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Development of PISA-Type Mathematics Questions with Change and Relationship Content Based on the Jambi Context

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ABSTRACT

This study aims to describe the development process and determine the quality of PISA-type mathematics questions on the Change and Relationship content using the Jambi context for junior high school students in terms of validity, practicality, and effectiveness. This study uses the Research and Development (R&D) method by applying the ADDIE model proposed by Branc. The ADDIE model consists of five stages, namely analysis, design, development, implementation, dan evaluation. The research subjects were grade VIII II students of SMPs Pelita Raya Jambi. However, this research was carried out up to the development stage in accordance with the research objective, which was to produce an initial product in the form of validated PISA-type mathematics questions. The resulting product was 15 PISA-type mathematics questions that measured the ability to formulating, employing, and interpreting according to the PISA framework by integrating the cultural and environmental context of Jambi to make it more meaningful for students. PISA-type mathematical questions on the Change and Relationship content based on the Jambi context that were developed are declared valid, practical, and effective to be used as an alternative evaluation instrument foor mathematics learning at the junior high school level.

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Introduction

According to Fadillah & Ni'mah (2019), PISA mathematics questions related to the content of change and relationships (Change and Relationship) include events or incidents that occur in various contexts, such as the growth of organisms, music, seasonal cycles, weather patterns, and economic conditions. In solving PISA-type mathematics problems using the Change and Relationship content, students are required to be able to understand the problem

and use mathematical models to identify and solve the problems in the problem (Susilawati et al., 2020). So, algebra is one of the contents in PISA, namely Change and Relationship content.

The Programme for International Student Assessment (PISA) is a tool used internationally to measure students' mathematical literacy. PISA emphasizes problem-solving in contexts relevant to everyday life, which is an indicator of educational success in various countries (OECD, 2021). The Programme for International Student Assessment (PISA) is an international standardized assessment developed in collaboration with participating countries, covering the domains of mathematics, reading, and science. This assessment is administered by the OECD (Organization for Economic Cooperation and Development) and is conducted on 15-year-old children. One of the materials tested is mathematics. The PISA assessment is released every three years, providing an appropriate time to evaluate the average development of students in each country. Mathematical literacy is an important skill that students must have to face various problems in everyday life. The Programme for International Student Assesment (PISA) emphasize students' ability to formulate, use, and interpret mathematics in various life contexts. However, PISA results show that students' mathematical literacy skills in Indonesia are still relatively low. In their study, according to Timutang et al. (2021), PISA uses the term "literacy" to refer to assessments that encompass not only domain knowledge but also the ability to apply that knowledge. PISA study results serve as one measure for assessing students' mathematical literacy abilities. Indonesia is one of several countries participating in the PISA program. However, Indonesia's PISA mathematics results are still relatively low.In 2012, Indonesia ranked the lowest, at 64th out of 65 countries participating in the PISA mathematics assessment (Charmila et al., 2016). Meanwhile, in the latest PISA mathematics results in 2018, Indonesia was ranked 73rd out of 79 other countries rith an average score of 379 (Tohir, 2019).

The low performance of students who are still unable to solve PISA questions can be caused by various factors. One of them is a lack of partice in solving questions with characteristics similar to those of PISA questions due to the lack of PISA questions in the Jambi. One way to overcome low student achievement is to get them used to practicing PISA-style questions. This habit should begin early, when students are in 7th grade. The memorization and only relies on examples in textbooks, so students experience difficulties when faced with questions with different patterns (Oktaviranda & Asmara, 2021). Furtheremore, students are less accustomed to working on complex, non-routine problems that require advanced problem-solving skills. This is exacerbated by their limited mmastery of the material, making it difficult for them to connect old concepts to the problems they are currently facing (Asdarina, 2020). Furthermore, students rarely practice solving problems based on real situations, so they often make mistakes when faced with questions related to everyday life contexts (Kiawati et al., 2023). Therefore, it is important to develop questions that are equivalent to PISA in the Indonesian context, both by teachers, researchers, and students who are completing theur final assignments (Johar, 2012).

This demonstrates the need to use questions with real-world contexts, such as the PISA questions with real-world contexts, such as the POSA questions on algebra. In PISA mathematics questions, context is one of the main concepts applied, divided into four categories: personal, occupational, social, and scientific. Therefore, it is important to use a variety of contexts in PISA assessments (OECD, 2024). PISA questions are developed based on four content areas: Shape and Space, Change and Relationship, Quantity, and Uncertainty. According to (Jurnaidi & Zulkardi, 2014) these content areas focus on quantitative needs. Important aspects include understanding relative size, recognizing numerical patterns, and using numbers to represent quantitative attributes of real-world objects. Therefore, it is clear

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that researchers developed questions on the Change and Relationship content because Change and Relationship itself is a mathematical aspect widely used in real-world quantification.

One way to improve students' mathematical literacy is to present questions that resemble the characteristics of PISA questions. These questions require students to think at a higher level, understand real-life contexts, and model problems mathematically. Because students need to practice with PISA-modeled questions, such as using local contexts, the application of context in math questions plays a crucial role in improving students' understanding of mathematical concepts and their application in everyday life. This is reflected in PISA questions, which present real-life problems with a variety of contexts. Furthermore, PISA questions can serve as a reference for developing questions in Indonesia, given that PISA is an international test that evaluates students' abilities in various fields, including mathematics. In this regard, teachers are required to be able to design questions that integrate real-world contexts (Pangaribuan et al., 2023).

Using local context in math problems can help students understand problems more realistically. Contexts close to students' lives make it easier for them to connect mathematical concepts to everyday experiences. Therefore, this study developed PISA-type math problems on the Change and Relationship content using the Jambi context. By utilizing the local cultural context in learning, students can experience more meaningful learning and develop their mathematical representation skills. Developing PISA-style math problems will be easier to understand and can increase student learning motivation if presented with a relevant context. Therefore, to create more innovative math learning, problem development can be done by adopting or modifying tested PISA problems. Math problems designed based on PISA problem characteristics are known as PISA math problem models (Dewantara, 2019).

The local context of Jambi Province possesses diverse potential. This diversity can be used as a reference source for mathematics learning in schools using the Jambi context. Within the scope of Jambi Province, there are various things that contain mathematical concepts, including the mathematical content of PISA. A variety of more specific content within it, such as geometry, number patterns, algebra, as well as probability and uncertainty, and data, are found in the Jambi context. This can be found in the natural and social environment, historical heritage, and the development journey of Jambi Province to date. These include Jambi batik motifs, Jambi's traditional foods, Kerinci Sebelat National Park (TNKS), and so on.

Because they were previously unfamiliar with the use of PISA-style questions in their learning, the application of context was also considered very important. This aims to motivate students to learn mathematics (Widjaja, 2013). Based on previous research, the contexts used are still relatively general or originate from outside the region. When students are unfamiliar with the context, they struggle to visualize and solve problems. Because the researchers are based in Jambi, they are interested in developing PISA-equivalent questions using the Jambi context. In addition to exploring local culture, students are expected to experience the context firsthand, thus increasing their engagement in solving the problems and honing their thinking skills. Contextual PISA questions can also foster mathematical motivation in everyday life. When students realize the benefits of the problems they solve, they will be more interested in applying them to real-life situations (Lutfianto & Sari, 2017).

Several studies on the development of PISA questions that have been conducted include one entitled Development of PISA Model Mathematics Questions Using the Jambi Context, with the results obtained being that the questions developed have several potential effects, namely giving rise to the involvement of various basic mathematical abilities in the solution process (Charmila et al., 2016). Another study entitled "Development of PISA Like Mathematics Questions on Change and Relationship Content for Junior High School Students" written by Diyah Fatmawati, produced several valid and practical PISA model questions at

different levels (Sabrina et al., 2019). Furthermore, the previous development differs from the current one in that it utilizes a broad local context, such as the culture, environment, and daily life of Jambi province. This will allow junior high school students to more easily understand the material through an approach relevant to their daily lives. The questions developed will focus on Change and Relationship content and utilize the Jambi context. Using the Jambi context as a background, these questions are designed not only to test students' mathematical problem-solving abilities but also to assess their understanding of real-life situations involving Change and Relationship content.

Method

Types of Research

This research is a research and development (R&D) that aims to develop a product in the form of PISA-type mathematics questions on the Change and Relationship content based on the Jambi context for junior high school students. This development research uses the ADDIE model proposed by (Branch, 2009) which consists of five stages: analysis, design, development, implementation, and evaluation. However, in this study the stages carried out only up to the development stage because this research is focused on producing an initial product in the form of valid, practical, and effective PISA-type mathematics questions for use with junior high school students. The product developed in this study consists of five open-constructed response PISA-type mathematics questions designed to measure students' mathematical literacy skills in the Change and Relationship content. The questions were developed based on PISA characteristics, which include aspects of content, context, and mathematical processes. The content used is Change and Relationship, while the context of the questions includes the local context of Jambi, such as the environment, culture, economy, and daily life of the Jambi community to make the questions more relevant to students' experiences.

Research Subjects

The subjects in this study were 22 eighth-grade students at a junior high school (SMP). These students were used as trial subjects to determine the quality of the developed questions. The research instruments used in this study included an expert validation sheet, a teacher response questionnaire, a student response questionnaire, and a mathematical literacy test. The expert validation sheet was used to assess the feasibility of the questions in terms of content, construction, and language. The teacher and student response questionnaires were used to determine the practicality of the developed questions, while the mathematical literacy test was used to measure students' mathematical literacy abilities after using the developed PISA-type mathematics questions.

Instrument

The instruments used in this study included an expert validation sheet, a practicality questionnaire, and a mathematical literacy test. The expert validation sheet was used to assess the appropriateness of the questions in terms of content, construct, language, suitability to the Jambi context, and suitability of the question characteristics to the PISA framework for the Change and Relationship content. The validation sheet used a 4-level Likert scale model, namely a score of 4 (very good), a score of 3 (good), a score of 2 (poor), and a score of 1 (poor).

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The validation instrument was given to material experts and learning evaluation experts to obtain assessments and suggestions for improvements to the questions developed.

A practicality questionnaire was used to assess teacher and student responses to the developed questions. The questionnaire was constructed using a four-level Likert scale, covering aspects of readability, clarity of language, ease of use, interest in the context of the questions, and their suitability for junior high school mathematics learning. The questionnaire was administered after students and teachers had used the developed PISA-type mathematics questions. The test is used to measure the effectiveness of the questions in developing students' mathematical literacy skills. The test consists of open-constructed response questions structured based on PISA characteristics and equipped with a scoring rubric to assess students' abilities in formulating, employing, and interpreting.

The instrument validity in this study used content validity, which was obtained through expert judgment. The validator assessed the instrument's suitability to the research objectives, the indicators measured, and the characteristics of the PISA questions. Meanwhile, the instrument's reliability was determined through the consistency of the validator's assessment results and the results of a limited pilot study on students. The reliability of the questionnaire and test was analyzed using a reliability coefficient. Therefore, an instrument is considered suitable for use if it meets the criteria for reliability and consistency in measuring the aspects studied.

Data Collection

Data collection was conducted according to the ADDIE model. In the analysis stage, data were collected through literature studies, curriculum analysis, and needs interviews with teachers. In the design stage, researchers developed a question grid, indicators, and a locally based stimulus design. In the development stage, data were collected through expert validation, which involved filling out assessment sheets by validators, limited trials, which involved administering a mathematical literacy test to 22 students, and response questionnaires completed by teachers and students after using the questions. Data from all stages were used to assess the validity, practicality, and effectiveness of the developed questions.

Data Analysis

Data were analyzed using quantitative and qualitative descriptive analysis techniques. Quantitative analysis was used to process data from expert validation, teacher and student practicality questionnaires, and student mathematical literacy test results. Validity was analyzed through the percentage of feasibility based on the validator's assessment of the content, construct, language, contextual suitability, and characteristics of the PISA questions. Practicality was analyzed through the percentage of teacher and student responses to ease of use, readability, clarity of instructions, and interest in the questions. Meanwhile, effectiveness was analyzed based on the percentage of students' mathematical literacy test results after using the developed questions. The results of the quantitative analysis were then categorized into very good, good, sufficient, and poor criteria based on predetermined percentage intervals.

In addition to quantitative analysis, this study also employed descriptive qualitative analysis. Qualitative analysis was used to analyze data from interviews, observations, documentation, as well as comments and suggestions from validators, teachers, and students during the question development process. The qualitative data were used to determine students' understanding of the questions, the suitability of the Jambi context in the questions, the obstacles experienced by students in solving the questions, and as material for revising and refining the developed products. Thus, the use of quantitative and qualitative analysis in this

study complemented each other to obtain a more comprehensive picture of the quality of the PISA-type mathematics questions developed. The assessment criteria used categories of very good, good, sufficient, and poor based on percentage intervals.

Table 1. Likert Scale Score Categories

Scale Value	Assessment Criteria
5	Strongly Agree
4	Agree
3	Somewhat Agree
2	Less Agree
1	Strongly disagree

To calculate the percentage of validity through data obtained from assessment item scores, use the following formula:

$$Validity\ Percentage\ (Vs) = \frac{Total\ score\ obtained}{Maximum\ Score} \times 100\%$$

Once the percentage results are determined, they are grouped by interval category, which can be seen in Table 2.

Table 2. Valid, Practical, and Effective internal categories

Interval	Assessment Criteria
$0\% < P \leq 20\%$	Very Invalid
$20\% < P \leq 40\%$	Invalid
$40\% < P \leq 60\%$	Quite Valid
$60\% < P \leq 80\%$	Valid
$80\% < P \leq 100\%$	Very Valid

(Riduwan, 2013)

Research Findings

Relationship content. In terms of literacy processes, most items combine two to three PISA processes in a hierarchical manner-beginning with formulating to model situations, continuing with employing to apply concepts, and concluding with interpreting to interpret results in real-world contexts. The distribution of cognitive levels ranges from levels 3 to 5, with complex items such as social arithmetic for Cultural Tourism Week (No. 12) and sequence combinations for Malay Cultural Week (No. 14) occupying the highest levels. This composition ensures that the instrument is able to measure students' literacy skills in stages, not just at the lower levels.

Expert Validation

The initial product (Prototype I) was validated by three experts competent in mathematics education, consisting of one lecturer and two teachers. Validation covered aspects of content (alignment with the PISA *framework*), construct (alignment with the Independent Curriculum), and language (alignment with Indonesian language rules). The quantitative assessment results are presented in Table 3.

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Table 3. Validator Assessment Results

Validator	Earned Score	Maximum Score	Percentage
V1	70	70	100%
V2	64	70	91%
V3	66	70	94%
Total	200	210	95%

Based on Table 3, the total validation score reached 200 out of 210 (95%), placing the product in the highly valid category. These results indicate that the questions are suitable for use with minor revisions, particularly to visual aspects and sentence clarity. In addition to the quantitative assessment, the validator provided qualitative suggestions which were summarized thematically along with follow-up revisions in Table 4.

Table 4. Summary of Validator Suggestions and Revision Follow-up (Prototype I → Prototype II)

Validator Suggestions	Revision Follow-up
Images need to be clarified and their sources included.	The image has been replaced with a better resolution and includes source attribution.
The variable assignment in mathematical model questions is not yet explicit.	Added an example (e.g.: "if x represents time and y represents cost")
Some items contain too many sub-questions for junior high school level.	The number and level of difficulty of sub-questions are simplified according to level.
The writing of character names and notation is inconsistent.	Character names were standardized (e.g. Rani → Rita) and notation was corrected (ke-nnn → ke-n)
Data presentation should use diagrams/tables and real years.	Data is presented in bar charts/tables as well as actual years (2018–2022)
Some contexts are less realistic	Scenarios are improved to be logical (eg. 7 friends using 4 two-wheelers)

After all suggestions were followed up, the validator gave a final assessment of very good/adequate. This indicates that Prototype II optimally met the content, construction, and language aspects.

Empirical Validity and Reliability

Prototype II was piloted on 22 students to obtain empirical data. Item validity was calculated using Pearson's product-moment correlation, while reliability was measured using Cronbach's Alpha. At a significance level of 5% with degrees of freedom $df = n - 2 = 20$, $r_{table} = 0.404$ was obtained. The results of the validity test for all items are presented in Table 5.

Table 5. Item Validity Test Results (n = 22)

No	r_{xy}	r_{table}	Note	No	r_{xy}	r_{table}	Note
1	0,654	0,404	Valid	9	0,812	0,404	Valid
2	0,673	0,404	Valid	10	0,555	0,404	Valid
3	0,543	0,404	Valid	11	0,721	0,404	Valid
4	0,794	0,404	Valid	12	0,689	0,404	Valid
5	0,866	0,404	Valid	13	0,748	0,404	Valid

No	r_{xy}	r_{table}	Note	No	r_{xy}	r_{table}	Note
6	0,793	0,404	Valid	14	0,831	0,404	Valid
7	0,803	0,404	Valid	15	0,702	0,404	Valid
8	0,676	0,404	Valid				

Table 5 shows that the r_{xy} values for all items are in the range of 0.543–0.866 and are all greater than r_{table} (0.404). Thus, all 15 items are declared valid, meaning each item has a significant correlation with the total score and is able to consistently measure the mathematical literacy construct of the Change and Relationship content. The high validity coefficients for several items (e.g., No. 5 and No. 14 above 0.83) indicate that these items are highly representative of the abilities being measured, while items with lower coefficients still meet the validity threshold. This consistency of results strengthens the instrument's suitability for continued reliability testing.

Table 6. Reliability Test Results

Test Components	Mark
Number of respondents (n)	22
Number of questions (k)	15
Cronbach's Alpha (α) value	0,887
Reliability category	Very high
Explanation	Reliable

Based on Table 6, the Cronbach's Alpha value of 0.887 is categorized as very high (range 0.80–1.00). This value far exceeds the r_{table} (0.404), indicating that the instrument has excellent internal consistency. These results confirm that each item provides a stable contribution to measuring student ability and minimizes measurement error.

Implementation (Limited Trial)

A limited trial was conducted on 22 eighth-grade students at Pelita Raya Middle School in Jambi. Students worked independently on the problems, then completed a response questionnaire, while researchers observed their activities during the process. The trial results showed that most students were able to understand the problem content, identify important information, determine initial steps for solving the problems, and connect the context to relevant mathematical concepts.

However, some students still experienced difficulties with higher-level items that required complex mathematical modeling, reasoning, and interpretation of results. Difficulties primarily arose when understanding long problems, converting contextual problems into mathematical form, and interpreting the final results back into context. In general, students were able to complete items at low to medium levels, while higher-level items required further guidance and practice. In terms of responses, students found the questions interesting, easier to understand because they used the Jambi context, and challenging. Observations showed that students were more active in thinking, rather than simply copying answers, and engaged in discussions with peers—indicating that the questions stimulated learning activities. These qualitative findings align with the needs questionnaire data in Table 1, thus reinforcing the conclusions regarding product acceptability.

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Product Quality Evaluation

Product quality evaluation was conducted based on three criteria: validity, practicality, and effectiveness. In terms of validity, the expert assessment results reached 95% (very valid) and were supported by empirical data in the form of all valid items ($r_{xy} > r_{table}$) and a reliability of 0.887 (very high). In terms of practicality, teacher and student response questionnaires showed that the questions were easy to use, appropriate to students' abilities, and interesting because they used a familiar context, so the product was categorized as very practical. In terms of effectiveness, the results showed that students were able to formulate problems from the context (formulating), apply mathematical concepts (employing), and interpret the results into the context (interpreting), which indicates that the questions were able to train mathematical literacy skills. Overall, the developed product meets the criteria of validity, practicality, and effectiveness. Therefore, the PISA-type mathematics questions on the Change and Relationship content based on the Jambi context are suitable for use as an instrument in junior high school mathematics learning, with the caveat that repeated practice is required to optimize student achievement on higher-level items.

Discussion

The research results show that the PISA-type mathematics questions developed for the Change and Relationship content, based on the Jambi context, meet the criteria for validity, practicality, and effectiveness. This demonstrates that the development process, conducted through the ADDIE model, is capable of producing products that align with the characteristics of junior high school mathematics learning and the PISA assessment framework. In terms of validity, the validator's assessment results indicate that the developed questions are in the very good category. This validity is evident in the content, construction, and language aspects, which have met the criteria for developing PISA-type questions. In terms of content, the developed questions are in line with the learning outcomes of junior high school mathematics, particularly algebra material in the Change and Relationship content. The questions also contain the main characteristics of PISA, namely measuring mathematical literacy skills through the processes of formulating, employing, and interpreting. Furthermore, the stimulus questions are structured based on contextual situations close to students' lives, thus encouraging students to understand the relationships between variables and changes in a mathematical situation.

In terms of constructivity, the developed questions align with the characteristics of PISA questions, as they contain non-routine problems, are based on real-world contexts, and require higher-order thinking skills (HOTS) (Oktaviranda & Asmara, 2021). The open-constructed response format allows students to explain the solution process, strategies, and mathematical reasoning used (Susilawati et al., 2020). The questions are also structured based on PISA cognitive levels, thus measuring students' abilities in stages, from understanding simple information to performing more complex mathematical reasoning and interpretation (Charmila et al., 2016). These results align with previous research, which suggests that PISA-type questions can train students' critical thinking and problem-solving skills by requiring them to connect mathematical concepts to real-world situations.

Meanwhile, regarding the language aspect, the validator assessed that the language used in the questions was communicative, clear, and appropriate for the developmental level of junior high school students. The sentences used were free from multiple interpretations, and the context presented was easy for students to understand because it used situations familiar to their environment in Jambi. The use of simple language while still adhering to

mathematical principles helped students focus more on the problem-solving process than on understanding the intent of the questions. This finding supports previous research that stated that clarity of language and contextual familiarity significantly influence students' ability to understand mathematical literacy questions.

In terms of practicality, the results of the teacher and student questionnaire responses showed a very good rating. Teachers provided positive responses, particularly regarding the suitability of the questions for junior high school mathematics learning, the ability of the questions to develop mathematical literacy, and the appropriateness of the questions' context to students' lives (Li et al., 2024; Rahmayani et al., 2025; Rittle-Johnson, 2024). Teachers assessed that the developed questions could be a more varied alternative evaluation instrument than the routine questions typically used in schools. Furthermore, the clear instructions and systematic presentation of the questions made it easier for teachers to implement the questions in the learning process.

Student responses also showed positive results. The strongest indicators were seen in the aspect of interest in the context of the questions and ease of understanding the problems because they used the Jambi context, which is close to their daily lives. Students found it easier to imagine the situations in the questions because they related to environments, they were familiar with, such as economic activities, culture, and environmental conditions in Jambi. However, some students still experienced difficulties on questions at a higher cognitive level, particularly in explaining mathematical reasoning and constructing mathematical models of contextual problems. This indicates that students still need to be accustomed to working on non-routine questions that require reasoning and higher-order thinking skills. This finding aligns with previous research that stated that Indonesian students tend to experience difficulties on high-level PISA questions because they are not yet accustomed to questions that require in-depth interpretation and reasoning.

In terms of effectiveness, the results of the mathematical literacy test indicate that the average student achievement is in the good category. These results indicate that the questions developed are able to train students' mathematical literacy skills in understanding, formulating, and solving mathematical problems based on real-world contexts. PISA-type questions encourage students to not only use formulas procedurally but also understand the relationships between mathematical concepts in everyday life. Compared to learning using routine questions, the use of PISA-based questions provides students with greater opportunities to develop critical thinking, reasoning, and problem-solving skills.

In addition to increasing student learning interest, the use of the local Jambi context also assists students in the mathematical modeling process. The familiar local context makes it easier for students to connect real-world problems to mathematical forms, such as determining relationships between variables, reading change patterns, creating equations, and interpreting solution results according to real-world situations (Achmetli et al., 2019; Jones, 2019; Sevinc & Lesh, 2022). Thus, the local context not only serves to attract students to the problem but also serves as a bridge that helps students build a more meaningful and contextual mathematical understanding (Liljekvist et al., 2017; Moala et al., 2019). These results support previous research that states that the use of local cultural and environmental contexts in mathematics learning can improve students' mathematical representational abilities and literacy because students more easily connect real-world experiences with the mathematical concepts being learned.

Overall, the results of this study reinforce previous research findings that developing PISA-based questions and utilizing local contexts can improve the quality of mathematics learning and students' mathematical literacy skills. However, this study has the advantage of

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specifically integrating the local Jambi context into the Change and Relationship content, resulting in questions that are closer to students' experiences and relevant to their learning environment. Therefore, developing PISA-type mathematics questions based on the Jambi context can be an alternative innovation in mathematics learning and evaluation in junior high schools, particularly in developing students' critical thinking and problem-solving skills.

Conclusion

This study produced 15 PISA-type mathematics questions on the Jambi context-based Change and Relationship content that have gone through development stages using the ADDIE model, starting from the analysis, design, to product development and validation stages. The questions developed were arranged based on PISA characteristics that include aspects of content, context, and mathematical processes, and include the local Jambi context that is close to the lives of junior high school students. Based on the research results, the questions developed met the criteria of validity, practicality, and effectiveness. The expert validation results obtained a percentage of 95% with a very good category, which indicates that the questions have met the content, construction, and language aspects according to the characteristics of PISA questions and the Change and Relationship material. The practicality results from teacher and student responses each obtained a percentage of 92% with a very good category, thus indicating that the questions are easy to use, easy to understand, and appropriate to the needs of mathematics learning in junior high schools. Meanwhile, the effectiveness results obtained a percentage of 78.18% with a good category, which indicates that the questions are able to train students' mathematical literacy skills, especially in understanding contextual problems, conducting mathematical modeling, and solving problems related to everyday life.

The use of the local Jambi context in developing questions provides direct benefits in the learning process because it helps students connect mathematical concepts with real situations in their environment. In addition, the questions developed can also help teachers in providing alternative evaluation instruments that are more innovative, contextual, and oriented towards higher-order thinking skills (HOTS) and students' mathematical literacy according to the characteristics of the PISA assessment. Academically, this research contributes to the development of PISA-based mathematics assessment instruments by utilizing the local context of the region, especially on the Change and Relationship content. This research can also be a reference for other researchers in developing contextual mathematics questions based on local culture and environment to improve the quality of mathematics learning and mathematical literacy skills of junior high school students. The research findings show that the use of the local Jambi context not only increases students' interest in the questions but also helps students in the process of mathematical modeling and understanding the relationship of mathematical concepts to real situations. Students find it easier to identify information, construct mathematical models, and interpret the results of the solutions because the context used is close to their daily experiences.

This study still has limitations, namely that the question development focused only on the Change and Relationship content and was conducted in one school with a limited number of subjects. Furthermore, the research only reached the development stage and limited trials, so widespread implementation has not yet been carried out. Therefore, further research is recommended to develop PISA-type mathematics questions on other content, such as Space and Shape, Quantity, or Uncertainty and Data, with a wider school coverage. Future research can also conduct more in-depth implementation tests to determine the effect of question use on improving students' mathematical literacy skills in the long term.

Conflict of Interest

The authors declares that there is no conflict of interest.

Auhor Contributions

W.S. conceived the research idea presented and collected the data. The other three authors (Y.R., F.T.P., and A.S.) actively participated in the development of theory, methodology, organization and analysis of data, discussion of results, and approval of the final version of the work. All authors declare that the final version of this paper has been read and approved. The total percentage of contributions to the conceptualization, preparation, and correction of this paper is as follows: W.S.: 35%, Y.R.: 25%, F.T.P.: 20%, and A.S.: 20%.

Data Availability Statement

The authors declare that data sharing is not possible, as no new data was created or analyzed in this study.

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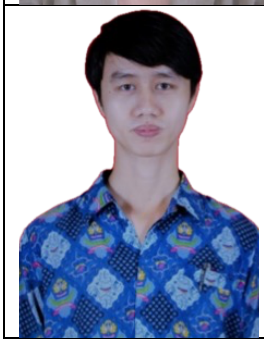	**Agun Sutrianto,** is a lecturer in the Information Systems Study Program, Faculty of Computer Science, Universitas Dinamika Bangsa. He is an expert in Mathematics and Information Systems. He completed his Master's degree in Mathematics Education at the University of Jambi in 2016. ✉ sutriantoa051@gmail.com.