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Using Mathematical Poetry to Enhance Students' Interest in Learning Mathematics by Leveraging Linguistic Intelligence

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Abstract: Using Mathematical Poetry to Enhance Students' Interest in Learning Mathematics by Leveraging Linguistic Intelligence. Objective: Mathematics is often perceived as challenging and anxiety-inducing, leading to low student interest and motivation. This study explores the potential of mathematical poetry as a teaching material to enhance students' interest in learning mathematics by leveraging linguistic intelligence. Linguistic intelligence, which involves the effective use of language, has been shown to positively influence mathematical understanding and problem-solving abilities. **Methods:** This study used a mixed-method approach with a sequential explanatory design involving 65 junior high school students from various schools in Indonesia. A mathematical poetry e-book was developed and validated as a teaching tool, followed by the distribution of learning interest questionnaires and interviews to collect data on student engagement. **Findings:** The findings indicate that using mathematical poetry significantly increased students' interest in learning mathematics, with the overall interest level being very high. The poetry's ability to convey emotions and vivid imagery through linguistic elements such as diction, figures of speech, and thematic depth played a crucial role in capturing students' attention and fostering a positive learning environment. Students expressed excitement, joy, and a deeper connection to the material when mathematical concepts were presented through poetry. However, the study also noted that the effectiveness of this approach varies depending on students' linguistic intelligence, with some students needing more language skills to connect with the material. **Conclusion:** The study concludes that integrating mathematical poetry into mathematics teaching can be an innovative and effective strategy to enhance students' interest and motivation, ultimately improving their mathematical abilities. Further research is recommended to explore the long-term impact of this approach and its applicability across different educational contexts.

Keywords: students' learning interest, mathematical poetry, linguistic intelligence.

▪ INTRODUCTION

Mathematics is often considered one of the most challenging and anxiety-inducing subjects among students (Lee, Tu, Chen, & Lin, 2023; Wang, Perry, Malpique, & Ide, 2023). The common perception that mathematics is a complex and tedious subject has resulted in students' low learning interest and motivation (Azmidar, Darhim, & Dahlan, 2017; Otoo, Iddrisu, Kessie, & Larbi, 2018). Learning interest is an essential factor influencing students' academic achievement (Mazana, Montero, & Casmir, 2019). High interest in learning mathematics can increase students' effort and persistence in learning mathematics, improving students' academic achievement (Harackiewicz, Smith, & Priniski, 2018). In addition to impacting cognitive achievement, learning interest can also enhance students' affective skills, such as positive attitudes toward learning and satisfaction (Renninger & Hidi, 2016). Therefore, increasing interest in learning becomes a significant challenge. According to the characteristics of the students, an innovative and exciting teaching approach is needed to overcome this challenge.

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Student characteristics can be seen in various ways, one of which is the intelligence possessed by students. Intelligence is often defined as learning from experience, adapting to new situations, understanding and applying knowledge to solve problems, and using cognitive skills to process information (Gardner, 1983; Sternberg, 1985). Furthermore, Gardner identified the uniqueness of student intelligence, which is multiple intelligences. Multiple intelligences are finding and solving problems and creating valuable products in one's culture. So, they cannot be measured using standard psychological test results such as IQ tests (Gardner, 1983; Gardner, 2006). Multiple intelligences consist of eight types of intelligence, including linguistic intelligence.

Linguistic intelligence is the ability to use words or language effectively, both orally and in writing, such as telling stories, liking to read, and being good at putting words together (Gardner, 1983; Gardner, 2006). A person with dominant linguistic intelligence is usually seen from their habits of writing in their spare time, making up stories, making up imaginary scenarios, telling jokes, quickly remembering small things, liking to read books, spelling words, liking rhymes, poetry, and various word games, liking to hear words orally, having a vast vocabulary, and excelling in school subjects that involve reading or writing (Hambrick, Burgoyne, & Altmann, 2020; Suarca, Soetjiningsih, & Ardjana, 2016). Though closely related to the use of language, linguistic intelligence is also vital in learning mathematics.

Several studies have shown a significant relationship between linguistic intelligence and mathematical ability. Linguistic intelligence is positively correlated with logical-mathematical intelligence in elementary school students, with language skills aiding in understanding mathematical language and problem-solving (Megawanti & Septiani, 2020). Likewise, linguistic intelligence has shown a consistent relationship with mathematical problem-solving ability, as it involves discursive skills essential for understanding and expressing mathematical concepts (Darwis, Mashuri, Tahmir, & Talib, 2024). Studies have shown that students with linguistic intelligence can identify the mathematical aspects of a problem, translate questions into mathematical language, and develop solution strategies. However, they may need help reinterpreting the results in a real-world context (Kurniawati & Kurniasari, 2019). Furthermore, linguistic intelligence has been shown to significantly influence students' mathematical connection skills when solving open-ended trigonometry problems, accounting for 38.13% of the performance variance (Fitriani, Rohman, & Cahyono, 2018). Other studies show that students with low number sense abilities are unable to write down the information given in the problems presented, which means that the information is not fully understood, causing errors in problem-solving (Arjudin, Turmuzi, Kurniati, & Wulandari, 2020). Understanding the information in the problems presented is related to students' linguistic intelligence. These findings highlight the importance of linguistic skills in various mathematical abilities. Therefore, linguistic intelligence-based mathematics teaching materials are needed to support the improvement of students' mathematical skills. Increased mathematical abilities can improve students' interest in learning mathematics because the stigma of the difficulty of mathematics is slowly fading.

One promising approach is the use of mathematical poetry as a teaching material. Mathematical poetry is poetry that makes mathematics the main subject, poetry that applies mathematical imagery to something that is not mathematical, or poetry whose structure is inspired by mathematics (Emmons, 2017). With its beautiful and meaningful

nature, poetry can stimulate students' linguistic intelligence and make learning mathematics more enjoyable and easier to understand (Budinski & Lavicza, 2020). Mathematical projects using poetry can facilitate the transition between story problems and mathematical models, design class participation, and introduce new concepts interestingly (Glaz, 2011). The integration of poetry in mathematics learning has been done several times, including asking students to write poetry related to the material for one school year to produce a book (Negrerie, 2015) and developing mini-learning around mathematical content using poetry (Karaali & Lesser, 2020) which showed positive results in changing students' perceptions of mathematics.

Several studies have demonstrated that incorporating art into learning can increase students' interest and comprehension. For example, research by Harackiewicz et al. (2016) showed that students' interest in subjects can be increased by combining emotional and cognitive aspects. In addition, using poetry in mathematics learning is efficacious in improving understanding of basic mathematical concepts (Whitin & Within, 2000). It improves students' mathematics learning outcomes (Mumtazah, Bistari, & Hartoyo, 2023). However, studies on using mathematical poetry as a teaching material that focuses on linguistic intelligence to increase interest in learning mathematics still need to be completed. Therefore, this study aims to explore and comprehensively describe students' interest in learning mathematics when using mathematical poetry. Thus, effective and enjoyable teaching methods can be found, which can enhance students' interest and achievement in mathematics.

▪ METHOD

Research Design and Procedure

This study uses a mixed method. This type of research is used because the researcher wants to explore and describe the learning interests of research participants when using mathematical poetry in mathematics learning. Questionnaires are distributed to as many participants as possible to generalize the results. Mixed method research is an approach that combines qualitative and quantitative research methods. The research design used is Sequential Explanatory Design, where quantitative methods are used to compile instruments and present data, and qualitative methods are used to analyze data and draw conclusions. Sequential Explanatory Design is a type of mixed-method research design with quantitative data collection and analysis carried out first. The results of the quantitative analysis are then followed by qualitative data collection and analysis. This design is used because this study aims to explore students' learning interests using mathematical poetry that utilizes linguistic intelligence. The results of this study can be the basis for developing a new theory about mathematical poetry that can increase students' learning interests.

The stages of implementing the research carried out are as follows: (1) developing quantitative instruments in the form of questionnaires; (2) conducting expert validation; (3) distributing questionnaires to junior high school students as research participants; (4) collecting quantitative data based on questionnaires; (5) conducting descriptive statistical analysis on the collected data; (6) presenting data in the form of tables and diagrams; and (7) conducting interviews with selected participants; (8) conducting in-depth analysis to understand the context, reasons, and factors influencing quantitative findings.

Participants

This research involved 65 junior high school students from 11 different schools. The participants were selected using multistage sampling, which was carried out by randomly selecting participants in several cities in several provinces in Indonesia. Then, at the interview stage, several participants with different interest levels in learning, namely very high, high, and low, were selected.

Instruments

The research used three instruments, which were non-test instruments: a language and literature validation questionnaire, student interest in learning questionnaire, and an interview guide. The instruments used in this study were developed by researchers and validated by experts. Before being used, this language and literature validation questionnaire was first validated by three expert lecturers in mathematics education at Universitas Tanjungpura so that each statement item represents the information to be obtained and all statements in the questionnaire can represent the validity of the language and literature validation questionnaire. The language and literature validation questionnaire validated the suitability of the mathematical poetry e-book for linguistic intelligence in mathematics learning. The linguistic intelligence validation questionnaire contains nine statements in Table 1 below.

Table 1. The language and literature validation questionnare

No	Criteria
1.	The language used is by EYD
2.	The language used can clarify the material being studied
3.	Accuracy in the use of diction
4.	Depth of poetry imagination
5.	Depth of poetry imagination
6.	Accuracy in the use of figures of speech
7.	The depth of feeling that the reader feels when reading poetry
8.	The poetry presented can describe the material being studied
9.	The message implied in the poem

The language and literature validation questionnaire are filled out using a 1—5 Likertscale format with the following criteria: means very bad, 2 means bad, 3 means less good, 4 means good, and 5 means very good (Widoyoko, 2017). The scores obtained are calculated on average and then interpreted according to criteria, as in Table 2 below.

Table 2. The criteria for linguistic and literary validity in mathematical poetry

Score (x)	Validity Criteria
$4.2 < x \leq 5.0$	Very good
$3.4 < x \leq 4.2$	Good
$2.6 < x \leq 3.4$	Less good
$1.8 < x \leq 2.6$	Bad
$1.0 < x \leq 1.8$	Very bad

The student interest in learning questionnaire used is a structured questionnaire with nine statements containing four indicators of interest in learning, namely: (1) feeling

happy; (2) excitement; (3) attention; and (4) involvement ("Role Interes. Learn. Dev.," 1992) Before being used, the student interest in learning questionnaire was first validated by two expert lecturers in mathematics education at Universitas Tanjungpura dan Universitas Pendidikan Indonesia so that each statement item represents the information to be obtained and all statements in the questionnaire can represent the validity of the student interest in learning questionnaire. The statement items for each indicator are distributed in Table 3 below.

Table 3. The distribution of statement items according to indicators of learning interest

Indicator	Statement Item
Feeling happy	I feel happy when learning mathematics using mathematical poetry
	Mathematical poetry made a memorable impression on me when studying mathematics
Attention	It was easier for me to understand the material using the mathematical poetry e-book
	The mathematical poetry presented can increase my curiosity as student
Excitement	Mathematical poetry makes the presentation of line and angle material more interesting
	I think mathematical poetry is exciting
	The mathematical poetry presented can increase my curiosity as a student
Involvement	Example questions are easy to understand
	If possible, I want to write mathematical poetry that explains mathematical material.

Participants responded to the statement items by giving numbers 1—4 with details: 1 indicates strong disagreement, 2 indicates disagreement, 3 indicates agreement, and 4 indicates strong agreement. The resulting score is then calculated by dividing the score obtained by the maximum score and multiplying it by 100 to determine the level of learning interest. The level of interest in learning mathematics when using mathematical poetry is demonstrated in Table 4 below.

Table 4. Students' level of learning interest in mathematics

Skor (x)	Tingkatan
$81.25 < x \leq 100$	Very high
$62.5 < x \leq 81.25$	High
$43.75 < x \leq 62.5$	Low
$25 < x \leq 43.75$	Very low

After completing the questionnaire, interviews were conducted with several participants with different levels of learning interest. The interviews were unstructured based on the participants' responses to the mathematics interest questionnaire.

Data Analysis

Data analysis was conducted using descriptive techniques. Scores from the learning interest questionnaire were analyzed for each indicator and as a whole. Interview data

were summarized and then used to support the analysis of data obtained from the questionnaire.

This qualitative data analysis was validated using method triangulation techniques. Method triangulation involves the use of a combination of quantitative and qualitative methods in one study. By combining various methods, researchers can evaluate whether data and findings obtained through one method are supported by data and conclusions obtained through other methods. This study used a quantitative survey to measure participants' general perceptions of interest in learning mathematics when using mathematical poetry, then used qualitative interviews to dig deeper into the reasons behind these perceptions and their relationship to linguistic intelligence. The steps taken in qualitative data analysis are data collection, reduction, presentation, and conclusion (Miles, Huberman, & Saldana, 2014).

Qualitative data was collected using: (1) analysis of language and literary validity documents and the results of student learning interest questionnaires; and (2) interviews. The data that had been collected was then reduced with the aim of filtering and simplifying relevant data so that it was easier to manage and analyze further. Data reduction was carried out in three stages: (1) initial coding by reading all data from interview transcripts and identifying categories of data obtained; (2) grouping codes; (3) discarding data that is not relevant to the research objectives to ensure that the focus remains on important information. The data reduction results were then presented using a thematic narrative to conclude. It concluded that it used several stages, namely: (1) identifying patterns and relationships from the data that had been presented; (2) conducting triangulation to ensure consistency and validity of findings; (3) conducting peer debriefing and member checks to gain other perspectives and confirm the conclusions drawn, and (4) synthesizing findings and reconnecting them to the research objectives.

▪ RESULT AND DISSCUSSION

Mathematical poetry as mathematics teaching material based on linguistic intelligence

The mathematical poems used in this study are integrated into mathematics learning as an e-book that can be accessed at the link https://intip.in/ebookpuisimatehematika17/. The mathematics material discussed in this e-book is lines and angles. This study uses the line sub-material with three subtopics: the definition of a point, the definition of a line, and the relationship between two lines, presented in Table 5 below.

Table 5. Poetry on each subtopic

Definition of point	Definition of line	Relationship of two lines
Anak adopsi, dari panti asuhan Senyumnya indah, ramah sikapnya Tidak berdimensi, juga berukuran Berbentuk noktah, apa namanya?	*Hujan merintik, menuju lebat Membuat perjalanan jadi tertunda Kumpulan titik yang sangat dekat Saling berhubungan, membentuk apa?* *Himpunan rintik membentuk gerimis Air menggenang, membasahi trotoar Kumpulan*	*Apakah kita adalah dua garis* ***sejajar*** *yang punya banyak kesamaan, selalu berjalan beriringan, tapi tidak pernah dipertemukan? Ataukah dua garis* ***berpotongan****, yang pertemuannya adalah kepastian, namun hanya untuk saling meninggalkan dan*

	titik membentuk garis Punya panjang, tak punya lebar Hujan reda, awan membiru Di langit lepas, pelangi terlukis Katanya beda, tolong beri tahu Apa itu ruas dan sinar garis?	*berjalan berseberangan? Atau justru dua garis **berimpit**an, yang tidak pernah merasakan arti perpisahan, tapi sering kali bingung perihal perasaan?*
*Perangai baik sedari awal Menjadi ciri kesan selanjutnya Dinamai dengan huruf kapital Dalam geometri, **titik** namanya*	*Himpunan rintik membentuk gerimis Air menggenang, membasahi trotoar Kumpulan titik membentuk garis Punya panjang, tak punya lebar Hujan reda, awan membiru Di langit lepas, pelangi terlukis Katanya beda, tolong beri tahu Apa itu ruas dan sinar garis?*	*Bersama karena kebutuhan, Atau karena tidak punya keberanian untuk saling meninggalkan?*

This e-book is a mathematics teaching material based on linguistic intelligence, namely by ensuring that the writing follows linguistic rules, the physical and mental elements of poetry are used appropriately, and the mathematics material being studied so that it can help in learning. The results of language and literature validation are presented in Table 7 below.

Table 7. The result of language and literature validation

No.	Criteria	Score	Description
1	The language used is by EYD	5	Very good
2	The language used can clarify the material being studied	4	Good
3	Accuracy in the use of diction	5	Very good
4	Depth of poetry imagination	5	Very good
5	Depth of poetry imagination	5	Very good
6	Accuracy in the use of figures of speech	5	Very good
7	The depth of feeling that the reader feels when reading poetry	5	Very good
8	The poetry presented can describe the material being studied	5	Very good
9	The message implied in the poem	5	Very good
Score		**4.89**	**Very good**

With this excellent score, the mathematical poetry used in this research is valid as linguistic intelligence-based mathematics teaching material. The mathematical poetry used meets linguistic rules, is by the material being studied, uses good physical elements and inner elements of poetry, and junior high school students can understand the figure of speech and diction as they are used.

How does mathematical poetry influence students interest in learning mathematics?

Students' interest in learning mathematics when using mathematical poetry is presented in Table 7 below.

Table 7. The scores of students' interest in learning mathematics using mathematical poetry

Indicator	Score	Level
Feeling happy	81.5	Very high
Attention	81.5	Very high
Excitement	85.6	Very high
Involvement	82.1	Very high

Of the 9 statements, the maximum score for each statement is 4. So, the maximum score for 65 respondents is 9 × 4 × 65 = 2340. The total score obtained from filling in the questionnaire was 1943, so the student's overall interest in learning mathematics score was $\frac{1943}{2340} \times 100 = 83$, with very high criteria. If we look at each level, the percentage of students' level of interest in learning mathematics when using mathematical poetry is presented in Figure 1 below.

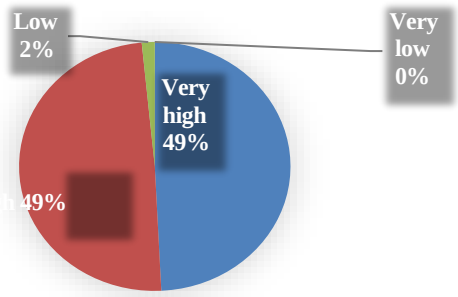

Figure 1. Distribution of students' level of interest in learning mathematics using mathematical poetry

Based on the learning interest questionnaire results, students' interest in mathematics when using mathematical poetry is very high. This means that mathematical poetry can positively influence mathematics learning, especially in increasing students' interest in learning mathematics. This influence is caused by poetry's superiority in describing a person's feelings or emotions from physical and inner elements, which are part of the linguistic aspect. The physical components of poetry consist of diction, imagery, figures of speech, rhyme, and typography. Meanwhile, the inner elements of poetry consist of theme, tone, feelings, and message (Setiadi & Firdaus, 2024). These findings explain that something can arouse someone's interest if it can fulfill their desires or needs (Setyani, 2022; Susanto, 2016). Therefore, poetry can positively influence students' interest in learning mathematics by providing what students need or want through linguistic aspects of poetry's physical and mental elements, which ordinary teaching materials cannot provide. Based on the interview results, the growth of students'

interest in learning mathematics when using mathematical poetry begins with an interest in the material being studied. A feeling of enjoyment appears when learning so that students are motivated to pay more attention to the learning process and then want to be actively involved in the learning process.

Excitement in Studying Mathematics Using Mathematical Poetry

The excitement indicator received the highest score in this study. To make someone interested in something, the first thing that must be done is to make that person interested in just knowing about that thing. Just the question, "What is that?" becomes very important to provoke more profound questions. This aligns with the statement of Wong, Chan, Chen, Looi, Chen, Liao, King, and Wong (2020), that curiosity is the first component that must be developed when triggering someone's interest. Curiosity arises from an interest in something foreign or different from what is usually encountered.

In this research, three statements describe students' interest in mathematical poetry and learning using mathematical poetry, namely: (1) I think mathematical poetry is exciting; (2) Mathematical poetry makes the presentation of lines and angles more interesting; and (3) The mathematical poetry presented can increase my curiosity as a student. Based on the responses obtained on these three statements, the result was that students were very interested in mathematical poetry, so the material studied became more interesting. If students already have an interest in the media and material being studied, then other indicators will emerge more quickly. On the other hand, if students are not interested from the start, it will not be easy to generate other feelings as indicators of interest in learning to make students interested in studying mathematics.

The results of the interest in learning questionnaire were also supported by an interview with one of the participants who had a low interest in learning, which is included in the following transcript.

Q : If you look at the questionnaire you filled out, your interest in studying mathematics is still low, right? Do you feel that way? (*Kalau dilihat dari angket yang kamu isi, minat belajar matematika kamu masih rendah, ya? Kamu merasa begitu nggak?*)

A : Yes, Sis. I would not say I like studying mathematics. (*Iya, Kak. Aku emang kurang suka belajar matematika.*)

Q : If I may ask, what is the reason? You still don't like studying mathematics even though you use poetry. Is it because the poetry isn't interesting? (*Kalau boleh tahu, apa alasannya? Kamu masih tetep nggak suka belajar matematika meski menggunakan puisi, apakah karena puisinya nggak menarik?*)

A : The poetry is fascinating, Sis, but I like the poetry. Still, I do not like mathematics because I do not understand poetry either. So, poetry did not interest me in studying mathematics. (*Puisinya menarik, Kak, tapi aku suka sama puisinya aja. Sama matematikanya tetep nggak suka, karena aku nggak terlalu paham juga sama puisinya. Jadi, puisinya nggak bikin aku jadi tertarik belajar matematika.*)

Based on the interview findings, it can also be inferred that students have no interest in studying mathematics using poetry because their linguistic intelligence is lacking, so poetry is unsuitable for linguistic intelligence-based teaching materials. On the other

hand, some participants admitted that they were interested in studying mathematics because they were interested in the poetry presented.

The Feeling of Joy When Studying Mathematics Using Mathematical Poetry

If students show interest in learning mathematics using mathematical poetry, then the feeling that can grow after that is joy. Csikszentmihályi (1990) states that to satisfy interest or curiosity, someone will feel happy to learn about things that made them interested and curious from the start. With this feeling of joy, students will enjoy the learning process more as something that does not burden them.

To see students' feelings of joy when learning mathematics using mathematical poetry, there are two statements that students as participants must respond to, namely: (1) I feel happy when studying mathematics using mathematical poetry, and (2) Mathematical poetry made a memorable impression on me when studying mathematics. Both statements received responses with very high criteria. This means that the majority of students strongly agreed with this statement. The joy students feel when studying mathematics can be generated from the different impressions students get when learning mathematical poetry. This aligns with the findings of study carried by Qadry & Alfiah (2023), which found that a learning approach that links student experiences with mathematical concepts can make students happier when learning mathematics because they feel mathematics is easier to understand. Apart from that, some students feel happy studying mathematics when using mathematical poetry because they like things related to language, so studying mathematics using one of the arts in a language, such as poetry, makes a good impression on them. This is known from an interview with one of the participants, who provided the following transcript.

Q : Based on your questionnaire, your interest in studying mathematics is very high. Is that true or not? (*Minat belajar matematika kamu tinggi banget nih kalau berdasarkan angket yang kamu isi. Benar begitu nggak?*)

A : Yes, Sis. I was excited when I saw the explanation of the material using poetry. The thing is, I like poetry, but I wouldn't say I like mathematics because there are too many numbers, and the language could be more familiar. So, when I found out that I could learn mathematics using poetry, I was excited. (*Iya, Kak. Aku excited pas lihat penjelasan materinya pakai puisi. Soalnya aku suka puisi, tapi kurang suka matematika karena terlalu banyak angka dan bahasanya juga kadang nggak familiar. Jadi, pas tahu belajar matematika bisa pakai puisi, aku excited banget.*)

Based on the analysis of the interview, several other pieces of information were also obtained, namely: (1) some previously did not like studying mathematics, so they liked studying mathematics after using mathematical poetry in learning mathematics; (2) some have liked studying mathematics from the start so that the feeling of joy when studying mathematics is not because they use mathematical poetry; (3) there are those who already like studying mathematics, but when they use mathematical poetry their enjoyment increases because they have discovered a new method of learning mathematics; and (4) there were no participants who stated that mathematical poetry made them dislike studying mathematics unless they already disliked mathematics from the start.

Pay Attention to Learning when Using Mathematical Poetry

Students will pay more attention to learning activities after feeling interested and happy. One indicator of interest in learning is the attitude of paying attention to learning. When these indicators are visible to students, they will look for more significant challenges while devoting greater attention so that sometimes they do not realize that learning time passes so quickly (Wong et al., 2020).

Statements that show students' attention when studying mathematics using mathematical poetry are: (1) It is easier for me to understand the material using mathematical poetry e-books, and (2) I am interested in studying other mathematical materials using mathematical poetry. The first statement shows that students have paid attention to their learning activities to understand the material. It states that it is easier to understand learning material when using mathematical poetry. Meanwhile, the second statement shows that students have begun seeking more significant challenges with an interest in learning to use mathematical poetry in other materials. As with other indicators, these two statements also received responses with very high criteria, which means that most students have paid attention when studying mathematics using mathematical poetry.

Using mathematical poetry as teaching material also activates students' linguistic intelligence and attracts students' attention. Students with high linguistic intelligence enjoy learning about language and narrative structures, such as poetry. This approach makes mathematics more exciting and allows students to explore and develop their linguistic abilities while learning mathematical concepts. In this way, learning becomes more inclusive and more enjoyable to pay attention to. Mathematical poetry also integrates art into mathematics learning, especially language arts. Therefore, the exceptionally high score on the attention indicator in this study is also due to findings from various other studies, resulting in the integration of arts in mathematics learning and significantly increasing students' attention and interest in the learning process (Awaliyah, 2019; Ayu et al., 2020; Wijayanti & Yanto, 2023).

Student Involvement in Mathematics Learning when Using Mathematical Poetry

When students pay attention to learning activities, they actively provide new ideas that make the learning experience more meaningful (Wong et al., 2020). His experience requires excellent skills, expertise, concentration, and perseverance. This will only be obtained if students are actively involved in learning. When students participate actively, they dominate learning activities, use their minds to discover critical ideas, solve problems, and apply knowledge to real-life situations. They will actively express opinions, participate in all stages of learning, show creative efforts, and seek knowledge independently (Murni, 2021; Nurlaeliyah, 2023).

Learning mathematics using poetry can motivate students to get involved in completing the challenges given and creating other poems that can explain mathematical material. This involvement indicator is described through two statements: (1) Example questions are easy to understand; and (2) If possible, I want to make mathematical poetry that can explain mathematical material. The first statement shows that students have been actively engaged in comprehending the example questions, which become their capital for solving practice questions. Meanwhile, the second statement shows that students want to be actively involved in creating mathematical poetry that can be useful in future learning. Filling in the questionnaire shows that student involvement in mathematics

learning when using mathematical poetry is very high. Research shows that language integration in mathematics learning significantly influences learning achievement (Ramadania, Wulandari, & Nahlini, 2018). Exemplary learning achievements are obtained with active student participation, which means their involvement is also high. Therefore, mathematical poetry as a mathematics teaching material based on linguistic intelligence is justified as a factor that can enhance student involvement in mathematics learning.

Interest in Learning Mathematics is Formed when Using Mathematical Poetry

The scores obtained for each indicator of learning interest show that almost all respondents felt happy, interested, curious, and wanted to be involved when studying mathematics using mathematical poetry. This interpretation is according to the criteria for interpreting the percentage of questionnaire responses in research on analyzing interest in learning mathematics learning (Friantini & Winata, 2019).

According to Hidi (1990), interest in learning consists of situational and individual categories. Situational interest is an immediate reaction but usually does not last long—interactions between students and the surrounding environment or the studied content cause these reactions. Meanwhile, individual interest is more personal because it concerns the student's knowledge and internal factors. Individual interest usually lasts longer because it allows students to enjoy the learning process continuously.

Based on the highest indicator of learning interest seen when using mathematical poetry, namely interest, it can trigger situational interest (Loewenstein, 1994). Apart from that, the interviews also showed that the interest in learning seen when using mathematical poetry was included in the situational interest category. The poetry presented provides a unique emotional experience for students, which cannot be guaranteed to arise if they have read it for the umpteenth time. However, there are opportunities to develop students' interests, for some students who are interested in language and literature or have high linguistic intelligence.

▪ CONCLUSION

Based on the research and analysis that has been carried out, it can be concluded that: (1) students' interest in learning mathematics when using mathematical poetry is very high, with a score of 83. Almost all students show four feelings, which are indicators of interest in learning in this research, with the indicator being felt the most, namely interest; (2) the interest that is formed when studying mathematics using mathematical poetry is situational; and (3) it is possible to develop students' interest when using mathematical poetry, especially for students with high linguistic intelligence.

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