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THE DEVELOPMENT OF MATHEMATICAL LITERACY INSTRUMENT: A CASE ON INDONESIAN TRADITIONAL GAME CALLED "ENGKLEK"

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ABSTRACT

Mathematical literacy constitutes a fundamental competency that enables learners to apply mathematical concepts in solving problems within everyday contexts. However, a considerable number of students continue to encounter challenges in establishing connections between mathematical knowledge and real-world applications. This circumstance underscores the necessity of developing assessment instruments that are both valid and reliable. Accordingly, the presents study seeks to construct a test instrument designed to assess students' mathematical literacy skills through an exploratory approach grounded in the Indonesian traditional game Engklek. The research adopted the 4D development framework, consisting of the stages: define, design, develop, and disseminate. During the define stage, a comprehensive needs analysis was conducted, followed by the formulation of assessment indicators. At the design stage, test items were systematically developed by integrating components of mathematical literacy with contextual elements from Engklek. The develop stage encompassed expert validation, wherein several dimensions-namely clarities of instructions, appropriateness of illustrations, diversity and difficulty of test items, application of mathematical concepts, and opportunities for reasoning-were rigorously evaluated. Finally, the disseminate stage comprised limited trials accompanied by the collection of student responses. The expert validation result demonstrated strong feasibility, across the evaluated aspects. Empirical validation produced a validity coefficient of 0,514, categorized as moderate, while reliability test yielded a coefficient of 0,786644, reflecting a high level of reliability. Furthermore, limited trials conducted with Grade 7 and 8 students showed a positive response with an average percentage score of 65%. Based on these findings, the developed test instrument can be regarded as valid, reliable, and pedagogically suitable for assessing students' mathematical literacy in an engaging and contextually meaningful manner.

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INTRODUCTION

Mathematical literacy is one of the essential abilities for solving mathematical problems, starting form understanding, analyzing, and formulating to drawing conclusions. This ability specifically aims to familiarize students with systematically organizing each answer and emphasizing the use of mathematical notations and symbols contained in the formula used (Jumarniati et al., 2021). Moreover, according to Amelia et al., (2022); Mauleto, (2019) mathematical literacy skills encompass all the objectives of mathematics learning as outlined by the Ministry of National Educations (2006), and are aligned with the NCTM, (2000); Departemen Pendidikan Nasional, (2006) which defines five competences in mathematics learning: 1) mathematical problem solving, 2) mathematical communication, 3) mathematical reasoning, 4) mathematical connections, and 5) mathematical representation. By developing mathematical literacy skills, students are better equipped to apply mathematics to real-life situations.

The development of instruments to assess students' mathematical literacy skills is highly necessary, as emphasized by Apriatni et al., (2022), because these skills are evaluated internationally through the programmed for International Student Assessment (PISA). According to Sutrimo et al., (2024), based on the latest PISA 2022 result, the average mathematics score of Indonesian students declined from 397 in 2018 to in 2022. Alarmingly, only 18% of Indonesian student reached level 2 out of 6 in mathematics proficiency. This data is supported by field observations, which show that students' mathematical literacy skills remain suboptimal. During classroom instruction, and they often prioritize multiple-choice question. As a result, miscommunication frequently occurs regarding the use of formula and mathematical operations.

It should be noted that the basis of the questions provided by PISA is often far removed from the habits and experiences of students in Indonesia (Aliah & Bernard, 2020). Therefore, it is necessary to develop mathematical literacy through questions that incorporate familiar habits, cultural elements, or traditional games (Widiantari et al., 2022) that students can relate to because they are commonly encountered in everyday life. The presentation of mathematical problems aimed at measuring or even improving mathematical literacy should consider students' daily life backgrounds (Ainun Fajriah & Nur, 2021). Therefore, the development of this instrument is highly appropriate if it presents an ethnomathematical context related to the Indonesian traditional game of *Engklek*.

According to (Febriyanti et al., 2018), the Indonesian traditional game of *Engklek* is one of the most well-known traditional games in Indonesian, especially in real communities. *Engklek* can be found in various regions of Indonesia, such as Sumatra, Java, Bali, Kalimantan, and Sulawesi. It has different names in each region. In java, it is commonly called *Engklek*, and it is generally played by women. The game Involves drawing a shape (a flat geometric figure) on the ground and using a pebble or shard to mark territory. The more areas a player controls, the closer they are to winning, and once all the lines have been conquered, the game is considered complete. The use of the Indonesian traditional game *Engklek* serve as reference for developing a test instrument consisting of seven story-based items. Moreover, *Engklek* can be explored through the lens of ethnomathematics, as it represents symbolic systems shaped by social and cultural processes ((D'Ambrosio, (2020); Akbar et al., (2023).

The exploration of the Indonesian traditional game *Engklek* in mathematics lies in the geometry element of flat shapes, which is derived from the patterns of the game's drawings on the ground. Fauziah et al., (2020) stated that the flat shapes found in the *Engklek* game include circles, squares, rectangles, trapezoids, and equilateral triangles. The development of mathematical literacy instruments will focus on story problems related to the *Engklek* game, especially the

mountain *Engklek* and propeller *Engklek* variations, which align with the research objectives namely, to develop instruments for assessing students' mathematical literacy using games that are familiar and often played, thus connecting with students' habits and backgrounds.

Based on the results of research conducted Monica et al., (2022) at SMP Negeri 1 Rangkasbitung, the test instruments used to measure literacy skills met the criteria for accuracy in the material on flat and spatial shapes. The research involved 30 students as subjects, and the developed instruments were declared valid and reliable, with a reliability score of 0.773, indicating a high level of reliability. Therefore, we as researchers are motivated to conduct a study on student's mathematical literacy skills by integrating the ethnomathematics of Indonesian traditional game *Engklek*.

This research will be very beneficial for teachers, students, schools, and Indonesian education in the international arena. The development of test instruments based on problems derived from Indonesian culture is expected to influence students' ability to answer each question, thereby revealing their mathematical literacy skills. Moreover, this practice should be consistently continued by teachers in every mathematics topic so that students become accustomed to solving problems that emphasize not only the use of formulas but also calculations and the interpretation of results.

METHOD

This research is a type of development research or Research and Development (R&D) using the 4D model (Define, Design, Develop, Disseminate) developed by Sivasailam Thiagarajan et al. The developed instrument will be tested on grade 7 and grade 8 junior high school students from various schools selected randomly, in order to measure mathematical literacy skills using questions that have been developed and validated by experts.

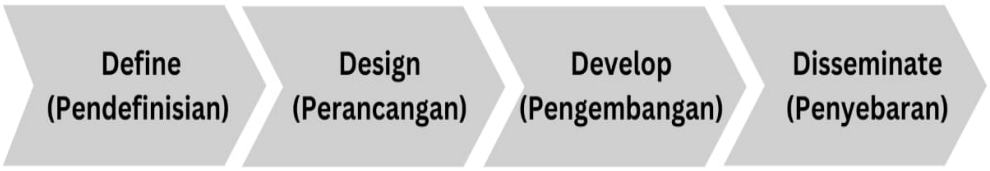


Figure 1. Design of 4D Stages

At the development stage of this research, the test instrument based on the exploration of the Indonesian traditional game *Engklek* designed to assess students' mathematical literacy skills on flat shapes will be analyzed using a validity test and a student response questionnaire administered after they have completed the developed test instrument. The validity test was conducted in two stages, namely theoretical validity and empirical validity.

The theoretical validity test in this study was carried out by two experts, namely one mathematics teacher from SMPN 2 Cikancung and one from MTs Mutiara Bangsa. In addition, testing was conducted on students to determine their responses to the developed test items. Data were collected using a Likert Scale modified to a range of 1-4 by eliminating the neutral score to avoid data bias.

Data analysis employed descriptive statistics by calculating the percentage of positive response frequencies. In this study, positive responses refer to students' answers categorized as Agree and Strongly Agree for positive statement, or Disagree and Strongly for negative statement.

$$FS = \frac{p}{n \times \sum Q} \times 100\%$$

FS = frequency percentage/percentage of positive response frequency
p = the number of positive responses
n = total respondents
$\sum Q$ = the number of items in each indicator
After calculating the frequency of positive responses for each indicator assessed by experts on the developed test instrument, the next step is to interpret the results based on the following criteria:

Table 1. Positive Response Frequency Interpretation

Percentage	**Criteria**
0 – 20	Very Low
21 – 40	Low
41 – 60	Medium
61 - 80	High
81 – 100	Very High

The content validity and empirical validity tests, based on the formula proposed by Setiawan et al., (2017), are as follows:

$$V_a = \frac{TS_e}{TS_h} \times 100\%$$

$$r_{xy} = \frac{n\sum xy - (\sum x)(\sum y)}{\sqrt{\{(n\sum x^2) - (\sum x)^2\}\{(n\sum y^2) - (\sum y\}}}$$

Description:

V_a = Validity
TS_{eb} = Total Score of Validation Results
TS_h = Total Maximum Expected Score
r_{xy} = Correlation Index
n = Many Students
x = Score for each question
y = Total Score

With the score assessment criteria:

Table 2. Empirical Validity Interpretation

Value r_{xy}	**Interpretation**
$0{,}80 < r_{xy} \leq 1{,}00$	Very high validity
$0{,}60 < r_{xy} \leq 0{,}80$	High validity
$0{,}40 < r_{xy} \leq 0{,}60$	Medium validity
$0{,}20 < r_{xy} \leq 0{,}40$	Low validity
$0{,}00 < r_{xy} \leq 0{,}20$	Very low validity

After the validity test is carried out, the next stage in the development step is the reliability test with the following formula:

$$r_{11} = \left[\frac{k}{k-1}\right]\left[1\frac{\sum s_i^2}{s_{t^2}}\right]$$

Description:

r_{11} = reliability coefficient

K = number of items

$\sum s_i^2$ = the sum of the variance of the scores of each item

s_{t^2} = variance shoes total

Table 3. Criteria for Interpretation of Problem Reliability

Value r_{xy}	Interpretation
r_{11} < 0,20	Very low reliability
0,20 ≤ r_{11} < 0,40	Low reliability
0,40 ≤ r_{11} < 0,70	Medium reliability
0,70 ≤ r_{11} < 0,90	High reliability

RESULTS AND DISCUSSION

Results

Define

The use of textbook materials and the practice questions contained within them tends to prioritize descriptive-type questions. However, the general nature of these questions often makes it difficult for students to analyze them effectively. Therefore, it is necessary to develop a test instrument that helps student grasp the essence of the questions, as well as improve and measure their mathematical literacy skills. In addition, problem visualization is needed to support students an analyzing question related to the exploration of the Indonesian traditional game *Engklek*, which is integrated with material on the area and perimeter of plane figure serving as a foundation and key indicators of mathematical literacy skills in development of his test instrument.

Design

Based on the result of defining the development of the test instrument, the design of the research product is as follows:

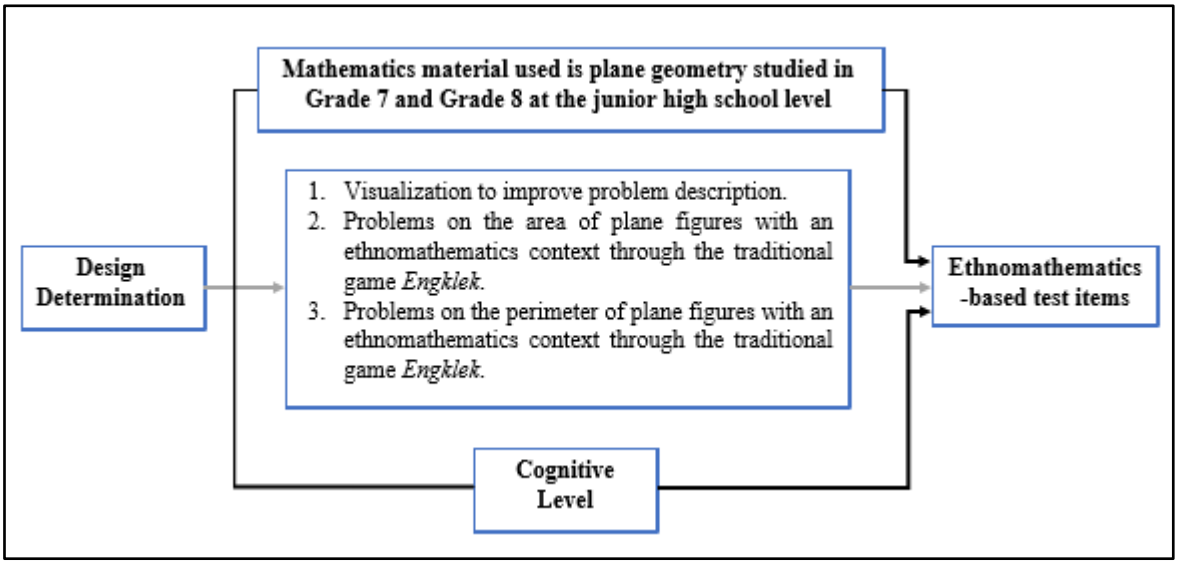


Figure 2. Instrument Test Development Structure

Blue arrows indicate the result of information gathering, while black arrows represent findings from literature studies. By designing the test instrument as shown in Figure 2 and 3, it is expected that the instruments will include visual stimuli that precede the reading tasks. There are aligned with the indicators of students' mathematical literacy skills, even though the problems are presented within an ethnomathematics context. The layout of the questions can be seen in the figure below:

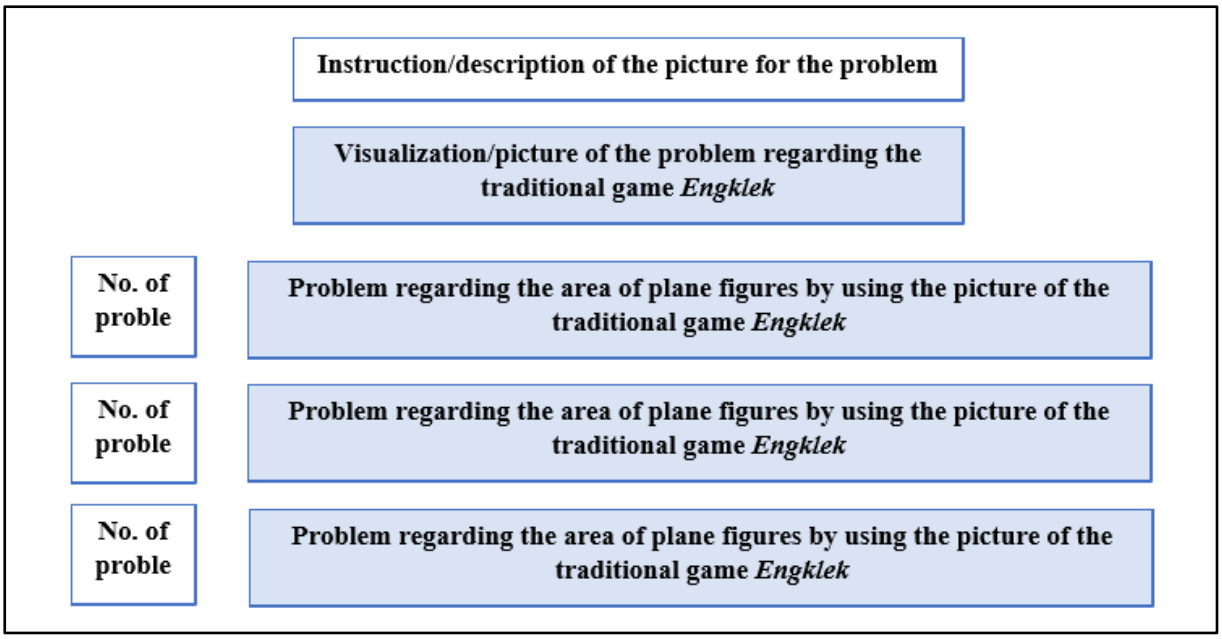
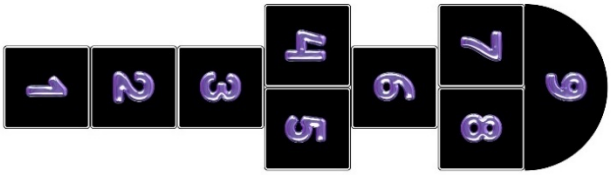
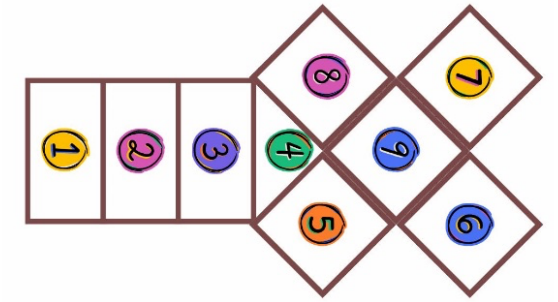


Figure 3. Problem Presentation Layout

Develop

The following are examples of questions from the mathematical literacy test instrument:

Tabel 4. Sample Test Items in the Context of *Engklek*

Context of Engklek	**Sample of the Items Used**
Figure for Questions 1–3 	In the afternoon, Nur and Elsa were drawing geometric shapes for the traditional game Engklek Gunung. Nur suggested making the figure as shown above. If Elsa constructs half of the mountain with a diameter of 26 cm, what is the area of one of the rectangles in the game?
Figure for Questions 4–7 	On the following day, Nur and Elsa played Engklek again using the windmill pattern, which consists of triangles, squares, and rectangles. If the width of the rectangle is the same as the side length of the square, and the area of one rectangle in the pattern is 84 cm², calculate the total area of all the shapes in the Engklek Windmill pattern!

The feasibility validation test of the test instrument can be seen in the following table:

Table 5. Validation Score Interpretation Criteria

Validations	**Aspects**	**Frekuenci Percentage**	**Criteria**
Validator	Clarity of Instrument	75%	Feasible
	Use of Images	80%	Feasible
	Diversity of Questions	67%	Feasible
	Level of Difficulty	67%	Feasible
	Application of Mathematical Concept	80%	Feasible
	Opportunity for Reasoning	75%	Feasible

Table 5 presents the results of expert validation of the test instrument, where the outcomes of each aspect indicate the feasibility of the developed instrument. Based on the obtained percentage, it can be concluded that the instrument is feasible for use. Subsequently, a limited trial was conducted by distributing student response questionnaires for individual analysis of the test instrument. The results are presented in the following table:

Table 6. Percentage of Student Response Questionnaire to the Test Instrument

Statement Number	**Frekuenci Percentage**	**Description**
Statement 1	74%	Feasible
Statement 2	66%	Feasible

Statement 3	68%	Feasible
Statement 4	66%	Feasible
Statement 5	66%	Feasible
Statement 6	53%	Feasible
Statement 7	68%	Feasible
Statement 8	50%	Feasible
Statement 9	66%	Feasible
Statement 10	76%	Feasible

Student' responses to the given instrument varied across each statement, consisting of five positive statements and five negative statements. The frequency of student responses showed that eight items were interpreted as positive and two items were interpreted as fair. Based on the average calculation of all student responses, it can be concluded that students' responses to this test instrument were interpreted as feasible, with a percentage of 65%.

The next stage involves conducting an empirical validation test and a reliability test on the questions, which were administered to a limited group of students. The data are presented in the table as follows:

Table 7. Empirical Validity Test Result

Item	R count	R table	Description
Question 1	0,461122	0,32	Valid
Question 2	0,656661	0,32	Valid
Question 3	0,587372	0,32	Valid
Question 4	0,161723	0,32	Invalid
Question 5	0,630996	0,32	Valid
Question 6	0,412483	0,32	Valid
Question 7	0,692779	0,32	Valid
Means R count	0,514733714		Valid

Table 7 indicates that the validity test of the develop test instrument shows that, out of the seven items constructed, one item was found to be invalid. This item cannot be used to assess students' mathematical literacy skills on the topic of plane figure; however, it may be utilized after revising the errors identified on the invalid item.

Table 8. Reliability Test Result

Formulate	Result
K	7
k-1	6
Number of Variants	6,162162
Total Variants	28,88205

Reliability	0,786644

Table 8 present the reliability data of the instrument under development. The result shows a reliability value of 0,786644, which is interpreted as very high reliability. Although the empirical validation indicated that one item was invalid, the reliability test demonstrated a high interpretation. Therefore, it can be concluded that each item develop can be used to assess students' mathematical literacy skills on the topic of plane figures; however, the administration of the invalid item should be carried out with caution.

Dissemination

At this stage, the researcher conducted a limited distribution tailored to the research needs. The test instrument was distributed to several schools, including MTs Nurul Huda, MTs Mutiara Bangsa, MA Al-Ikhlas, SMP Ma'arif, dan SMPN 1 Ngamprah, by administering response questionnaires to analyze the given test instrument.

Discussions

Based on the example of the test instrument in Table 4, two experts or mathematics teachers were asked to serve as validators for the questions developed. This was done to provide additional evidence that the test instrument has been reviewed and approved by education professionals, thereby increasing students' confidence in the accuracy and fairness of the test. Furthermore, an analysis was conducted on student responses across all six aspects, the instrument was deemed feasible and valid. Therefore, it can be concluded that the development of a mathematical literacy yest instrument with an ethnomathematics context specifically in the Indonesian traditional game of *Engklek* can be used to measure students' mathematical literacy skills. It should be noted that the validators also provided written feedback regarding their assessment of the test instrument, which is presented as follows:

Table 9. Percentage of Student Response Questionnaire to the Test Instrument

Aspect	Assessment	Suggestions/Advice
Clari of Instructions	The instruction provide in the problems are sufficiently detailed and include the steps students need follow	Some instructions may be confusing if students are unfamiliar with the context of the *Engklek* game. The use of mathematical terms should be emphasized to avoid ambiguity
Use of Images	The images used are relevant to the problems and help visualize the tasks to be completed	Images could be clarified further with markings or annotations to assist students in understanding each part of the image related to the problem.
Soundness of Questions	The problems are sufficiently diverse, covering a range of mathematical concept such as area, perimeter, and geometric shapes	The variety of problems could be enhanced by including additional mathematical concepts or by gradually increasing the level of complexity.
Difficulty Level	The problems are organized with varying levels of difficulty, ranging from simple to more complex.	The level of difficulty could be better adapted to different students' abilities. Some questions may be too challenging and may require adjustments to ensure accessibility to all students.

Application of Mathematical Concepts	The problems effectively apply mathematical concepts to real life contexts, especially through traditional games.	No significant weaknesses were identified in this aspect.
Opportunity for Reasoning	The problems provide opportunities for student to engage in mathematical reasoning and problem solving	Some questions could be revised to further challenge students and encourage the development of logical reasoning skills

Table 9 presents the rationale provide by the validator for their evaluations and the suggestions given for the test instrument development Agustiani et al., (2022). Based on the validators review, it can be concluded that the development of the test instrument on mathematical literacy skills within the ethnomathematics context of the Indonesian traditional game *Engklek* has a high validity score, and is categorized as highly feasible.

Table 7 presents the result of the empirical validation test and shows that one item falls into the invalid category, as its r-count value is lower than the predetermined r-table value. The low r-count value is attributes to students' perceptions that the given item was difficult to comprehend and even more challenging to solve. Students' understanding when reading the item naturally varies, which in turn leads to diverse evaluations of each question. However, since one item was found to be invalid, it cannot be used to assess students' mathematical literacy skills unless it undergoes revision. Meanwhile, Tabel 8 presents the reliability data of the test instrument, which is categorized as high. Therefore, the "The Development of Mathematical Literacy Instrument: A Case on 'Engklek' The Indonesian Traditional Game" has been tested in terms of both validity and reliability.

Consistent with the study conducted by Jafirah et al., (2024) entitled "Pengembangan Tes Formatif Matematika Materi Bangun Ruang Sisi Lengkung Berbasis Etnomatematika untuk SMP", the results of the validation and reliability indicate that the items proven to have valid interpretations can be utilized continuously or repeatedly to assess students' mathematical literacy skills as well as learning competencies in plane geometry material.

Table 6 shows of students responded feasibly Sukmawati et al., (2022) to the developed test instrument. Based on the data in Table 2 and Table 4, it can be concluded that the development of this test instrument has been comprehensively evaluated, both by teachers as validators or experts and by student as subjects in the limited trial of the study titled "The Development of Mathematical Literacy Instrument: A Case on 'Engklek' The Indonesian Traditional Game"

Student responses to the test instrument are important to consider Iqrima et al., (2023), as student involvement in the development process can, increase motivation and a sense of ownership over the evaluation outcomes. Students who feel that their opinions and input are valued tend to have a more positive perception of the test, which can, in turn, enhance their mathematical literacy skills. Therefore, involving students in the development and refinement of test instrument is a crucial step in creating a more effective and student-centered evaluation system.

The resulting test instrument consists of written questions on the topic on geometry specifically flat shapes, aimed at measuring junior high school students' mathematical literacy skills. This instrument can be used for both evaluation purposes and for training students to thing at a higher cognitive level in relation to mathematical literacy. The use of such test instruments should align with instructional strategies designed by the teacher to enhance students' mathematical literacy skills. This is in line with the findings of in their study entitled Lestari & Effendi, (2022)

"Analysis of Mathematical Literacy Skills of Junior High School Students on Flat Shapes Material". Their study concluded that, after analyzing and identifying student responses, most students demonstrated mathematical literacy skills at a sufficient level, indicating a need for further improvement. Therefore, the development of questions and instructional strategies is necessary to enhance students' mathematical literacy,

CONCLUSION

This study developed seven mathematical literacy test instruments within the context of ethnomathematics, specifically the traditional Indonesian game Engklek. Theorical validation by experts demonstrated that all test items met the criteria of being "feasible" in items of clarity of the mathematical concepts, and opportunity for reasoning. Students' responses to the developed test instruments indicated a high level of positive reception, suggesting that test instruments indicated a high level of positive reception, suggesting that test items incorporating ethnomathematical contexts of traditional games are effective in attracting students' interest in learning. Empirically, six test items were found to be valid, while one item (number 4) did not meet the empirical validity criteria. Nevertheless, the reliability analysis showed that the instruments as a whole achieved a very high level of consistency, ensuring strong reliability and dependable accuracy. Therefore, the mathematical literacy test in the context of the traditional Indonesian ethnomathematical game Engklek in considered suitable for use in mathematics learning, with the recommendation that the invalid item be revised or replaced. This study contributes to the development of culturally based innovative instruments, which may serve a reference in the teaching and learning process, both as an evaluation tool and as a stimulus at the beginning of instruction. Future research is expected to expand the diversity of contexts in developing test instrument and to conduct large-scale trials in order to more comprehensively assess students' mathematical literacy skills.

REFERENCES

Agustiani, N., Setiani, A., & Lukman, H. S. (2022). Pengembangan instrumen tes PLSV berdasarkan indikator berpikir kritis dan pemecahan masalah. *Jambura Journal of Mathematics Education*, *3*(2), 107–119. https://doi.org/10.34312/jmathedu.v3i2.15837

Ainun Fajriah, N., & Nur, F. (2021). Efektivitas penerapan model pembelajaran accelerated learning cycle dengan pendekatan visualisasi terhadap kemampuan literasi matematis ditinjau dari mathematical habits of mind. *Jurnal Cendikia: Jurnal Pendidikan Matematika*, *5*(2), 1626–1639. https://doi.org/https://doi.org/10.31004/cendekia.v5i2.634

Akbar, A., Herman, T., & Suryadi, D. (2023). Exploration of phinisi psip components as a source for learning elementary school geometry: Ethnomathematics study. *Prisma Sains: Jurnal Pengkajian Ilmu Dan Pembelajaran Matematika Dan IPA IKIP Mataram*, *11*(4), 1018–1027. https://doi.org/https://doi.org/10.33394/j-

Aliah, S. N., & Bernard, M. (2020). Analisis kesulitan siswa dalam menyelesaikan soal pemecahan masalah berbentuk cerita pada materi segitiga dan segiempat. *Suska Journal of Mathematics Education*, *6*(2), 111–118. https://doi.org/10.24014/sjme.v6i2.9325

Amelia, I., Syamsuri, Anwar Hadi Firdos Santosa, C., & Fatah, A. (2022). Meta analisis: Pengaruh model pembelajaran terhadap kemampuan literasi matematis siswa. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, *6*(2), 1720–1730. https://doi.org/https://doi.org/10.31004/cendekia.v6i2.1410

Apriatni, S., Yuhana, Y., & Sukirwan, S. (2022). Pengembangan instrumen literasi numerasi materi trigonometri kelas X SMA. *EDU-MAT: Jurnal Pendidikan Matematika*, *10*(2), 185–198. https://doi.org/10.20527/edumat.v10i2.13720

D'Ambrosio, U. (2020). In my opinion: What is ethnomathematics, and how can it help children in schools? *Teaching Children Mathematics*, *7*(6), 308–310. https://doi.org/10.5951/tcm.7.6.0308

Departemen Pendidikan Nasional. (2006). *Peraturan menteri pendidikan nasional republik Indonesia*. https://sma.kemendikbud.go.id

Fauziah, A., Erawati, E., & Annisa, C. (2020). Engklek gen 4.0 (studi etnomatematika: Permainan tradisional engklek sebagai media pembelajaran matematika). *Factor M: Focus Action Of Research Mathematic*, *3*(1), 33–48. https://doi.org/10.30762/f_m.v3i1.2499

Febriyanti, C., Prasetya, R., & Irawan, A. (2018). Etnomatematika pada permainan tradisional engklek dan gasing khas kebudayaan Sunda. *Barekeng: Jurnal Ilmu Matematika Dan Terapan*, *12*(1), 1–6. https://doi.org/10.30598/vol12iss1pp1-6ar358

Humaidi, H., Qohar, A., & Rahardjo, S. (2021). Respon siswa terhadap penggunaan video Youtube sebagai media pembelajaran daring matematika. *JIPM (Jurnal Ilmiah Pendidikan Matematika)*, *10*(2), 153–162. https://doi.org/10.25273/jipm.v10i2.9108

Iqrima, Zulkarnain, I., & Kamaliyah. (2023). Soal matematika dalam materi statistika berbasis etnomatematika untuk mengukur literasi matematis siswa. *PLUS MINUS: Jurnal Pendidikan Matematika*, *1*, 39–50. https://doi.org/https://doi.org/10.31980/plusminus.v3i1.1221

Jafirah, S., Fajriah, N., & Suryaningsih, Y. (2024). Pengembangan soal literasi matematika dengan konteks etnomatematika pada pasar terapung untuk siswa tingkat SMP/MTs. *EDU-MAT: Jurnal Pendidikan Matematika*, *12*(2), 393–403. https://doi.org/10.20527/edumat.v12i2.19007

Jumarniati, Baharuddin, M. R., & Firman, S. (2021). Deskripsi kemampuan literasi matematis pada materi aritmatika sosial berdasarka gender. *EQUALS: Jurnal Ilmiah Pendidikan Matematika*, *4*(2), 123–132. https://doi.org/https://doi.org/10.46918/equals.v4i2.1094

Lestari, R. D., & Effendi, K. S. N. (2022). Analisis kemampuan literasi matematis siswa SMP pada materi bangun datar. *Biomatika: Jurnal Ilmia Fakultas Keguruan Dan Ilmu Pendidikan*, *8*(1), 63–73. https://doi.org/https://doi.org/10.35569/biormatika.v8i1.1221

Mauleto, K. (2019). Analisis kemampuan pemecahan masalah ditinjau dari indikator NCTM dan aspek berpikir kritis matematis siswa di kelas 7B SMP Kanisius Kalasan. *Jurnal Ilmiah Pendidikan Matematika*, *4*(2), 125–134. https://doi.org/https://doi.org/10.26877/jipmat.v4i2.4261

Monica, S. S., Pamugkas, A. S., & Jaenudin, J. (2022). Instrumen literasi matematika model PISA dengan konteks budaya Baduy pada tingkat SMP. *Jurnal Educatio FKIP UNMA*, *8*(4), 1459–1470. https://doi.org/10.31949/educatio.v8i4.3839

NCTM. (2000). *Executive summary principles and standards for school mathematics overview*. Reston VA : NCTM. https://www.nctm.org/Standards-and-Positions/Primciles-and-Standards/

Setiawan, A., Suhandi, A., Kaniawati, I., & Hanisa Putri, D. (2017). Keterampilan pemecahan masalah mahasiswa dalam pembelajaran bandul fisis menggunakan model problem solving virtual laboratory. *Jurnal Pendidikan Fisika Dan Teknologi*, *3*(2), 164–172. https://doi.org/https://doi.org/10.29303/jpft.v3i2.396

Sukmawati, D., Anggoro, B. S., & Pratiwi, D. D. (2022). Pengembangan instrumen evaluasi literasi matematis berdasarkan perspektif multiple intelligences berbasis etnomatematika pada budaya Jawa. *Jurnal Educatio FKIP UNMA*, *8*(4), 1215–1226. https://doi.org/10.31949/educatio.v8i4.3172

Sutrimo, M. S., Sajdah, S. N., Sinambela, Y. V. F., & Bagas, R. (2024). Peningkatan literasi numerasi melalui model pembelajaran dan hubungannya dengan kemampuan self-efficacy: Systematic literatur review. *JPMI (Jurnal Pembelajaran Matematika Inovatif)*, *7*(1), 61–72. https://doi.org/10.22460/jpmi.v7i1.21650

Widiantari, N. K. K., Suparta, I. N., & Sariyasa, S. (2022). Meningkatkan literasi numerasi dan pendidikan karakter dengan e-modul bermuatan etnomatematika di era pandemi COVID-19. *JIPM (Jurnal Ilmiah Pendidikan Matematika)*, *10*(2), 331–343. https://doi.org/10.25273/jipm.v10i2.10218