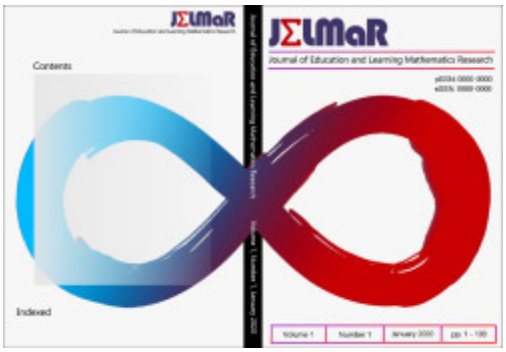

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Learning Design of Arithmetic Sequence Material Based on PMRI with the Context of the Roof of Banyuasin Traditional House

[1]Nadila Lasti, [2]Zulkardi, [3]Ely Susanti, [4*]Meryansumayeka
Mathematics Education Study Program, Faculty of Teacher Training and Education,
Sriwijaya University, Indonesia
**Email: meryansumayeka@fkip.unsri.ac.id*

***Abstract**: Arithmetic sequence is one of the important materials learned in class X. However, in practice, many students face difficulties in solving problems related to this material. Therefore, this researcher aims to design a learning trajectory or Hypothetical Learning Trajectory (HLT) with the approach of Indonesian Realistic Mathematics Education (PMRI), using the context of the Banyuasin Regency traditional house. The method used was design research with the research subjects of 24 students in class X of SMK Manggala Palembang. Data collection techniques include observation, interviews and analysis of student work results on Student Worksheets (LKPD). The results of the study show that the HLT developed is effective in helping students understand the concept of arithmetic sequences in depth, understand patterns, and be able to use the nth term formula in various contextual situations. The implementation of HLT based on local context also helps students to understand the material in a more meaningful and relevant way.*
Keyword: arithmetic sequences; hypothetical learning trajectory; PMRI; traditional house of Banyuasin,

INTRODUCTION

Education is a conscious and planned effort to build a fun learning environment, so that students can actively participate in developing their potential. The ultimate goal is for them to have spiritual strength in religion, self-control, good personality, intelligence, noble ethics, and skills that are useful for themselves and society (Pristiwant et al., 2022). Education is a structured process and aims to transfer knowledge, skills, values, and attitudes. In the context of education, learning is a means for students to understand concepts, hone skills, and expand their knowledge. Learning success can be achieved if teachers develop several important elements, especially learning objectives, materials, strategies, and assessments (Nurafni et al., 2020).

Teaching materials have distinctive and specific characteristics. Khas means that these teaching materials are specially prepared to be used by certain audiences in a certain learning process. Specifics mean that the content of the teaching material is specifically designed to achieve specific learning objectives for that audience. The delivery method is also adjusted to the characteristics of the subject and the characteristics of the students who use it. (Nuryasana & Desiningrum, 2020).

LKPD is a worksheet that contains tasks, both in the form of questions and activities, that need to be completed by students as a means to achieve learning goals. (Prastowo, 2014) LKPD is a teaching material in the form of a paper print that contains learning materials, summaries, and guidelines for carrying out tasks that must be completed by students. This LKPD contains tasks, both theoretical and practical, which are designed based on the basic competencies that need to be achieved by students.

In addition to teaching materials, teachers need to use learning approaches when teaching mathematics. This agrees with (Hamzah & Muhlisrarini, 2014) In order for students to truly understand concepts in depth, teachers need to apply various learning approaches that are tailored to the material and characteristics of students. According to (Atika & Amir, 2016) argues that PMRI aims to make mathematics learning more meaningful for students by relating subject matter with their life experiences. In line with

that (Jannah & Towafi, 2020) PMRI is a mathematics learning approach that makes abstract concepts easier to understand by connecting them with real experiences and situations that students often face. In line with research (Adha & Refianti, 2019), the use of contexts relevant to the student's environment has proven to be effective in facilitating students' understanding of mathematical concepts.

Arithmetic sequence material taught in class X of high school is an important part of the learning outcomes, namely students can determine sequence and series of numbers, both sequence and series of arithmetic and sequence and series of geometry are included in solving problems related to single and compound flowers(Hariyomurti et al., 2020). Facts in the field show that students often feel confused in solving problems related to arithmetic row and sequence materials. Many students do not understand the basic concepts of sequence and rows, so they tend to solve problems only by memorizing the solving steps taught by the teacher (Hartati, 2021).

In line with this, research conducted by (Hariyomurti et al., 2020)identified three types of student learning difficulties, namely ontogenic difficulties, didactic difficulties, and epistemological difficulties. (Marella & Shofan, 2023) Ontogenic difficulties are related to students' inability to solve problems related to the material, such as confusion in understanding problems, errors in writing formulas, ignorance in finding n values, difficulty in determining arithmetic sequence differences, errors in entering the value of Un correctly, and difficulty understanding the formula for the sum of n terms of arithmetic sequences. (Rahmawati et al., 2023) Didactic difficulties occur when teachers make mistakes, such as ineffectiveness in teaching basic concepts, students tend to use manual methods rather than formulas to solve problems, and students feel that the teacher's explanation of number materials and arithmetic series is less clear (Panggabean & Tamba, 2020) Epistemological difficulties are related to errors in understanding the basic rules of computational operations, such as errors in using the rules of addition and multiplication, as well as procedural errors when applying distributive properties or errors in performing algebraic operations, such as converting subtraction into division.

Based on the results of research conducted by (Saputri et al., 2022), LKPD was developed based on local wisdom with the PMRI approach for grade IV elementary school students which is proven to be valid, practical, and has the potential to have a positive impact on student learning outcomes. Furthermore, research by (Gestikatama et al., 2023) entitled *Realistic Mathematics Education on Arithmetic Row and Series Materials by Counting Chair Rows* shows that the RME approach is effective in helping students understand and determine arithmetic series formulas. Students use a variety of symbols to implement this concept, so that their understanding of arithmetic series becomes more meaningful. The difference between this study and previous research lies in the context used. The research (Gestikatama et al., 2023) uses the context of chairs, while this research uses the context of traditional houses in Banyuasin Regency.

Based on research conducted by (Efuansyah & Wahyuni, 2018) By using teaching materials made based on the PMRI approach, students can more easily find and understand the mathematical concepts contained in each problem. This is in accordance with the results of research (Lestari & Surya, 2017) which shows that the application of PMRI can increase students' understanding of mathematical concepts.

Based on the previous presentation, it is clear that we need to develop more interesting and effective teaching materials to help students understand the concept of arithmetic sequences. To achieve this goal, the researcher will develop a Student Worksheet (LKPD) which is based on the Indonesian Realistic Mathematics Learning (PMRI) approach. This LKPD will use the context of the Banyuasin Regency traditional house as a real example to teach the concept of arithmetic sequence.

METHOD

This study uses a qualitative research method with a type of validation study in the framework of design *research* with the research subjects of 24 students in class X of SMK Manggala Palembang. In this study, the researcher will analyze in depth the learning process with arithmetic sequence material developed using the context of the Banyuasin Regency traditional house and is based on three main stages according to (Gravemeijer & Cobb, 2006), namely the experimental preparation stage, design experiment, and retrospective analysis.

In the first stage, namely preparing *for the experiment*, the researcher studied various literature, such as the vocational school curriculum for arithmetic sequence material, the Indonesian Realistic Mathematics Education (PMRI) approach, In addition, students' reasoning ability on arithmetic sequence material was also evaluated, and interviews were conducted to find out students' initial understanding of the learning prerequisite material. The results of this stage are used to design *the Hypothetical Learning Trajectory* (HLT), which includes the initial hypothesis and a series of learning activities. The HLT is designed to be flexible, so that it can undergo cyclical changes and developments during the *teaching experiment process.*

The second stage in the experimental design consists of two cycles: *the pilot experiment* (first cycle) and *the teaching experiment* (second cycle). In the first cycle, six students with diverse abilities were involved as subjects, and researchers also acted as teachers. The results of this cycle are used to improve the *Hypothetical Learning Trajectory* (HLT) which will be tested again in the second cycle. In the second cycle, learning is carried out in one class.

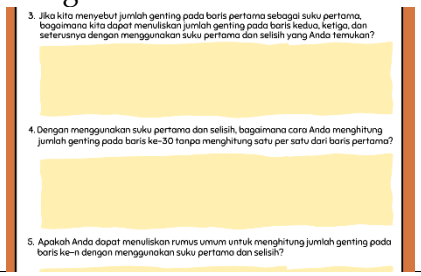
The final stage of this research is retrospective analysis, where data from *teaching experiments* are analyzed to improve future learning designs. At this stage, the learning trajectory that has been designed in the *Hypothetical Learning Trajectory* (HLT) is compared with the actual learning trajectory of students or *the Actual Learning Trajectory* (ALT) to answer research questions. Overall, the goal of retrospective analysis is to develop *Local Instructional Theory* (LIT), which will support continuous improvement in learning.

The data collection techniques used in this study include the provision of Student Worksheets (LKPD), observations, and interviews. Data collection through LKPD and interviews was carried out during the trial stage and teaching experiments. Interviews were conducted to confirm students' answers to the LKPD as well as to explore additional information that was not obtained during the learning process. The data obtained were analyzed using qualitative descriptive techniques.

RESULT AND DISCUSSION

Based on the results of the analysis in Stage 1, namely the preparation of the experiment, a literature review, analysis, and discussion were carried out with lecturers in the Indonesian Realistic Mathematics Education course. Furthermore, the researcher designed HLT that will be used in learning arithmetic sequences with the PMRI approach. The HLT design consists of three components (Graveneijer & Cobb, 2013) and (Eerde et al., 2013) which is the learning objective (*Learning Goal*), activity (*activities*), and hypothetical processes or conjectures (*hypothetical processes/conjecture*). The details of the designed HLT are shown in Table 1.

Table 1. "HLT Arithmetic Line Learning"

Learning Objectives	*Learning Activities*	*Hypothetical Learning Process or Assumption*
Students are able to understand the concept of arithmetic sequences in depth	Students recall the concepts of integers and calculation operations. Students observe the pattern of the number of tiles in the rows of traditional houses 	Students have difficulty distinguishing between arithmetic sequence and other sequence.
Students can identify patterns in arithmetic sequences	Students count the number of tiles in each sequence on the roof of a traditional house. Students were then asked to identify the simple patterns that emerged from these calculations and record the results of their findings. Students are looking for additional information related to the patterns found on the roofs of traditional houses. 2. Tentukan selisih antara jumlah genting pada dua baris yang berdekatan. Apakah selisih ini selalu sama? Jelaskan alasan Anda?	Students begin to understand the concept of fixed differences and find that the pattern is an arithmetic sequence.
Students can use formulas to find the nth term of an arithmetic sequence	Students determine a general formula based on the first term (a) and different (b). Students calculate the number of tiles in the 30th sequence using the formula 	Students can smoothly use the nth term formula to solve a variety of contextual problems and problems, although there are some that are difficult to apply to mathematical variables.

The revised HLT has met the validity criteria set by experts. This HLT is not only in accordance with the principles of Indonesian Realistic Mathematics Learning (PMRI) but is also designed to create a meaningful learning experience for students in the learning process. All components in HLT have been coherently arranged and supported each other.

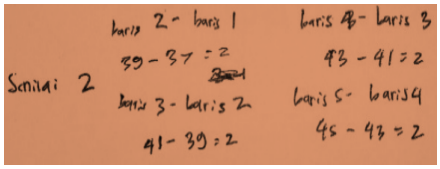
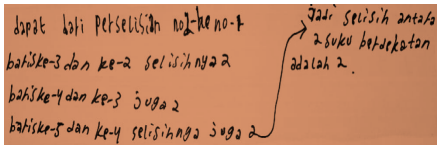
Pilot Experiment

In Phase 2 of the initial trial, the activity was tried on 6 students with different levels of ability (high, medium, low). Given a real context that is close to students' lives.

Figure 1. Banyuasin Regency Traditional House

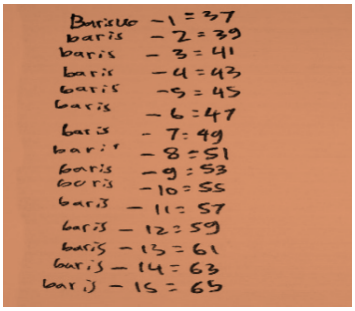
Students are invited to observe the picture of the traditional house of Banyuasin Regency and asked to find What are the differences or differences between two adjacent tribes? Examples of the results of the answers on the activity sheet given to students. Can be seen in Table 1.

Table 2. Sample Student Answers in Activity 1

English Version	Student Answer (Indonesian Version)
Student A: sequence 2−sequence 1 $39-37=2$ sequence 3−sequence 2 $41-39=2$ sequence 4−sequence 3 $43-41=2$ sequence 5−sequence 4 $45-43=2$	Student A: 
Student B: It can be from disputes number-2-number, the 3rd and 2nd sequence, the difference is 2, the 4th and 3rd sequence are also 2, the 5th and 4th sequence are also 2 So, the difference between 2 adjacent terms is 2.	Student B 

Based on observations, students tend to have difficulty understanding the concept of variable. This is seen in the students' answers that focus more on concrete numbers than using letter symbols to present patterns. For example, in the activity of finding the difference between two terms in the arithmetic row, students write the results of the calculation numerically, such as 39-37 = 2 or 41-39 = 2, but do not continue in the generalization using variables. In addition, students seemed confused when asked to write down patterns or relationships between tribes with symbols, so they could not formulate a general pattern of the lineup. Then the results of the students' answers when asked to determine the number of tiles in the 15th row can be seen in Figure 2.

Table 3. Examples of Student Answers in Activity 2

English Version		Student Answer (Indonesian Version)
Student		Student
sequence 1 = 37	sequence 9 = 53	
sequence 2 = 39	sequence 10 = 55	
sequence 3 = 41	sequence 11 = 57	
sequence 4 = 43	sequence 12 = 59	
sequence 5 = 45	sequence 13 = 61	
sequence 6 = 47	sequence 14 = 63	
sequence 7 = 49	sequence 15 = 65	
sequence 8 = 51		

After being given the LKPD, students observe the number of tiles in each line, they answer every question given in the LKPD, but here it is difficult for students to find the nth term formula, when given the problem as above, students are still calculating manually from the first row to the nth row, it can be seen that students have not understood terms such as quarters, differences, and arithmetic sequence. Students have difficulty seeing the application of arithmetic sequences.

Based on interviews with students

Researchers: How can you get the number of tiles on the 15th sequence?

Student: I count the number of tiles on each sequence individually. But after a few lines, I started to see a pattern that each line was increasing by 2 tiles. So, after that, I no longer count one by one. I just add 2 to the number of tiles from the previous row until I reach the 15th row.

Researchers: That's a great way to find patterns. But why don't you try using formulas? With formulas, you don't have to write all the steps up to the 15th line, so it's faster.

Student: I actually wanted to try using a formula, but I was confused about how to turn this pattern into a mathematical form.

Researchers: So, do you find it difficult to translate the patterns you find into formulas?

Student: Yes, that's right. If there is an example or the formula explains the steps, maybe I can understand better. But now I am more comfortable calculating manually because I already know the pattern.

Researchers: It's interesting how you find that pattern. Maybe later we can learn together to understand how the formula is made. That way, you can see that the formula is actually just a quick way from the pattern you've found.

Student: Yes, ma'am. If I explain it slowly, I will definitely try to use the formula.

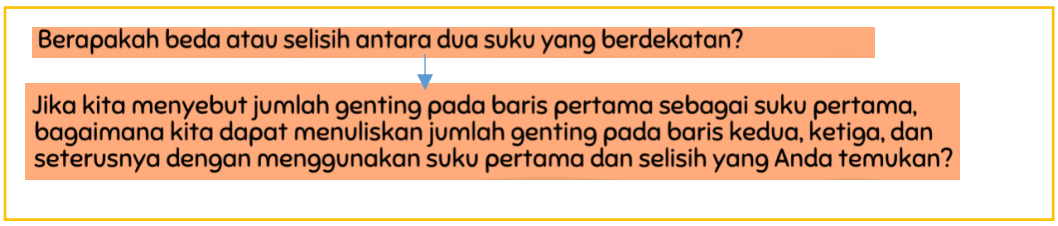
Based on the interviews, it shows that students are more comfortable when they are directed to see patterns gradually. This means that LKPD needs to provide exploratory steps that allow students to discover on their own. The above conversation can be used by researchers as a reference to improve the Student Worksheet (LKPD). The focus is on helping students find patterns, relate them to mathematical concepts, and finally formulate those relationships.

The results of students' work in the initial pilot *experiment* stage are used to improve practice questions to be more effective in teaching mathematical concepts in the next learning stage (*teaching experiment*).

Retrospective Analysis (*pilot experiment*)

The results of students' answers in the pilot experiment stage are used as a basis to improve the series of activities in the worksheet to be more effective. Based on the analysis of students' answers and observation results, it was found that some students experienced confusion on the questions. This can be seen from the number of students who ask questions about how to do the work and answers that are not in accordance with the purpose of the activity. Most students have difficulty converting number patterns into mathematical forms using variables, so they fail to compile the nth term formula in the arithmetic sequence. This is in line with the opinion (Hartati, 2021) students often feel confused in solving problems related to arithmetic sequence and series materials, many students do not understand the basic concepts of rows and rows. In addition, according to (Afifah, Tamrin, Salsabila, Hasanah, & Herman, 2024) the results of data analysis show that the average ability of students to understand mathematical concepts in arithmetic sequence material is in the sufficient category, which is 54.8%.

Therefore, the researcher decided to make improvements by adding information to the questions and reducing some information so that students are more active in calculating on their own to help students understand the steps to compose patterns and convert them into variable forms. The improvements made can be seen in the following Figure 3.

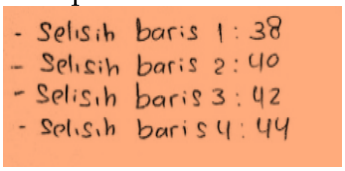


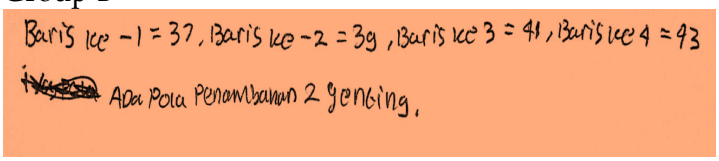
Improvements to the student worksheet (LKPD) are made by adding more supportive guidance and information so that students can understand the concept of variables in arithmetic sequences. This improvement aims to make it easier for students to understand the transition process from concrete patterns to algebraic forms using variables. Students are trained to recognize patterns, use variable notation, and construct commonly accepted formulas in arithmetic sequences.

Teaching Experiment

In the third stage of the learning experiment, student worksheets were tested on 24 students in class X of SMK Manggala which were divided into 5 groups, 4 groups consisting of 5 students and 1 group consisting of 4 students. Their goal is to solve problems that focus on the concept of arithmetic sequences. The activity consists of questions designed to help students achieve learning objectives, namely understanding and applying the concept of arithmetic sequences in various forms of representation. The initial activity that students do is to calculate the number of tiles in each row and analyze whether there is a definite pattern. In this initial activity, all groups were able to find patterns on the roofs of traditional houses, the answer can be seen in Table 2.

Table 4. Sample Student Answers in Activity 1

English Version	Student Answer (Indonesian Version)
Group A: Line difference 1: 38 Line difference 2: 40 Line difference 3: 42 Line difference 4: 44	Group A: 

Group B: 1st sequence = 37, 2nd sequence =39, 3rd sequence 42, 4th sequence =43 There is a pattern of adding 2 tiles.	Group B 

The table displayed shows the results of students' answers for activity 1. In this activity, students were asked to count the number of tiles on the sequences of traditional house roofs as shown in the picture. Student group A counts the number of tiles in each sequence from the first to the fourth and finds consecutive results: 37, 39, 41, and 43. They do not draw conclusions about patterns and go into much detail about adjacent rows. Student group B also recorded the number of precarious in four rows, namely 37, 39, 41, and 43. And they observed that there was a pattern of adding 2 tiles and they had not used variables to answer still using sequence. Student group C wrote down the number of tiles with the same results, namely 37, 39, 41, and 43. They write down patterns 37, 39, 41, 43, and they can already replace the rows with variables.

In activity 2, students were asked to write down the number of tiles using the first and different terms found. Question from student activity "If we call the number of tiles in the first sequence as the first term, how can we write the number of tiles in the second, third and so on using the first term and the difference you found?" the student's answer can be seen in the table below

Table 5. Sample Student Answers in Activity 2

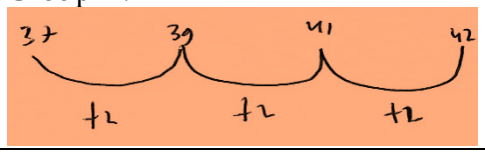
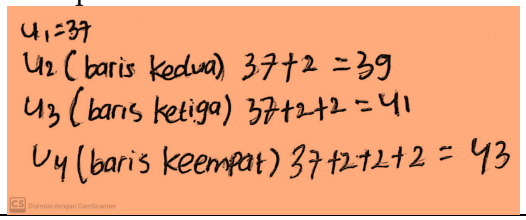
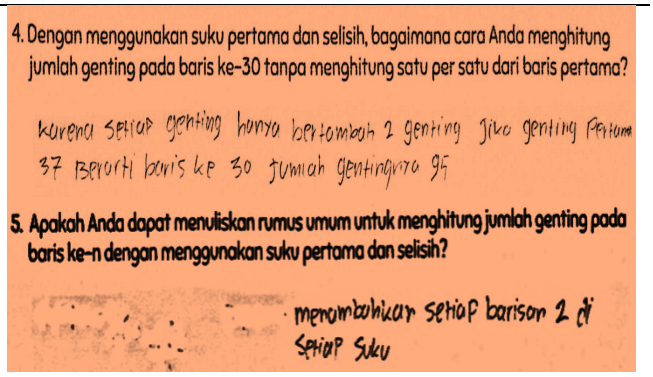
English Version	Student Answer (Indonesian Version)
Group A: Group 1 adds 2 so that the next number of tiles is obtained	Group A: 
Group B: $U_1 = 37$ U_2 (second sequence) 37+2 = 39 U_3 (third sequence) 37+2+2 = 41 U_1 (third sequence) 37+2+2+2 = 43	Group B: 

Figure 5 shows the results of students where groups A and B add 2 so that the next critical number is obtained, group C writes in detail along with the variables in the mathematics. Groups D and E are the same as group C's answers.

In activity 2 of questions number 4 and 5, students are asked to calculate the number of tiles in the 30th sequence without counting one by one from the first sequence and write the formula for the nth line using the first term and difference. The results of students' answers to these activities can be seen in Figure 6 below.

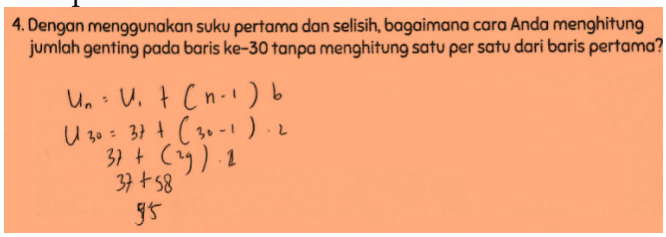
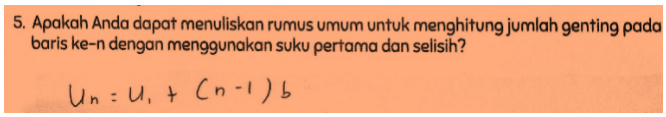
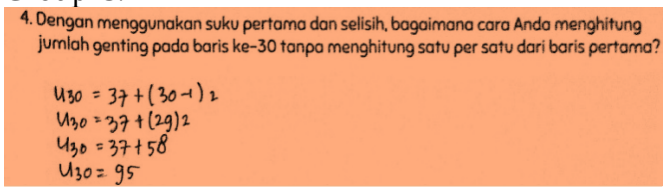
Table 6. Example Of Student Answers In Activity 2 Questions 4 And 5 Group A

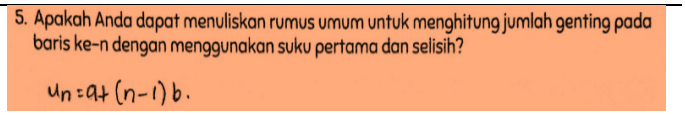
English Version	Student Answer (Indonesian Version)
Group A: 4. Using the first term and the difference, how do you calculate the number of tiles on the 30th row	Group A:

without counting one by one from the first sequence? Answer: Because each tile only adds 2 tiles, if the first tile is 37, it means the 30th tile, the number of tiles is 95 5. Can you write a general formula to calculate the number of tiles on the nth sequence by using the first term and the difference? Answer: Adding every line 2 in each quarter	 4. Dengan menggunakan suku pertama dan selisih, bagaimana cara Anda menghitung jumlah genting pada baris ke-30 tanpa menghitung satu per satu dari baris pertama? karena setiap genting hanya bertambah 2 genting jika genting Pertama 37 berarti baris ke 30 jumlah gentingnya 95 5. Apakah Anda dapat menuliskan rumus umum untuk menghitung jumlah genting pada baris ke-n dengan menggunakan suku pertama dan selisih? menambahkan setiap barisan 2 di setiap suku

Based on the answers of group A they only explained that if each tile increases by 2 per row then the number of tiles on the 30th sequence is 95, and when asked to write the formula they only explain adding 2 in each row, without bringing it into mathematical form. The following are the results of group B and C activities can be seen in Figure 7 below.

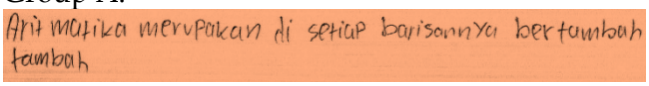
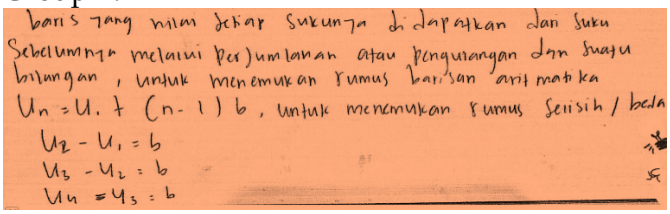
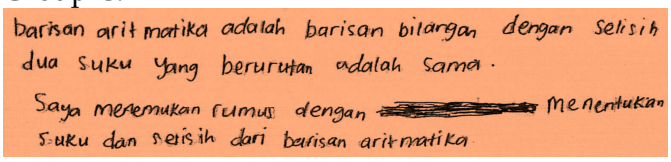
Table 7. Sample Student Answers To Activity 2 Questions 4 And 5 Of Group B&C

English Version	Student Answer (Indonesian Version)
Group B: 4. Using the first term and the difference, how do you calculate the number of tiles on the 30th sequence without counting one by one from the first sequence? Answer: $U_n = U_n + (n-1)b$ $U_{30} = 37 + (30-1)2$ $= 37 + (29)2$ $= 37 + 58$ $= 95$ 5. Can you write a general formula to calculate the number of tiles on the nth sequence by using the first term and the difference? Answer: $U_n = U_n + (n-1)b$	Group B:  4. Dengan menggunakan suku pertama dan selisih, bagaimana cara Anda menghitung jumlah genting pada baris ke-30 tanpa menghitung satu per satu dari baris pertama? $U_n = U_1 + (n-1)b$ $U_{30} = 37 + (30-1) \cdot 2$ $37 + (29) \cdot 2$ $37 + 58$ 95  5. Apakah Anda dapat menuliskan rumus umum untuk menghitung jumlah genting pada baris ke-n dengan menggunakan suku pertama dan selisih? $U_n = U_1 + (n-1)b$
Group C: 4. Using the first term and the difference, how do you calculate the number of tiles on the 30th sequence without counting one by one from the first sequence? Answer: $U_{30} = 37 + (30-1)2$ $= 37 + (29)2$ $= 37 + 58$ $= 95$ 5. Can you write a general formula to calculate the number of tiles on	Group C:  4. Dengan menggunakan suku pertama dan selisih, bagaimana cara Anda menghitung jumlah genting pada baris ke-30 tanpa menghitung satu per satu dari baris pertama? $U_{30} = 37 + (30-1)2$ $U_{30} = 37 + (29)2$ $U_{30} = 37 + 58$ $U_{30} = 95$

the nth sequence by using the first term and the difference? Answer: $U_n = a + (n-1)b$	

Based on the answers of groups B and C, they were able to find the number of critical points in the 30th sequence without counting them one by one, and they could already use variables to write the nth term formula, even though the variables they used were different. Furthermore, students are invited to conclude the meaning of arithmetic sequences and explain how they can find the nth term formula. The following students' answers to the last activity can be seen in Figure 8 below.

Figure 8. Conclusion Of The Student's Answer

English Version	Student Answer (Indonesian Version)
Group A: Arithmetic is in each line of increasing	Group A: 
Group B: The sequence whose value of each term is obtained from the previous term by adding or subtracting it by a number, to find the formula for arithmetic sequences. To find the difference/difference formula $U_n = U_1 +)n-1)b$ $U_1 = 37$ $U_2 - U_1 = b$ $U_3 - U_2 = b$ $U_4 - U_3 = b$	Group B: 
Group C: An arithmetic sequence is a sequence of numbers with two consecutive syllables of the same. I found the formula by specifying the terms and differences from the arithmetic sequences	Group C: 

Based on the analysis of students' answers, it can be concluded that the majority of students managed to find the nth term formula in the arithmetic sequences. This is evident from the high percentage of success. In addition, students also show a strong understanding of first tribes and differences. They can clearly explain the steps they take to obtain the formula. Some students are even able to use a variety of strategies to solve more complex problems.

Retrospective Analysis (*teaching experiment*)

Based on the second stage, although there are still some mistakes but some students gave very complete and correct answers, when compared to the initial test results, there was a significant improvement in students' skills in determining the nth term formula. At

the end of the activity, students are asked to explain again about arithmetic sequences and the steps they take so that they can find the general formula of arithmetic sequences.

A series of learning activities designed by the researcher aims to support the development of students' ability to understand and reexpress student information in understanding and applying the concept of arithmetic sequences. An in-depth analysis of the learning data in the second stage showed that there was a match between the actual learning trajectory (ALT) and the expected learning trajectory (HLT). This comparison, which is associated with the theoretical framework of Indonesian Realistic Mathematics Learning (PMRI), indicates that the HLT designed has succeeded in facilitating student learning activities in accordance with the principles of PMRI. This is in line with the opinion (Efuansyah & Wahyuni, 2018) By using teaching materials made based on the PMRI approach, students can more easily find and understand the mathematical concepts contained in each problem. This is in accordance with the results of (Lestari & Surya, 2017) which shows that the application of PMRI can increase students' understanding of mathematical concepts.

CONCLUSION

The results of the study show that the Learning Track Hypothesis (HLT) that utilizes the context of traditional houses in Banyuasin Regency as a learning medium for arithmetic sequence has been proven to be effective. A series of learning activities that are specifically designed are able to identify students' level of understanding in recognizing patterns, differences, and applying the concept of arithmetic sequence formulas in various problem situations.

REFERENCES

Adha, I., & Refianti, R. (2019). Pengembangan Lembar Kerja Siswa (LKS) Menggunakan Pendekatan Matematika Realistik Indonesia Berbasis Konteks Sumatera Selatan. *Jurnal Pendidikan Matematika (JUDIKA EDUCATION)*, *2*(1), 1–10. https://doi.org/10.31539/judika.v2i1.729

Atika, N., & Amir, Z. (2016). LKS development is based on the RME approach to develop mathematical critical thinking skills. *Suska Journal of Mathematics Education*, 2(2), 103-110.

Eerde, V., Van Eerde, D., & Nl, H. A. A. V. (2013). *Design research: Looking in to the heart of mathematics education*.

Efuansyah, & Wahyuni, R. (2018). Development of PMRI-based Mathematics Teaching Materials on Class VIII Cube and Block Materials. *Journal of Derivat*, 5(2), 28-41.

Gestikatama, E., Prasasti, Y. N., Susanti, A. D., & Hamidah, D. (2023). Penerapan Pendidikan Matematika Realistik Pada Materi Deret Aritmatika Kelas Xi Sma Dengan Menghitung Barisan Kursi. *Union: Jurnal Ilmiah Pendidikan Matematika*, *11*(1), 85–95. https://doi.org/10.30738/union.v11i1.12927

Gravemeijer, K., & Cobb, P. (2006). *Educational Design Research.* London: Routledge Taylor & Francis Group.

Graveneijer, K., & Cobb, P. (2013). Design Research from the Learning Design Perspective. *In Educational Design Research Part A: An Introduction. Netherland Institute for*.

Hamzah, A., & Muhlisrarini. (2014). *Mathematics Learning Planning and Strategy*. Jakarta: PT. King Grafindo Persada.

Hariyomurti, B., Prabawanto, S., & Al Jupri, D. (2020). Learning Obstacle Siswa dalam Pembelajaran Barisan dan Deret Aritmetika. Dalam *Journal for Research in Mathematics Learning) p* (Vol. 3, Nomor 3).

Hartati, S. (2021). Analisis Kesulitan Siswa SMA Dalam Memahami Materi Barisan Dan Deret. *Supermat Jurnal Pendidikan Matematika*, *5*(2).

Lestari, L., & Surya, E. (2017). The Effectiveness of Realistic Mathematics Education Approach on Ability of Students' Mathematical Concept Understanding. *International*

Journal of Sciences: Basic and Applied Research. http://gssrr.org/index.php?journal=JournalOfBasicAndApplied

Nurafni, A., Pujiastuti, H., & Mutaqin, A. (2020). Pengembangan Bahan Ajar Trigonometri Berbasis Kearifan Lokal. *Journal of Medives : Journal of Mathematics Education IKIP Veteran Semarang*, *4*(1), 71. https://doi.org/10.31331/medivesveteran.v4i1.978

Nuryasana, E., & Desiningrum, N. (2020). Development Of Teaching And Learning Strategies Teaching Materials To Increase Student Learning Motivation. *Journal of Research Innovation*, 1(5), 967-974.

Panggabean, R. F. S. B., & Tamba, K. P. (2020). Kesulitan Belajar Matematika: Analisis Pengetahuan Awal [Difficulty In Learning Mathematics: Prior Knowledge Analysis]. *Johme: Journal of Holistic Mathematics Education*, *4*(1), 17. https://doi.org/10.19166/johme.v4i1.2091

Prastowo. (2014). *Development of Thematic Teaching Materials for Theoretical and Practical Review*. Jakarta: Kencana Prenadamedia Group.

Saputri, L., Destiniar, D., & Murjainah, M. (2022). Pengembangan LKPD Berbasis Kearifan Lokal dengan Pendekatan PMRI untuk Siswa Kelas IV Sekolah Dasar. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, *6*(3), 2949–2961. https://doi.org/10.31004/cendekia.v6i3.1664

Rahmawati, N. D., Prayito, M., & Salsabilla, A. P. (2023). *Prosiding Seminar Nasional Pascasarjana Analisis Kesulitan Belajar Matematika Siswa SMA dalam Memecahkan Masalah Aplikasi Turunan Fungsi Trigonometri Berbasis Desain Didaktis*. http://pps.unnes.ac.id/pps2/prodi/prosiding-pascasarjana-unnes