the learners. The mean indicated the practicability of the developed module, explanatory-based teaching material.

Besides that, the learners also shared some suggestions and comments related to the developed module. Here are the comments and suggestions from the small group evaluation.

Table 6. *Comments and suggestions of the learners in small experiment group test*

Number	Initials	Comments and Suggestions
1	N1	Learning with this module was something new. The explained materials were very detailed and understandable.
2	N2	The implementation of the language in this module was understandable thus learning during the pandemic was easy with this module implementation. However, more vocabulary addition to the glossary would be better.
3	N3	The stages of concluding the explanatory text were

		understandable because I had not found an easy explanation to conclude a text.		
4	N4	This module facilitated the learning process.		
5	N5	The colorful book cover selection made the module attractive.		
6	N6	This module provided a new learning experience.		

The field test results

The researchers applied the second revised design based on the suggestions and recommendations from the small group test. The researchers promoted the field test from October 3 until 12, 2022. The subjects consisted of eighth graders of Public JHS 52 Palembang, consisting of 32 learners.

The researchers did the pretest by applying the explanatory text module for the eighth graders of VIII-2 at Public JHS 52 Palembang. The researchers held the test on October 3, 2022. The test included working on the PISA-based questions, 20 items.

After that, the learners worked on the posttest once they learned with the developed explanatory text module. The learners worked on the posttest after joining the pretest. Both tests were the same.

After the pretest and the posttest, the researchers analyzed the score comparison from both tests to determine the effectiveness of the developed product. Here is the recapitulation of the pretest-posttest comparison results of the developed module.

Table 6. *The posttest result recapitulation*

Number	Initials	Pretest Score	Posttest Score	Less
1	AP	66	89.1	23.1
2	AAJ	66	89.1	23.1
3	AW	49.5	72.6	23.1
4	AS	59.4	72.6	13.2
5	ABI	59.4	75.9	16.5
6	CPL	69.3	82.5	13.2
7	DA	75.9	82.5	6.6
8	FJS	75.9	85.8	9.9
9	FS	75.9	79.2	3.3
10	GA	59.4	75.9	16.5
11	GI	52.8	89.1	36.3
12	HA	59.4	89.1	29.7
13	HSK	59.4	89.1	29.7
14	KNI	59.4	85.8	26.4
15	LM	66	82.5	16.5
16	LK	66	89.1	23.1
17	MW	66	75.9	9.9
18	MV	69.3	79.2	9.9
19	ML	75.9	85.8	9.9
20	NS	75.9	85.8	9.9
21	NI	75.9	85.8	9.9
22	RA	69.3	79.2	9.9
23	RRN	69.3	79.2	9.9
24	RH	66	75.9	9.9
25	SW	59.4	72.6	13.2
26	SAM	59.4	79.2	19.8
27	SS	56.1	85.8	29.7
28	TR	59.4	85.8	26.4
29	TW	59.4	89.1	29.7
30	TY	66	75.9	9.9
31	WA	72.6	89.1	16.5
32	ZSA	75.9	85.8	9.9
Total		2095.5	2640	544.5
Average		65.5	82.5	17.0

The table shows the pretest mean score is 65.5 while the mean score of the post-test is 82.5. The difference between the posttest and the pretest indicated an improvement, 17.0. After calculating the difference, the researchers examined the effectiveness of the N-gain formula. Here is the effectiveness calculation formula.

The obtained N-gain is:

$$g = \frac{82{,}5 - 65{,}5}{100 - 65{,}5} = 0{,}49$$

Based on the calculation, the obtained n-gain was 0.49. The value was between 0.3 and 0.7, categorized as moderate, indicating the moderate effectiveness of the inquiry method-based explanatory text with PISA-standardized questions.

The statistic results

The statistic test was useful to determine the differences between the learners' skills before and after the implementation of the developed teaching material. The statistics tests included descriptive, normality, and t-tests with SPSS 20.

The descriptive statistics test results

The researchers promoted the descriptive tests on the pretest and posttest scores. The obtained data showed the lowest pretest score was 49.5 with the highest score of 75.90. On the other hand, the lowest post-test score was 72.60 while the highest score was 89.10. The obtained mean score of the pretest was 65.5 with an SD of 7.502 while the posttest means the score was 82.5 with an SD of 5.684. This table provides the statistics descriptive data.

Table 7. *The statistics descriptive*

	N	Min	Max	Mean	Std. Deviation
The score of Pretest	32	49.50	75.90	65.5	7.502
The score of Postest	32	72.60	89.10	82.5	5.684
Valid N (listwise)	32				

The normality test results

The normality test was useful to compare the data distribution with the normal-standardized distribution. The applied normality test procedure was the Kolmogorov-Smirnov test to determine the data normality of the learners. Here is the normality test table.

Table 8. *The normality test results*

		Pretest Score	Posttest Score
N		32	32
Normal Parameters[a,b]	Mean	65.4844	82.5000
	Std. Deviation	7.50222	5.68495
Most Extreme Differences	Absolute	.198	.219
	Positive	.198	.127
	Negative	-.136	-.219
Kolmogorov-Smirnov Z		1.118	1.240
Asymp. Sig. (2-tailed)		.164	.092
a. Test distribution is Normal.			
b. Calculated from data.			

The table shows the obtained significance of the pretest is 0.164 while the post-test is 0.092. The significant values are higher than 0.05, indicating normal distribution. Thus, the pretest and posttest data distributions were normal.

The t-test

In this research, the t-test was useful to determine the significant difference between before and after the module implementation. The researchers conducted the t-test with paired sample test assisted by SPSS 20.

The table shows the results of paired sample t-tests are -17.01, std 5.789, and Sig (2-tailed) 0.00. The value indicated a significant difference between before and after the module implementation.

Thus, the inquiry-based explanatory module with PISA-standardizes questions was effective.

This module development could be a learning source reference for Indonesian language learning. The questions in the module also train the learners' higher-order thinking skills and habituate the learners to work on PISA-based questions.

This research had some strengths and shortcomings. The strengths of this research included the learning facility for the learners to be self-directed based on their learning speeds. They could also learn the materials in the module because the module was printed for them. Learners without gadgets could still study with the printed module. The module also had an interesting design and some textual topics as the stimulus. For example, a text-themed TikTok application that made the learners motivated to read and obtain information. On the other hand, the shortcomings of the module were due to the printed form. This form required additional cost to copy the print for all learners.

CONCLUSION

From the results and discussion, the researchers concluded that (1) the teachers and the eighth graders of Public JHS 52 Palembang had the same necessity of teaching material, the explanatory text module. (2) the developed module, the inquiry-based explanatory text module with PISA standardized questions, was the first design before the validation and revision. (3) the experts determined the developed module to have content and presentation validity. The questions were also categorized as very excellent while the graphic was categorized as excellent. (4) the developed module was practically based on the one-to-one test and the small group test. (5) the developed module, the inquiry-based explanatory text reading module with PISA standardized questions was effectively based on the field test with an increased score of 17.00, from the pretest, 65.5, and the post-test, 82.5.

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