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Development of Numeracy Literacy Instrument in the Context of Local Wisdom in Pandeglang at the Madrasah Tsanawiyah

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Abstract

Numeracy literacy, as the ability to understand and apply mathematical concepts in everyday life, has been recognized as a crucial competence in this era. In the context of formal education, many students face challenges in developing their numeracy literacy skills, thus necessitating the development of instruments that have the potential to contribute significantly by being contextual and enriching students' numeracy literacy learning experiences. The aim of this research is to produce a development product of a numeracy literacy instrument based on local wisdom in Pandeglang Regency for grade IX students at Madrasah Tsanawiyah, focusing on number patterns, probability, two-dimensional shapes, and algebraic elements. This research falls under the category of development research, referring to Tessmer's formative research model. The subjects up to the final prototype in this research are 38 students from class IX at MTsN 2 Pandeglang. The instruments used for data collection were validation sheets, interview guidelines, and a numeracy literacy test instrument based on local wisdom in Pandeglang Regency. The data analysis method used involved evaluating the suitability, quality, and accuracy of the developed instrument through expert judgment and statistical analysis. The research results indicate that the developed questions have a good level of validity. Furthermore, in terms of the quality of the developed test, the difficulty index of the four items falls under the moderate category, the item discrimination is acceptable and valid, and the test exhibits high reliability (0.93). Based on these research results, it can be concluded that the developed numeracy literacy instrument based on local wisdom in Pandeglang Regency is suitable for use.

Kata kunci: Assesment, Local Wisdom, Mathematics, Numeracy Literacy

Pengembangan Instrumen Literasi Numerasi dalam Konteks Kearifan Lokal di Pandeglang pada Madrasah Tsanawiyah

Abstrak

Literasi numerasi sebagai kemampuan memahami dan menggunakan konsep matematika dalam kehidupan sehari-hari, telah diakui sebagai salah satu kompetensi penting dalam era ini. Dalam konteks pendidikan formal, banyak siswa menghadapi tantangan dalam mengembangkan kemampuan literasi numerasinya, sehingga diperlukan adanya pengembangan instrumen yang berpotensi memberikan kontribusi penting yang kontekstual dan memperkaya pengalaman belajar literasi numerasi siswa. Tujuan dari penelitian ini adalah untuk menghasilkan produk pengembangan instrumen literasi numerasi berbasis kearifan lokal di Kabupaten Pandeglang bagi siswa kelas IX MTs dengan elemen materi pola bilangan, peluang, bangun ruang sisi datar dan aljabar. Penelitian ini termasuk dalam kategori penelitian pengembangan

yang mengacu pada model penelitian formatif Tessmer. Subjek hingga di prototipe akhir pada penelitian ini adalah 38 orang siswa kelas IX di MTsN 2 Pandeglang. Instrumen yang digunakan untuk pengumpulan data adalah lembar validasi, pedoman wawancara dan soal tes instrumen literasi numerasi berbasis kearifan lokal Kabupaten Pandeglang. Metode analisis data yang digunakan adalah dengan mengevaluasi kesesuaian, kualitas dan akurasi instrumen yang dikembangkan melalui ahli dan analisis statistik. Hasil penelitian menunjukkan bahwa pertanyaan-pertanyaan yang dikembangkan memiliki tingkat validitas yang baik, selanjutnya untuk kualitas tes yang dikembangkan diantaranya indeks kesukaran keempat soal berada pada kategori sedang, daya pembeda soal dapat diterima dengan baik dan valid serta memiliki realibilitas yang tinggi (0,93). Berdasarkan hasil penelitian tersebut, maka dapat disimpulkan instrumen literasi numerasi berbasis kearifan lokal di Kabupaten Pandeglang yang dikembangkan sudah layak untuk digunakan.

Kata kunci: Penilaian, Kearifan Lokal, Matematika, Literasi Numerasi

INTRODUCTION

Numeracy literacy, as the capacity to comprehend and apply numerical ideas in daily existence, has been perceived as one of the fundamental capabilities in the time of mechanical and educational turn of events. Not only does an increase in numeracy literacy have an impact on people's ability to solve math problems, but it also plays a crucial role in making decisions about various aspects of daily life. (Goos et al., 2011) say that in the 21st century, numeracy also known as mathematical literacy, needs to emphasize the development of skills that are relevant to science, technology, and the professional world and are inseparable from activities that involve numbers and calculations. In the meantime, (Dirjen PAUD, Dikdas, dan Dikmen Kemendikbud, 2021) defines numeracy as the capacity to use numbers, data, and mathematical symbols, as well as to apply concepts and computational skills to solve real-world problems and make decisions.

Based on the fundamental idea of numeracy literacy, the mathematical reasoning and three phases of the problem-solving (mathematical modeling) cycle are linked in the PISA 2022 mathematics framework, which defines the theoretical foundations of the PISA mathematics assessment. The four content categories of mathematical content knowledge are described in the framework. Additionally, it identifies four contexts in which students will encounter mathematical difficulties. As part of their constructive, engaged, and reflective citizenship for the 21st century, the PISA test measures how effectively countries are preparing students to use mathematics in all aspects of their personal, civic, and professional lives (*PISA 2022: Mathematics Framework*, n.d.).

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According to (Kurniawati & Sugiharto, 2022) literacy in mathematics is the ability to (a) use a variety of basic mathematics-related numbers and symbols to solve real-world problems and (b) analyze information presented in a variety of formats (such as tables, graphs, etc.). and predict and make decisions based on the interpretation of the analysis results.

The ability to formulate, apply, and interpret mathematics in a variety of settings is called numeracy literacy. Numeracy literacy includes mathematical reasoning, which entails using mathematical concepts, procedures, facts, and tools to describe, explain, and predict phenomena in order to assist people in making decisions that are thoughtful and constructive (OECD, 2019). Due to a lack of teacher practice in assigning tasks centered on numeracy literacy, students struggle to solve problems based on numeracy literacy, according to (Mahmud & Pratiwi, 2019). According to (Fiangga et al., 2019), teachers frequently provide structured problems that can be solved directly by applying formulas. This is caused by a number of things, one of which is thought to be teachers using math textbooks as a reference when giving exercises and not all teacher's reference books are of high quality or appropriate (Utami & Harta, 2017).

According to the results of the national assessment report (Education Report) of MTsN 2 Pandeglang in 2023, it is stated that only 34.09% of students are deemed to have achieved the minimum numeracy competency based on their ability to think using mathematical concepts, procedures, facts, and tools to solve everyday problems in various relevant contexts. Therefore, efforts are needed to encourage students in reaching the minimum competency. Purchase of measurement instruments to measure students' level of numeracy literacy and increase the number of opportunities for students to apply numeracy literacy to contextual problems is one possible solution (Pangesti, 2018); By connecting numerical concepts and skills to real-world situations, learning in real-world contexts is a powerful strategy for improving students' numeracy literacy (Patta et al., 2022; Agustina et al., 2022; Mutmainah, 2022). Students can understand the utility and relevance of mathematics in everyday situations by being presented with real-world problems (Istiana et al., 2020). As a result, students will comprehend the significance of mathematics in solving problems and making decisions pertaining to the use of numbers in everyday life.

Local wisdom has unique characteristics that are suitable to be introduced and utilized within the school context (Lusiana, 2018). Integrating local wisdom in the development of numeracy literacy instruments can provide meaningful contexts for students. This approach can enrich mathematics learning by connecting mathematical concepts and skills with familiar and understood real-life situations. Furthermore, the use of local wisdom in mathematics education can enhance students' interest and promote appreciation for cultural diversity. As stated in the study by (Febriani et al., 2019), Students can develop their awareness of mathematical issues within the context of cultural values in a particular area by integrating cultural contexts with mathematical problems.

Numerous studies have been carried out regarding local wisdom or culturally based numeracy. For instance, a study by (Juhaevah, 2022) concentrated on the creation of an assessment that dealt with mathematical issues while taking into account Maluku's cultural aspects. A numeracy test based on the sociocultural context of Bali was developed in another study (Darmawisada, 2022). Furthermore, (Sirait et al., 2022) on Buano Island looked at how well students could use local knowledge to solve math problems. To improve numeracy literacy in primary schools, they investigated the practices of a cooperative learning model based on local wisdom. A study on the development of numeracy-based video learning with local wisdom for elementary school students (Wardhani, 2022) was carried out. In addition, (M. A. K. Putri, 2022) investigated the impact of the Using ethnic group's development of culturally valued mathematics learning tools on students' numeracy skills. In general, the findings of this study indicate that students' numeracy skills can be improved by incorporating local wisdom. However, based on a review of articles in the last ten years, no literacy assessment instrument has been developed taking into account local wisdom to measure literacy skills, especially in the local wisdom of Pandeglang Regency. By adopting an innovative local wisdom approach, this research has the potential to make a significant contribution to the development of a more contextual numeracy literacy assessment and to enrich the mathematics learning experiences of students in Pandeglang. The purpose of this research is to develop a literacy assessment by considering the valid and reliable local wisdom of Pandeglang Regency

RESEARCH METHODS

In this research method, a research and development approach was employed. According to (Zulkardi, 2002), the process of question development consists of two main stages: the preliminary stage and the formative evaluation stage. In the formative evaluation stage, the steps taken follow the approach proposed by (Tessmer, 1998) which includes (1) self evaluation, (2) prototyping (expert review, one-to-one, and small group), and (3) field test. In the preliminary stage, the researcher conducted student analysis, analysis of the junior high school/MTs curriculum, and analysis of the numeracy literacy instrument by adapting local wisdom. Subsequently, the design of the question instrument, including the framework of numeracy literacy based on local wisdom, was developed and continued to the formative evaluation stage.

In the formative evaluation stage, the first step was self-evaluation, where the researcher evaluated the designed questions. The results of this evaluation were referred to as Prototype I. Next, the prototyping phase involved expert review, one-to-one, and small group testing. The expert review phase was a validity test conducted by experienced experts or educators. These experts assessed and tested Prototype I by examining, evaluating, and reviewing it based on its content, structure, and language.

Suggestions from the experts were recorded in the validation sheet and question cards. The characteristics of this prototype can be seen in Table 1. Simultaneously with expert review, the one-to-one stage is also conducted. In this stage, Prototype I is tested with three students as testers who are asked to work on the developed questions and provide comments or feedback on the questions they have answered.

Table 1. Characteristics of the Validation Sheet in the Expert Review Stage

No.	Criteria	Characteristics
1	Content	The items are aligned with problem-solving indicators.
		The stimuli include pictures, graphs, tables, and others that are relevant to real-life situations.
2	Construction	The questions adhere to the principles of developing mathematical problem-solving items.
		They are appropriate for students at the junior high school level (SMP/MTs).
		They cover a variety of concepts.
3	Language	In accordance with PUEBI (Indonesian Language Spelling and Writing Guide), the questions do not have ambiguous interpretations.
		The question and answer constraints are clearly defined.

Source: personal documents

Based on Table 1, which serves as a benchmark for the results and findings obtained from the expert review and one-to-one stage, they are used as a basis for revising Prototype I. After revising Prototype I, Prototype II is produced. Prototype II is then tested in the small group stage. In this stage, three students are asked to solve the questions in Prototype II and provide comments on the questions they have answered. The comments and findings from the small group stage are considered in revising Prototype II. The results of the Prototype II revision are referred to as Prototype III. Before proceeding to the field test stage, the author conducts a trial to observe the difficulty level, discriminant power, and reliability of the questions. The trial results are analyzed and discussed to generate suggestions for improving Prototype III so that it can produce the final prototype. The field test results will be used to calculate the scores of each student and serve as a basis for assessing numeracy literacy in the context of local wisdom.

The development of a numeracy literacy instrument with the context of local wisdom in Pandeglang becomes the focus of this research. It includes four items, each with a level 1 question with the level of knowing, two questions with the level of applying and 1 question with level of reasoning. The content domains include Algebra (number patterns), Geometry, Data and Uncertainty, and Equations and Linear Inequalities. Therefore, the population of this research consists of 9th-grade students who have studied the relevant material. The sample size is limited to only 38 students from class IX at MTsN 2 Pandeglang in the even semester of 2022/2023. The sampling technique employed in this study is nonprobability sampling, specifically purposive sampling.

The instruments used for data collection are as follows: (1) Validation sheet, in the form of a questionnaire to identify the shortcomings of the developed numeracy literacy instrument based on local wisdom of Pandeglang District. The feedback and suggestions from validators were obtained through the questionnaire provided. (2) Interview guidelines, interviews were conducted based on students' performance in solving the numeracy literacy instrument based on the local wisdom of Pandeglang District. Therefore, the interviews conducted fall into the category of unstructured interviews. (3) Numeracy literacy instrument based on the local wisdom of Pandeglang District. The data analysis method used involved evaluating the suitability, quality, and accuracy of the developed instrument through expert judgment and statistical analysis. The instrument

development process considers three criteria adopted from criteria proposed by (Nieveen, 2007) validity, practicality, and effectiveness. The instrument is considered valid if the validation results from the experts state that the developed questions are valid in terms of content, construction, and language. Additionally, the instrument is considered practical if the developed questions can be used by all mathematics education practitioners, and the experts acting as validators confirm that the questions can be implemented.

Table 2. Indicators of Numeracy Literacy Proficiency

No	Indicators	Activities
1	Formulating mathematical problems.	1) Identifying mathematical aspects of the problem within real-life context.
		2) Simplifying the problem for better understanding.
		1) Representing problems using variables, diagrams, and mathematical models.
		2) Transforming problems into mathematical models.
2	Applying mathematical concepts, facts, and reasoning.	1) Determining strategies to solve the problem.
		2) Applying mathematical facts, rules, and structures to find solutions, interpreting, describing, and evaluating mathematical results in real-life context.
3	Interpreting, representing, and evaluating mathematical results in real-world contexts.	1) Interpreting the obtained mathematical results back into real-world problems.
		2) Evaluating the reasoning associated with the obtained solution in the real-world problem.
		3) Explaining whether the mathematical results are appropriate or not for the given problem context.

Source: personal documents

The instrument was developed based on the numeracy literacy ability indicators according to (OECD, 2019), which are listed in Table 2.

RESULTS AND DISCUSSION

In the preliminary stage, the author has four questions used in this research. These four questions will be further tested for their suitability through expert evaluation and statistical analysis to obtain a validated instrument quality. The following are examples of questions from the initial product (Prototype I) before being validated by experts.

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Figure 1. The Question Number One in Prototype 1 Before Validation

Figure 1 displays an algebraic question (number patterns) with a cognitive level knowing that incorporates the local wisdom of Pandeglang regarding the content of sea waste in the form of seashells that can be transformed into various decorations such as figurines, hanging lamps, curtains, and other ornaments commonly developed as commodities in the daily lives of students in coastal areas of Pandeglang. This is in line with the research by (D. R. Sari et al., 2021) which highlights that the use of context in numeracy is employed to recognize the role of mathematics in everyday life.

Figure 2. The Question Number Two in Prototype 1 before validation

Figure 2 displays a question on data and uncertainty (probability) with a cognitive level applying that integrates the local wisdom of cultivating Mangrove forests with various types of trees commonly grown in the coastal areas of Pandeglang. This

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instrument is also intended to educate students and teachers to love and preserve the coastal environment. The context in this numeracy includes situations close to students' environment, social, cultural, and scientific contexts in their daily lives, (OECD, 2019).

Kue Jojorong Khas Pandeglang

Kue Jojorong adalah makanan khas Banten dari Kabupaten Pandeglang. Makanan ini berbahan dasar tepung beras dan santan kelapa yang didalamnya diberi gula aren. Tempat atau mangkuk kuenya terbuat dari daun pisang yang setiap ujungnya diikat menggunakan tusuk gigi atau lidi.

Berdasarkan informasi di atas, berilah tanda centang (✓) pada kotak dari pernyataan berikut yang benar!

1	Sisi tegak pada mangkuk kue berbentuk balok.	
2	Kisaran volume satu bungkus Kue Jojorong berisi 200 cm³ adonan kue.	
3	Jika kita memiliki adonan Kue Jojorong sebanyak 2 liter maka akan menghasilkan 10 Kue Jojorong dengan ukuran mangkuk seperti pada gambar.	
4	Jika bagian atas Kue Jojorong akan diberi tutup, maka dibutuhkan setidaknya 40 cm² daun pisang untuk setiap Kue nya.	

Figure 3. The Question Number Three in Prototype 1 before validation

Figure 3 displays a question on Geometry and Measurement (3D Shapes in 2D) with a cognitive level applying that integrates the local wisdom of the culinary snack "Kue Jojorong," which is a traditional food of the Banten ethnic group from Pandeglang Regency. This food is made from rice flour and coconut milk, with the inner part filled with palm sugar. The cake bowl is shaped like a rectangular block and is made of banana leaves, with each end tied using bamboo sticks (lidi). This is supported by the research (Andiani et al., 2021) which states that numeracy is expected to be used to measure students' ability in applying mathematical concepts, thinking, and determining mathematical procedures in everyday life.

Sate kikil merupakan jajanan yang sangat cocok untuk dicampurkan sebagai makanan pendamping bubur sop khas daerah Labuan. Ibu Inah mempunyai usaha membuat sate kikil. Selain disetorkan ke warung-warung bubur sop dan pasar, Ibu Inah juga menerima pesanan. Hari ini, Ibu Inah mendapat pesanan 2 jenis sate kikil seperti yang terlihat pada gambar di bawah ini.

Sate A　　　　　　　　**Sate B**

Jika Ibu Inah memiliki persediaan kulit kikil sebanyak 100 potongan kecil, berapa tusuk sate kikil yang dapat dibuat oleh Ibu Inah? Tentukan benar dan salah pernyataan berikut ini.
1. Berdasarkan gambar tersebut, tentukan benar atau salah pernyataan berikut ini. Berilah tanda centang (✓) pada kolom yang sesuai!

No.	Pernyataan	Benar	Salah
1	Sate A sebanyak 8 tusuk dan sate B sebanyak 15 tusuk		
2	Sate A sebanyak 11 tusuk dan sate B sebanyak 12 tusuk		
3	Sate A sebanyak 12 tusuk dan sate B sebanyak 10 tusuk		

Figure 4. The Question Number Four in Prototype 1 before validation

Figure 4 displays an algebraic question (linear equations and inequalities) with a cognitive level reasoning that integrates the local wisdom of Pandeglang with the content

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of culinary snack Sate Kikil, which is often served together with Labuan style rice porridge in the Pandeglang region. This food is also closely related to the students' daily lives. Numeracy questions are designed to alleviate students' tension while working on exam questions that only contain learning content and to familiarize students with critical thinking to solve everyday problems, (Ayuningtyas & Sukriyah, 2020).

The expert review was conducted by the researcher providing instruments including guidelines, test questions, worksheets, answer criteria, and assessment guidelines to the validators, consisting of two experts with doctoral degrees and a mathematics teacher with a master's degree. In this validation stage, the validators assessed 5 aspects related to the generated instruments in Prototype I. Each aspect had a maximum score of 5 and a minimum score of 1. A score of 1 indicated invalid, 2 indicated less valid, 3 indicated moderately valid, 4 indicated valid, and 5 indicated highly valid. Based on the validation in the expert review stage in this research, it can be concluded that the developed questions have a good level of validity, meaning that the instrument is suitable for use, but still requires revisions based on the suggestions and feedback provided by the validators. The recommendations from the expert review can be seen in Table 3.

Table 3. The revision suggestions from the validators on Expert Review

Validator	Instrumen	The Revision Suggestions.
Validator 1	Test Questions	The sentences in the stimulus are condensed. If the image in the stimulus is sourced from another party, please include the original source of the image.
	Scoring Guidelines	Include educational level/class.
Validator 2	Test Questions	The command to answer questions in items 1 and 4 is condensed into a single command.
	Answer Key	Answer keys are provided per step according to the desired assessment criteria.
	Scoring Guidelines	Add a column for question weight.
Validator 3	Answer Sheet	Provide a separate column for answering the questions, placed directly below the question and labeled with "Given," "Asked," and "Answered."
	Test Questions	Pay attention to the command and question sentences as well as punctuation marks.
	Assessment Criteria/ Rubric	Adjust according to the steps of solving.

Source: personal documents

Based on Table 3, the comments and suggestions from the validators are used as considerations to revise the test instrument and produce Prototype II. In the one-to-one stage, Prototype I was developed and tested on three students with different levels of abilities, namely high, medium, and low abilities. Each student was asked to answer 4 questions and provide their opinions, comments, and suggestions regarding the questions. Based on this activity, it was found that only 1 question needed revision. This indicates that the developed questions have a good level of practicality. The results of the one-to-one test can be seen in table 4.

Table 4. The Results of One to One Test

Question Number	Findings/Input	Recommendations
1	There are two question sentences that have the same meaning.	The question sentences should be merged into one sentence.
2	The stimulus sentence is too long and unrelated to the main question.	It needs to be simplified to focus on the main question.
4	There are two question sentences that have the same meaning.	The question sentences should be merged into one sentence.

Source: personal documents

Based on Table 4, the comments and suggestions from the one-to-one results are used as considerations to revise the test instrument in Prototype I. The small group trial involved five students from class IX. These students were asked to solve the problem-solving questions provided and provide comments on the questions they had answered by responding to several questions on the prepared sheet.Based on the small group test results, it is known that out of the 4 given questions, only 1 question needs to be revised. This indicates that the developed questions are practical. Before proceeding to the field test, Prototype II was tested on ten students from grade IX at MTsN 2 Pandeglang. The results of the test were analyzed to evaluate the level of difficulty, item discrimination, and reliability of the 4 developed questions. The determination of criteria or interpretation of the levels of difficulty, item discrimination, and reliability was based on classification (Arikunto, 2007). The difficulty level and item discrimination of the test items in the test are shown in table 5;

Table 5. Difficulty Index, Item Discrimination, and Item Reliability

Question Number	Difficulty Index (IK)	Criteria IK	Item Discrimination (DB)	Criteria DB	R_{xy}	Conclusion Validity	Realibility
1	0.56	Sedang	0.44	Baik	0.661	Valid	
2	0.54	Sedang	0.46	Baik	0.965	Valid	0.93
3	0.58	Sedang	0.42	Baik	0.970	Valid	
4	0,58	Sedang	0.42	Baik	0.671	Valid	

Source: personal documents

Based on the data in table 5 above, it is found that all four questions have a moderate level of difficulty, acceptable item discrimination, and high item reliability, making them considered valid. After this stage, a field test was conducted in class IX, The questions in Prototype III can be seen in the following Figures 5, 6, 7 and 8.
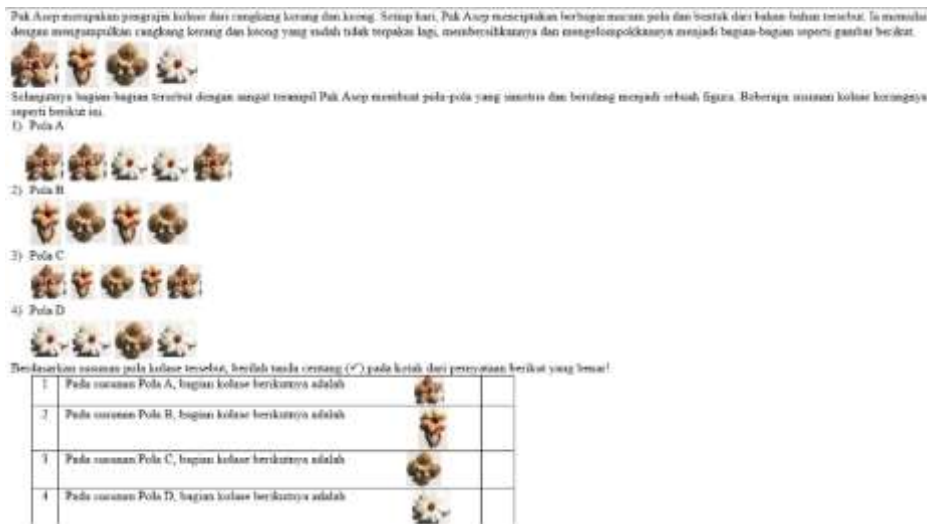
Figure 5. Question Number 1 in Prototype III

In Figure 5, The concept of number patterns in mathematics is closely related to the content of arranging seashells in question number 1 because the arrangement of seashells can be organized and counted based on a number pattern. In the arrangement of seashells, we can observe the sequence of numbers formed by the total number of seashells. For example, we can observe patterns of gradual addition or multiplication used in the arrangement of seashells. This question aims to assess students' knowledge in understanding facts, processes, concepts, and procedures. The level of understanding in this question includes the ability to remember, identify, classify, calculate, and predict numbers in the arrangement of seashells, thereby helping to understand the relationship between mathematics and everyday life contexts such as the local wisdom contained in the

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arrangement of seashells. In accordance with the opinion of several experts who stated that in creating context-based questions with local wisdom, teachers can develop question themes based on the Indonesian context, such as traditional cuisine, traditional houses, and tourism in Indonesia, by providing questions rooted in culture that have a positive impact on student knowledge, mathematical problem-solving skills, and character. (Zulfah, 2018; Hervanda et al., 2020)

Reboisasi Hutan *Mangrove* bersama Badan Restorasi Gambut dan *Mangrove* (BRGM)

Hutan *mangrove* merupakan salah satu sumber daya alam yang sangat penting bagi kehidupan manusia dan lingkungan khususnya daerah pesisir pantai. Badan Restorasi Gambut dan *Mangrove* (BRGM) Provinsi Banten akan mereboisasi beberapa hektare hutan bakau kawasan pesisir pantai di kabupaten Pandeglang melalui kegiatan menanam beberapa jenis *mangrove* seperti tertera pada tabel berikut.

Jenis *Mangrove*	*Nypa*	*Lumitzera*	*Avicennia*	*Rhizophora*
Jumlah yang ditanam	14.000	14.000	8.000	9.000
Jumlah yang Hidup	12.000	10.000	4.800	7.200

Berdasarkan bacaan di atas, tentukan benar atau salah pernyataan berikut ini dengan memberi tanda centang (✓) pada kolom yang sesuai!

No.	Pernyataan	Benar	Salah
1	Peluang pohon *Nypa* hidup lebih tinggi daripada peluang hidup pohon *Rhizophora*		
2	Peluang pohon *Lumitzera* hidup lebih tinggi daripada peluang hidup pohon *Avicennia*		
3	Peluang pohon *Avicennia* hidup lebih tinggi daripada peluang hidup		

Figure 6. Question Number 2 in Prototype III

Figure 6 illustrates the context of this inner instrument, the number of mangrove tree species that have the potential to survive after planting can be considered as an event. By studying the concept of probability through these mangrove trees, it is expected to assess students' ability to apply knowledge and understand various facts, relationships, processes, concepts, procedures, and methods in the context and methods of real life situations to solve various problems. At the application level in this instrument, students can analyze and predict the likelihood of a certain type of mangrove tree surviving after planting. For example, by using the concept of probability to calculate the percentage or ratio of the likelihood that a certain type of mangrove tree will successfully grow and survive after planting. Furthermore, the concept of probability also helps in understanding the factors that affect the survival of mangrove trees, such as environmental conditions, care provided, and other factors. As in the study conducted by (Nurkamilah et al., 2018) and (Deviana & Sulistyani, 2021), mathematics is a human activity, and mathematical material must be meaningful to students, serving as a driver for developing numeracy literacy through learning stages that emphasize contextual learning. In this approach,

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students can become familiar with the local wisdom of their surroundings, making what is learned at school beneficial in their everyday lives.

Kue Jojorong Khas Pandeglang

Kue Jojorong adalah makanan khas Banten dari Kabupaten Pandeglang. Tempat atau mangkuk kuenya terbuat dari daun pisang berbentuk menyerupai bangun ruang balok dan di setiap ujungnya diikat menggunakan tusuk gigi atau lidi.

Berdasarkan informasi di atas, berilah tanda centang (✓) pada kotak dari pernyataan berikut yang benar!

1	Sisi tegak pada mangkuk kue berbentuk balok.	
2	Kisaran volume satu bungkus Kue Jojorong berisi 200 cm³ adonan kue.	
3	Jika kita memiliki adonan Kue Jojorong sebanyak 2 liter maka akan menghasilkan 10 Kue Jojorong dengan ukuran mangkuk seperti pada gambar.	
4	Jika bagian atas Kue Jojorong akan diberi tutup, maka dibutuhkan setidaknya 40 cm² daun pisang untuk setiap Kue nya.	

Figure 7. Question Number 3 in Prototype III

Figure 7 is a question about the concept of two-dimensional geometric shapes in mathematics, specifically flat faced solids, is related to the content of kue jojorong because Kue Jojorong has a shape that can be associated with a two dimensional flat faced solid, namely a rectangular prism. In learning the concept of two dimensional flat faced solids, students can apply their understanding of the shape and properties of a rectangular prism to kue jojorong. Students can identify the faces, edges, and vertices associated with a rectangular prism in Kue Jojorong. Additionally, students can learn about measurements and calculations related to two dimensional flat faced solids, such as calculating surface area or volume, similar to the shape of Kue Jojorong. They can see how mathematics can be applied to understand and apply the properties of two dimensional flat faced solids to real life objects, such as Kue Jojorong. When students are given practice in solving mathematics problems related to everyday life, they will become skilled in handling mathematical problems and using problem-solving patterns repeatedly, (Wahyuni & Angraini, 2021).

Figure 8. Question Number 4 in Prototype III

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Figure 8 is a instrument about the concept of linear equations, students can apply their knowledge of linear equations and inequalities to the quantity of kikil in Sate Kikil. They can use variables to represent the amount of kikil and construct equations or inequalities that reflect the relationship between the amount of kikil and other factors, such as the number of satay or the portion size. Furthermore, students can use the concept of linear equations and inequalities to solve problems involving the quantity of kikil in Sate Kikil. For example, they can use equations or inequalities to determine the required amount of kikil given the desired number of satay. This helps students strengthen their understanding of mathematics and connect it to everyday life. The utilization of local wisdom context also plays a crucial role in enhancing students' cognitive skills (Arisetyawan, 2019). Incorporating traditional cuisine as a local wisdom context in the classroom will stimulate students to think critically, be active and creative, create an enjoyable atmosphere, understand the material easily, and ultimately boost students' learning enthusiasm and achievement (Muslimahayati, 2020; Setyaningsih et al., 2019).

Based on the analysis of students' work, the following findings are obtained. On the first question's answer sheet, it was discovered that students still struggle to identify problem-solving strategies like recognizing sequence patterns. They had trouble formulating generalizations from number patterns and identifying the question's existing patterns. In addition, students frequently focused too much on formulas. This is consistent with research conducted by (Ariyanti & Setiawan, 2019; N. I. P. Sari et al., 2018). Students continue to encounter difficulties, according to the answer sheet for the second question. As a general rule, the variables adding to these challenges remember understudies' battles for grasping the issue, low thinking abilities, and restricted imagination in taking care of genuine relevant issues. They also have trouble converting problems into numerical forms and aren't used to following Polya's steps for the right way to solve problems. This is consistent with research conducted by (Riana & Fitrianna, 2021; Fitriana & Mampouw, 2019). On the third question's answer sheet, it was found that students still struggle with using variables, diagrams, and mathematical models to represent problems. They also have trouble connecting concepts and principles. Applying formulas to straightforward calculations and algorithmically solving problems present challenges for students. Additionally, they have trouble putting two-dimensional shape properties into practice. This is consistent with research conducted by (Badraeni et al., 2020; Fahlevi & Zanthy,

2020). On the sheet of responses to question number four, it was discovered that students struggle to comprehend the concept of variables. They make mistakes when converting problems into mathematical models and struggle to express generalizations. This is consistent with research conducted by (Permaganti & Zanthy, 2023; Jumiati & Zanthy, 2020).

Data from the test used to measure students' numeracy literacy skills were analyzed based on the final scores obtained during the test. The data were then analyzed and converted into qualitative data to determine the level of students' numeracy literacy skills. To determine the categories of students' numeracy literacy skills, the (Arikunto, 2007) score interpretation categories were used, where scores of 76-100 were categorized as Excellent, scores of 51-75 as Good, scores of 26-50 as Sufficient, and scores of 0-25 as Insufficient. The analysis of students' numeracy literacy skills test results shows that 20% of students are categorized as Excellent, 40% of students are categorized as Good, and 40% of students are categorized as Sufficient. In addition, several students were interviewed regarding their responses to the tested numeracy literacy based on local wisdom. Based on the interview results, students showed curiosity and interest in solving the numeracy literacy questions based on local wisdom, despite facing difficulties. One of the interview findings was expressed by a student when asked about this development instrument:" *We used to do questions like that when we took part in the Computer-Based National Assessment (ANBK) and the Indonesian Madrasah Competency Assessment (AKMI). short and complex multiple choice. But there is a difference, the readings and pictures on the questions contain local wisdom that we often encounter in everyday life, which makes us excited to find answers because it turns out that the local wisdom we know can be used as questions for mathematics. However, we still encountered difficulties when working on it because we were not used to questions in the form of readings with question types such as ANBK and AKMI".* This is consistent with findings (Mahmud & Pratiwi, 2019) that students have not been accustomed to literacy-based questions by teachers. Closed ended questions that can be answered directly by using a formula are frequently provided by teachers (Fiangga et al., 2019). The creation of instruments for evaluating students' numeracy literacy abilities and introducing them to the practical applications of numeracy literacy is one approach that could be taken (Pangesti, 2018). This is due to the fact that the

problem with numerical literacy arises from engaging real-world problems that necessitate the use of real-world data in problem modeling (R. I. I. Putri & Zulkardi, 2020).

CONCLUSION

This research produces four numeracy literacy instruments using the context of local wisdom in Pandeglang Regency that are valid, practical and all of them are suitable for use. Validity is reflected in the comments of experts and students during the testing phase, indicating that the content aligns with the domain of numeracy literacy. In terms of construct, the questions have been adjusted to match the characteristics of the numeracy literacy ability indicators according to OECD and the abilities of the target group. Linguistically, the questions comply with the PUEBI (Indonesian Spelling and Language Guidelines) and do not have multiple meanings. Practically, the testing phase shows that the questions can be understood as dealing with number patterns, probability, flat geometric shapes, and numbers. The potential effects of students' responses when solving numeracy literacy problems within the local wisdom context of Pandeglang Regency, Banten are observed. Furthermore, the provided questions can facilitate students' abilities in communication, representation, and mathematization through numeracy literacy. Based on the development stages, it is concluded that the developed prototype of the numeracy literacy test based on local wisdom in Pandeglang Regency has a positive effect, categorized as good. Based on the research findings and conclusions, it is recommended for mathematics teachers to use the numeracy literacy test based on local wisdom in Pandeglang as an alternative to enrich the diversity of mathematics questions while training students' numeracy literacy skills. For students, it can serve as motivation to continually practice numeracy literacy skills in learning mathematics. For future research, this study can provide input for designing numeracy literacy tests based on local wisdom in Pandeglang for other content materials.

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