International Journal of Elementary Education
Volume 7, Number 4, Tahun 2023, pp. 677-688
P-ISSN: 2579-7158 E-ISSN: 2549-6050
Open Access: https://doi.org/10.23887/ijee.v7i4.63420

Mathematics Ethnic Learning Program in Improving the Understanding of Mathematical Concepts and the Character of Homeland Love

Sigit Wibowo[1*], Unik Ambarwati[2], Fery Muhamad Firdaus[3]

[1,2,3] Department of Basic Education, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia

ARTICLE INFO

Article history:
Received June 12, 2023
Accepted November 10, 2023
Available online November 25, 2023

Kata Kunci:
Matematika, Pembelajaran Matematika Etnis, Pemahaman Konsep, Permainan Tradisional, Cinta Tanah Air

Keywords:
Mathematics, Mathematics Ethnic Learning, Understanding Concepts, Traditional Games, Love For The Motherland

ABSTRAK

Pembelajaran matematika masih dianggap abstrak dan sulit dipahami oleh sebagian besar siswa sekolah dasar. Hal tersebut mengakibatkan rendahnya pemahaman konsep matematika siswa. Penelitian ini bertujuan untuk mengukur efektivitas dari program "Mathematics Ethinic Learning" yang telah dilaksanakan dalam meningkatkan pemahaman konsep matematika dan rasa cinta tanah air siswa sekolah dasar. Penelitian ini menggunakan jenis penelitian kuantitatif dengan desain penelitian one group pretest-posttest design dan metode kuasi eksperimen. Teknik sampling yang digunakan yaitu teknik purposive sampling. Data diperoleh dari hasil tes pemahaman konsep matematika dan hasil angket karakter cinta tanah air. Analisis data menggunakan uji paired sample t-test dan uji n-gain. Hasil penelitian ini menunjukkan nilai tes pemahaman siswa dan angket karakter cinta tanah air sebelum dan sesudah program tersebut diimplementasikan menunjukkan adanya peningkatan secara signifikan terhadap kedua aspek tersebut. Berdasarkan analisis statistik yang telah dilakukan menunjukkan bahwa pembelajaran matematika dengan menerapkan permainan tradisional dapat berpengaruh secara signifikan dalam pemahaman konsep dan karakter cinta tanah air pada siswa. Lebih lanjut, setelah diuji menggunakan rumus n-gain score, menunjukkan bahwa permainan tradisional cukup efektif dalam meningkatkan pemahaman konsep matematika dan karakter cinta tanah airnya. Disimpulkan bahwa Mathematics Ethinic Learning dapat meningkatkan pemahaman konsep matematika dan rasa cinta tanah air siswa sekolah dasar.

ABSTRACT

Mathematics learning is still considered abstract and challenging to understand for most elementary school students. This results in students' low understanding of mathematical concepts. This research aims to measure the effectiveness of the "Mathematics Ethnic Learning" program, which has been implemented to increase elementary school students' understanding of mathematical concepts and patriotism. This research uses a quantitative type of research with a one-group pretest-posttest research design and a quasi-experimental method. The sampling technique used is the purposive sampling technique. Data was obtained from a test for understanding mathematical concepts and the results of a Love of the Country character questionnaire. Data analysis used the paired sample t-test and n-gain test. This research shows that students' comprehension test scores and the love of the country character questionnaire before and after the program was implemented showed a significant increase in these two aspects. Based on the statistical analysis that has been carried out, it shows that learning mathematics by applying traditional games can significantly influence students' understanding of the concept and character of patriotism. Furthermore, after being tested using the n-gain score formula, it showed that traditional games were quite effective in increasing understanding of mathematical concepts and the character of loving one's country. It was concluded that Mathematics Ethnic Learning can increase elementary school students' understanding of mathematical concepts and their sense of patriotism.

1. INTRODUCTION

Mathematics is a part of science that is very necessary to support the activities of human life. Based on this, mathematics is a compulsory subject that is studied at every level of education. Mathematics has a longer learning time than other subjects (Fathani, 2016; Sili et al., 2018; Utami et al., 2018). However, mathematics is often referred to as a "scourge" for most students. These subjects are still considered abstract and difficult to understand by students, even though mathematics has use value in everyday life (Mahmudah et al., 2021; Sili et al., 2018). These are two situations that contradict each other and are not in line with Piaget's theory where elementary school age is still in the concrete operational

*Corresponding author.
E-mail addresses: sigitwibowo.2022@student.uny.ac.id (Sigit Wibowo)

stage, where in understanding and constructing knowledge children are still assisted by concrete objects (Ariandi, 2016; Huang, 2021; Sanghvi, 2020; Wahyuni et al., 2013). In teaching mathematics, teachers often use methods that do not activate students so that students are less enthusiastic about learning mathematics. This makes it difficult for students to understand learning so that the material being studied and its use in life cannot be connected. Most students still think that mathematics contains a lot of memorization so they are only able to memorize the material received (Faelasofi et al., 2015; Mahmudah et al., 2021; Rusyda & Sari, 2017). These factors cause students to think that the mathematics material being studied is very different from everyday life so students find it difficult to understand the concept of learning mathematics taught by the teacher. Whereas in mathematics it is necessary to have a really deep understanding of concepts so that these concepts can be implemented by students in their daily lives.

The concept is the foundation of the thinking process which plays an important role in the next process. The concept shows the basic understanding of the child. Students can understand a concept if they can classify objects and associate a name with a group of objects (Alam, 2022; Puspitasari, 2022). Students' understanding of mathematical concepts starts from concrete to abstract, from intuitive to analytical, from exploration to long-term assignments, and from the simplest to the highest stages. Elementary school students' initial ability in learning mathematics is the ability to understand basic mathematical concepts which include grouping, matching, size, geometry, numbers, patterns, and graphics (Ahdhianto et al., 2020; Zuliana et al., 2019). From this explanation, understanding the concept is important for students to master the next learning process. If students are not able to understand the initial concept, then the next learning stage will not be achieved optimally. This will also result in students not being able to solve problems or provide alternative solutions to solve problems that are understood because they do not understand the concept.

This problem was found in SD Negeri 1 Kauman. Based on the results of interviews with the Head of SD Negeri 1 Kauman stated that there were still many students who experienced difficulties in learning mathematics. This is caused by the low interest in learning mathematics so that most students make mathematics a subject they do not like. This phenomenon is certainly a factor hindering students in understanding mathematical concepts and results in them not being able to solve the problems of everyday life properly. From this, we need a method that makes students able to do mathematics learning in a fun way. According to previous study states that everyone will be happier doing something he likes than doing something he doesn't like (Nurkayati, 2020). In fact, most of the students at SDN 1 Kauman do not like mathematics which is considered difficult. This is reinforced by the statement that the factors that cause mathematics to be a difficult subject are the characteristics of mathematics which are abstract, logical, systematic and full of confusing symbols and formulas and mathematics is full of calculations and poor communication (Widodo et al., 2018). In addition, the methods used by teachers in teaching are still conventional and there is no adequate media, so that learning does not provide broad opportunities for students to actively interact with other students in developing their skills and mindset (Nasta'in et al., 2021; Saputro, 2016). This resulted in students not being too enthusiastic in learning mathematics.

One of the efforts to improve students' understanding of mathematical concepts is with traditional games. Along with this, character education is also encouraged, so that traditional games are the right effort. This is related to improving the character of students, one of which is through culture. Shifts in cultural values began to occur, where the generation in the current era began to leave the culture that was around them, one of which is a traditional game (Hardiman & Ardianto, 2016; Rosala & Budiman, 2020). Through the game will lead to learning that is in accordance with the characteristics of elementary school students, namely happy to play that can interact directly with the environment and with games children will more easily absorb the material because the resulting learning will be meaningful. Apart from that, elementary school age children also like to move, like to work in groups, and like to try directly. Given the importance of traditional games, further exploration is needed regarding the repertoire of traditional games that can be associated with learning material, especially mathematics (Adpriyadi, 2018; Kurniawan, 2015; Rochmad., 2012).

One of the character education contained in traditional games is love for the motherland. According to Yuliatin, he explained that love for the motherland is a sense of pride, respect, belonging, respect and loyalty to the country where he lives. exist in that country. Love for the motherland is an effort to wholeheartedly accept our country as a part that must be protected and developed (Agus et al., 2021; Fatmawati et al., 2018). The sense of love for the motherland is understood as a feeling of loving the nation with all one's heart so that it strives to protect and promote the life of the nation so that it can compete with other nations. However, in this era of globalization, people need to be aware of the existence of foreign cultural elements that can cause the loss of love for the country. The loss of love for the motherland will cause concern for the future of the younger generation. One of the efforts to strengthen

the character of loving the homeland is by integrating it in learning, one of which is learning mathematics by utilizing traditional games (Hasyim et al., 2022; Rakhman & Wibawa, 2019).

Based on the description of the problem, there is a gap between the ideal conditions and the facts that occur. Learning mathematics that should be able to train critical thinking skills in solving problems in students' lives, however, is a subject that is considered difficult by students. This results in a low understanding of mathematical concepts in students, so that it will have an impact on low learning outcomes and students' inability to solve problems that occur. On the other hand, the character education currently being promoted by the government is included in elementary schools, however, the character of students' love for their homeland is declining. There are still many students who do not know the culture of their own region. If this is allowed, then these students will lose their identity as Indonesian people.

One program that can be used as an innovation in increasing students' understanding of mathematical concepts and a sense of love for their homeland is the Mathematics Ethnic Learning program. This program has been implemented at SDN 1 Kauman with the title of community service. The Mathematics Ethnic Learning Program is one of the learning quality development programs at SDN 1 Kauman which has the aim of increasing the interest and learning outcomes of students at SDN 1 Kauman by associating learning mathematics with traditional games. In addition, this program is designed to preserve local wisdom. With traditional games, the learning achievement of students in grades 4, 5 and 6 at SDN 1 Kauman can increase because the learning is carried out according to the characteristics of elementary students, involves active participation, and is meaningful for students. Based on the description of the data and discussion in the service in grades 4, 5 and 6, it can be concluded that the Mathematics Ethnic Learning program can be used to increase interest in learning mathematics for high-grade elementary school students. This can be proven by the significant increase in student mathematics learning outcomes (O'Neil Jr. & Brown, 1998; Wibowo et al., 2022). However, it is necessary to carry out further research on this program to increase the understanding of the concept and love for the motherland in elementary school students.

Research conducted by previous study revealed that games in learning can increase student involvement in learning (Yu et al., 2021). Students can carry out activities directly so that the resulting learning will be meaningful and will be contained in long-term memory. This is in accordance with the current learning principle which emphasizes the active role of students in learning or is referred to as student centered learning, where students not only listen to the teacher's explanation, but are also directly involved in learning as active subjects. The research is supported by research conducted by Trajkovik which reveals that the game can improve student learning outcomes (Trajkovik et al., 2018). This is because games can attract students' interest and learning motivation so that students are enthusiastic in participating in learning. The positive impact is increasing learning outcomes significantly. This is in line with the Mathematics Ethnic Learning program which was previously implemented by other study which reveals that the program can increase student interest and learning outcomes (Wibowo et al., 2022). Not only improving learning outcomes, but research conducted by other study states that traditional games can be implemented as an effort to increase students' love for their homeland for local wisdom (Enok & Mayasarokh, 2022). Thus, Indonesian culture will not fade and can still be preserved .

Based on the description of the problems above, research was carried out on the effectiveness of the "Mathematics Ethinic Learning" program in increasing understanding of mathematical concepts and a sense of love for the homeland in students of SDN 1 Kauman. This study aims to analyze the implementation of the "Mathematics Ethinic Learning" program and determine the effectiveness of the "Mathematics Ethinic Learning" program that has been implemented in increasing understanding of mathematical concepts and a sense of love for the homeland of the students of SDN 1 Kauman.

2. METHOD

This study used a quantitative research type with a one group pretest-posttest research design and a quasi-experimental method (Setia, 2016). The research was conducted to describe the implementation of the "Mathematics Ethinic Learning" program and to find out the effectiveness of the "Mathematics Ethinic Learning" program that has been implemented in increasing understanding of mathematical concepts and a sense of love for the country of students at SDN 1 Kauman. The research was conducted in the even semester of the 2022/2023 academic year located at SD Negeri 1 Kauman, Tulungagung Regency. The population in this study were all students of SDN 1 Kauman, totaling 186 students. The sample used was grade 5 students at SDN 1 Kauman, totaling 42 students and a number of these students would be the subjects of this study (Firmansyah & Dede, 2022). The data in this study are quantitative data because they are in the form of numbers. Data collected by test technique. The test is used to assess and measure the understanding of mathematical concepts in grade 5 students and their

love for their homeland. The test used to understand mathematical concepts is in the form of multiple choice questions totaling 10 questions including how to get the answers that have gone through a validity test and a reliability test. The test used to determine the increase in love for the country by using a questionnaire. The questionnaire utilizes the guttman scale with 12 questions in the form of statements. The data analysis technique in this study used the prerequisite test, namely the Kolmogorov-Smirnov normality test and the homogeneity test. If the data is normally distributed and homogeneous then a parametric statistical test is carried out via a paired sample t-test to prove the hypothesis that has been formulated. If the data obtained is not normally distributed, then a nonparametric statistical test is performed. Statistical analysis test using SPSS 16.0 software.

Students' understanding of mathematical concepts was measured using essay questions with reference to three aspects, namely restating a concept, giving examples and non-examples, and applying them in solving problems. The test grid for students' understanding of mathematical concepts can be presented in Table 1.

Table 1. The Test Grid for Student's Understanding of Mathematical Concepts

Question Indicator	Concept Understanding Aspects			Question Form	Question Number
	1	2	3		
Presented a picture, students can describe the picture in mathematical sentences correctly.	✓			Essay	1,2
Presented illustrations, students can describe in mathematical sentences correctly.	✓			Essay	3,4
Presented the operation of calculating the gap, students can determine the right number to fill in the operation completely.		✓		Essay	5,6
An illustration of guessing numbers is presented, students can predict what number is correct to complete a counting operation correctly		✓		Essay	7
Presented illustrations in the form of word problems, students can solve problems in everyday life correctly.			✓	Essay	8,9,10

Notes: Aspect 1 : Restating a concept; Aspect 2: Give an example and not an example; Aspect 3: Applying in problem solving.

In this study also measured the character of students' love for the motherland by implementing traditional games in learning mathematics using a questionnaire. The questionnaire grid for the homeland love character can be presented in Table 2.

Table 2. The Questionnaire Grid for Student's Homeland Love Character

Indicator	Question Number
Knowledge of traditional games	1,2,3,4,5
Preservation of national culture	6,7
Understanding of nationalism and respect for culture	8,9.10
Proud attitude towards the culture that is owned	11,12

The effectiveness of the Mathematics Ethnic Learning program is measured using the n-gain score formula. In a one group pretest posttest design study, the n-gain score test can be used when there is a significant difference between the pretest and posttest mean values through the paired sample t-test (Aulia et al., 2018). After that, the effectiveness of the final data will be tested using the n-gain score formula and categorized based on the following Table 3.

Table 3. Categorization of N-Gain Scores

Percentage	Category
< 40	Ineffective
40 – 55	Less effective
56–75	Effective enough
> 76	Effective

3. RESULT AND DISCUSSION

Result

The Mathematics Ethnic Learning Program makes use of traditional games with the main objective of increasing interest and learning outcomes in Mathematics at SDN 1 Kauman. In addition, this program is designed to preserve existing local wisdom. With traditional games, the mathematics learning achievement of SDN 1 Kauman students can increase because the learning is carried out in accordance with the characteristics of elementary students, involves active participation of students, and is meaningful for students. This research focuses on the implementation of the program in grade 5 of SDN 1 Kauman with a total of 42 students. In grade 5, the traditional games used are sack and stilt racing which are related to the material of speed. The following is an explanation of the implementation of the Mathematics Ethnic Learning program in class 5 at SDN 1 Kauman.

The first stage is the preparation stage. The results obtained from this stage are that a Learning Implementation Plan (RPP) and its accessories have been prepared for 6 meetings. In addition, traditional game tools have been prepared to be used for program implementation in the form of congklak, gobak sodor tracks, sacks for sack races, stilts, and first aid kits. Then do the pretest. This activity was carried out on March 6 2023 offline at SDN 1 Kauman. The purpose of this activity is to find out students' understanding and character of love for the motherland in grade 5 SDN 1 Kauman. Students are given tests in the form of understanding questions and questionnaires on the character of loving the homeland. The next stage is implementing traditional games in learning mathematics. Before the game is carried out, briefing and guidance activities are first carried out with the aim that students understand the stages of the activities to be carried out.

The implementation of the Mathematics Ethnic Learning program activities has actually been carried out regularly by teachers and students as a school program that is integrated with the subject matter. However, in this study the implementation of the activity was carried out four times by adjusting the research design. In the first and second weeks, the implementation of the first session of speed learning was carried out by utilizing the traditional sack racing game. In the third and fourth weeks, the implementation of the second session of speed learning was carried out by utilizing the traditional game of stilts. Students took part in the activity enthusiastically. With that enthusiasm,

The Mathematics Ethnic Learning program begins with an apperception to explore students' prior knowledge in an effort to relate the learning material to be delivered. Furthermore, students were given assignments in groups to work on Student Worksheets (LKPD). In working on the LKPD students are given facilities in the form of traditional media games to make it easier for students to work on LKPD and to understand every material being taught. In working on group worksheets using traditional game media, it turned out that students found it easier to work on questions and understand the material. This is evident from the results of student answers on LKPD, which on average have the correct answer. The use of traditional game media is felt by students to make learning mathematics more fun and easy to understand so that students' interest in learning mathematics becomes higher. To find out more about students' understanding of mathematics subject matter, students were then asked to work on evaluation questions according to the material obtained that day. Based on the results of the scores obtained by students after working on evaluation questions, it turned out that many students got quite good grades. In accordance with these results it is evident that traditional games really help make it easier for students to understand the material. The implementation of the Mathematics Ethnic Learning program can be presented in Figure 1.

Figure 1. Implementation of Mathematics Ethnic Learning Program Activities in Grade 5

After the implementation is complete, in the fifth week a festival of traditional game activities is held. In this activity students form teams, each team consisting of 5 students and students can play all the games that exist at the game festival. This activity was also carried out as a venue for appreciation and motivation for students in learning mathematics so that they would be more interested and enthusiastic about participating in mathematics learning and the hope would also be able to improve their achievement. In the fifth week, a posttest was also carried out. Posttest activities have been carried out with the aim of measuring students' conceptual understanding abilities in learning mathematics and a sense of love for the homeland after the application of the Mathematics Ethnic Learning program.

After all the activities were implemented, evaluation and reflection activities were carried out which were attended by all students, along with the class 5 teacher at SDN 1 Kauman. This activity aims to evaluate the Mathematics Ethnic Learning program that has been implemented and to provide reflections for schools to implement program sustainability with better implementation. In this activity the results were achieved that the partners were very impressed with the Mathematics Ethnic Learning program because it can help schools increase students' interest and achievement in mathematics. The students are also very happy with this program because they can learn while playing, not just in class.

As an indicator of program success, activities at SDN 1 Kauman begin with a pretest and end with a posttest after the implementation of the activity. The implementation of research activities integrated with the school program was carried out in 4 meetings with each meeting including traditional games. The implementation of this activity begins with giving pretest questions to each grade 5 student to measure the extent to which students understand concepts in learning mathematics and love for the motherland. Then, at the end of the implementation, a posttest was carried out to find out changes in students' conceptual understanding abilities in learning mathematics and a sense of love for the homeland after the implementation of the Mathematics Ethnic Learning program.

The Mathematics Ethnic Learning Program has been carried out as an effort to improve students' understanding of mathematical concepts. Data was collected from the results of the pretest and posttest of all 5th grade students at SDN 1 Kauman, totaling 42 students. Before testing the hypothesis, a prerequisite test is first carried out in the form of a normality test and homogeneity test on the data that has been collected. The normality test is used to determine whether the data that has been obtained is normally distributed or not.

The results of the normality test for the kolmogorov-smirnov data for understanding mathematical concepts from the pretest data show that the significance value is 0.124 > 0.05, so that the pretest data for understanding mathematical concepts obtained is normally distributed. The posttest data shows that the significance value is 0.06 > 0.05, so the posttest data for understanding mathematical concepts obtained is also normally distributed. So according to the basis for decision making in the kolmogorov-smirnov normality test, it can be concluded that the data that has been obtained is normally distributed. Thus, the assumptions or requirements for normality in the t test in parametric statistics have been fulfilled.

Apart from being tested for normality, the data obtained related to students' understanding of mathematical concepts was also tested for homogeneity. It aims to determine whether the data has a homogeneous variance or not. Based on the results of the homogeneity test, it is known that the value of Sig. for the pretest and posttest variable values of students' understanding of mathematical concepts obtained is 0.964. Due to the significance value of 0.964 > 0.05, it can be concluded that the data variance of grade 5 students' pretest and posttest scores related to students' understanding of mathematical concepts is homogeneous, so that it can proceed to the t-test.

Once it is known that the data on students' understanding of mathematical concepts obtained are normally distributed and homogeneous, then it can be continued with hypothesis testing in parametric statistics using the paired sample t-test. The paired sample t-test aims to determine whether there is a significant difference between the two paired samples, in this case, the results of the pretest and posttest data. If there is a difference, then there is a significant influence from the Mathematics Ethnic Learning program in increasing students' understanding of mathematical concepts. Following are the results of the paired sample t-test from data on students' understanding of mathematical concepts which can be presented in Table 4.

Table 4. Paired Samples Test Understanding Mathematical Concepts

	Paired Differences						
	Means	**std. Deviation**	**std. Error Means**	**95% Confidence Interval of the Difference**	**t**	**df**	**Sig. (2-tailed)**

					Lower	Upper			
Pair 1	Pretest - Posttest	-24.643	3.727	0.575	-25.804	-23.481	-42.846	41	0.000

The results of testing students' mathematical concept understanding data on the paired samples t-test as show in Table 4 shows that the sig. (2 tailed) is less than 0.05 (0.000 <0.05) which means that there is a significant difference in the results of the pretest and posttest data on students' understanding of mathematical concepts. This shows that there was a significant increase in data from the pretest to the posttest. So, it can be concluded that the Mathematics Ethnic Learning program has a significant effect on increasing students' understanding of mathematical concepts. Thus, the decision of the statistical test, H_o is rejected and H_a is accepted. To test the effectiveness of the Mathematics Ethnic Learning program in increasing students' understanding of mathematical concepts, an n-gain score test was carried out. The test is used to determine the effectiveness of a treatment given to the sample. The following is the final result of calculating the n-gain score from the Mathematics Ethnic Learning program which can improve students' understanding of mathematical concepts in Table 5.

Table 5. Recapitulation of N-Gain Scores for Understanding Mathematical Concepts

Test	Mark
Pretest mean	61.90
Posttest mean	86.55
Maximum/Ideal Score	100
N-Gain Figures	0.647
N-Gain percentage	64.7%

Based on the n-gain score test as show in Table 5, the n-gain percentage is 64.7%. Referring to the categorization of n-gain percentages, these percentages can be categorized as quite effective. So, it can be concluded that the Mathematics Ethnic Learning program can be quite effective in increasing the understanding of mathematical concepts in grade 5 students at SDN 1 Kauman.

The Mathematics Ethnic Learning program has also been carried out as an effort to improve the character of students' love for the homeland. The program utilizes traditional Indonesian games, namely sack racing and stilts which are related to speed material in grade 5. This is an alternative way to foster a sense of love for the homeland in students, because mathematics learning is carried out using traditional games which are one of the nation's cultural treasures. Indonesia. Before testing the hypothesis, a prerequisite test is first carried out in the form of a normality test and homogeneity test on the data that has been collected. The results of the normality test of the kolmogorov-smirnov data for the love of the homeland character from the pretest data show that the significance value is 0.06 > 0.05, so that the pretest data for the love of the homeland character obtained is normally distributed. The posttest data shows that the significance value is 0.056 > 0.05, so that the posttest data for the love of the homeland character obtained is also normally distributed. So according to the basis for decision making in the kolmogorov-smirnov normality test above, it can be concluded that the data that has been obtained is normally distributed. Thus, the assumptions or requirements for normality in the t-test in parametric statistics have been fulfilled. Apart from being tested for normality, the data obtained related to the character of students' love for their homeland was also tested for homogeneity. It aims to determine whether the data has a homogeneous variance or not. Based on the results of the homogeneity test, it is known that the value of Sig. for the pretest and posttest value variables of the student's love of the motherland character obtained is 0.927. Due to the significance value of 0.927 > 0.05, it can be concluded that the data variance of grade 5 students' pretest and posttest values related to the students' patriotism character is homogeneous, so that it can proceed to the t-test.

Once it is known that the data on students' understanding of mathematical concepts obtained are normally distributed and homogeneous, then it can be continued with hypothesis testing in parametric statistics using the paired sample t-test. The paired sample t-test aims to determine whether there is a significant difference between the two paired samples, in this case, the results of the pretest and posttest data. If there is a difference, then there is a significant influence from the Mathematics Ethnic Learning program in increasing students' sense of patriotism. Following are the results of the paired sample t-test from the data on students' love for their homeland which can be presented in Table 6. Base on Table 6 show the results of testing the character data of students' love for their homeland in the paired samples t-test above shows that the sig. (2 tailed) is less than 0.05 (0.000 < 0.05) which means that there is a significant difference in the results of the pretest and posttest of the students' love of land character data.

This shows that there was a significant increase in data from the pretest to the posttest. So, it can be concluded that the Mathematics Ethnic Learning program has a significant effect on increasing the character of students' love of the homeland. Thus, the decision of the statistical test, Ho is rejected and Ha is accepted.

To test the effectiveness of the Mathematics Ethnic Learning program in increasing students' love of the land character, an n-gain score test was carried out. The test is used to determine the effectiveness of a treatment given to the sample. The following is the final result of calculating the n-gain score from the Mathematics Ethnic Learning program which can increase the character of loving the motherland in students in Table 7.

		Paired Differences					t	df	Sig. (2-tailed)
		Means	std. Deviation	std. Error Means	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pretest - Posttest	-3.714	1.154	0.178	-4.074	-3.355	-20.865	41	0.000

Table 6. Paired Samples Test Character of Homeland Love

Table 7. Recapitulation of the N-Gain Score for the Character of Homeland Love

Test	Mark
Pretest mean	5.86
Posttest mean	9.57
Maximum/Ideal Score	12
N-Gain Figures	0.604
N-Gain percentage	60.4%

Based on the n-gain score test Table 7, the n-gain percentage is 60.4%. Referring to the categorization of n-gain percentages, these percentages can be categorized as quite effective. So, it can be concluded that the Mathematics Ethnic Learning program can be quite effective in increasing the character of love for the homeland for grade 5 students at SDN 1 Kauman.

Discussion

The Mathematics Ethnic Learning Program has succeeded in making students more interested and enthusiastic in learning mathematics. Students can more easily understand the concepts in learning mathematics. In its application in grade 5 it was carried out for four meetings by utilizing the traditional game of sack and stilt racing. Students understand the concept of speed with the game, from instilling the initial concept to applying speed in everyday life. In this study, researchers sought to determine the effectiveness of the implementation of the Mathematics Ethnic Learning program, especially in grade 5 of SDN 1 Kauman in increasing students' understanding of mathematical concepts and the character of loving the homeland. The advantage of this program is of course that it can increase students' enthusiasm for learning mathematics with games.

The Mathematics Ethnic Learning Program is a program from SDN 1 Kauman which is integrated with the subject of mathematics. This effort was carried out by utilizing traditional games as an effort to attract students' interest and enthusiasm in learning mathematics. Traditional games associated with learning mathematics are often referred to as ethnomathematics. This is in line with the statement that ethnomathematics is an idea in mathematics education with the aim of making mathematics relevant and meaningful for students, so that mathematics feels close to students' social and cultural life (Herawaty et al., 2020). Thus, this learning approach can help students understand mathematical concepts. In addition, regional local wisdom is maintained by preserving traditional games so as to foster attitudes and character of love for the motherland in students (Ahdhianto et al., 2020; Rakhman & Wibawa, 2019).

The theory expressed by Vygotsky states that one of the important factors in the stages of students understanding learning is the student's social environment, including that students will more easily learn to use songs, language, art, and games. This will make it easier for students to understand learning material because they are in the socio-cultural environment around students (Barnett, 2019; Dewi et al., 2019). Students already understand something that comes from their social environment, so

that when learning tries to be associated with their social environment, the learning will be meaningful for students and make it easier for students to understand concepts in learning (Barnett, 2019; Das, 2020). In addition, there is an associating process within students, so that students try to associate it with their social environment and this will enter into students' long-term memory.

Besides that, the theory expressed by previous study states that the position of meaningful learning is very important in the learning process. Meaningful learning is learning where students can relate the new knowledge they have acquired with the experience they have previously obtained (Agra et al., 2019; Makhmudah et al., 2019). Learning with meaningfull learning theory will make the knowledge students receive last a long time. Traditional games are an attempt to associate with learning mathematics with the aim that students can more easily understand the concepts in learning mathematics. The results of the study show that traditional games really support student learning. The results of this study are in line with research conducted by previous study which states that traditional games can be used to increase student motivation and enthusiasm for learning (Junaedah et al., 2020). This will have an impact on students' understanding of concepts. Strengthened by the results of research conducted by other study which produces traditional game-based learning media can lead to fun learning for students (Oktavia & Agustin, 2019). Furthermore other study revealed that the impact of traditional game-based mathematics learning can increase student motivation and learning outcomes (Partovi & Razavi, 2019).

Based on the research results from the students' understanding test scores and the character questionnaire for loving the homeland before and after the program was implemented, it showed a significant increase in these two aspects. Based on the statistical analysis that has been done, the results of the paired sample t-test from both aspects have a value of 0.000 < 0.05. This shows that there is a significant difference in the form of an increase in students' understanding of mathematical concepts and the character of loving their homeland. These results indicate that learning mathematics by applying traditional games can have a significant effect on students' understanding of the concept and character of loving the motherland. Furthermore, after being tested using the n-gain score formula,

The findings in this study are in line with research conducted by previous study which states that the traditional game of gobag sodor has an effect on students' learning interest (Nasta'in et al., 2021). Based on the results of the post-test of the interest in learning with the traditional game Gobag Sodor, the results obtained have increased when compared to before the traditional game Gobag Sodor was given, with an average pretest score of 67.1690, an increase in the post-test score of 80.2676. This further strengthens that there is an influence of the traditional Gobag Sodor game on students' learning interest. This is shown from the results of the t-test analysis obtained tcount = 27.838 with a significant level ttable of 5% df = 70 of 1.994. So tcount > ttable with sig. 0.000 <0.05, then Ha is accepted and H0 is rejected (Nasta'in et al., 2021).

This is also supported by research conducted by previous study which states that learning by utilizing traditional games is effective in increasing students' understanding of mathematics learning concepts (Puspitasari, 2022). The results of this study show an increase in the understanding of numbers through traditional games. In cycle 1 there is an average value of 25.6 and in cycle 2 the average is 35. This shows that there is a significant increase. Based on these results, it proves that playing can provide fun, information, develop imagination, improve communication skills, and help understand children's thoughts (Enok & Mayasarokh, 2022; Puspitasari, 2022). In addition to increasing understanding of concepts in mathematics, traditional games can also foster attitudes and character of patriotism in students through regional local wisdom.

The character of loving the motherland is a character that must be owned by every citizen because it will affect the way individuals think, behave, and act that reflects loyalty, care, and gives the highest respect to their nation. Cultivating character through culture, one of which is traditional games, is an effort to foster students' love for existing local wisdom and respect for something that belongs to their nation (Mustakimah & Mu'amamah, 2021; Taskiyah & Widiyastut, 2021). This will lead to an increase in students' love for their homeland, so that students can be proud to be individuals who live in their country. Based on the results of this study, it is proven that the Mathematics Ethnic Learning program by utilizing traditional games can effectively increase students' love of the country. This is in line with research conducted by by previous study which states that traditional games can be used as a means to foster a sense of love for the motherland in children (Enok & Mayasarokh, 2022). The results of this study can be concluded that planning begins with entering the eighteen character values into the semester program and then into the RPPM and RPPH. The implementation of the formation of the character value of loving the motherland is found in learning activities, acculturation activities and habituation. While the evaluation of the implementation of character education learning is carried out daily, weekly, monthly, and periodically. With this activity, children's sense of concern for their environment can grow well and

children are able to protect the school environment and the environment around the school (Enok & Mayasarokh, 2022; Putri Ningrat et al., 2018).

The limitations of this research are that it is only implemented in grade 5, but school programs run in all classes. This is done because grade 5 is the age of the child from concrete operational to formal operational, so that it becomes an emphasis on understanding concepts in students so that students can more easily go to the stages of formal operational development without being assisted by concrete objects. The implication of this research is that students become enthusiastic in participating in learning mathematics because this is in accordance with the stages of development and their socio-cultural environment. This will have an impact on students' understanding of mathematical concepts so that students will be more able to solve their daily life problems more easily. In addition, students are introduced to local wisdom in their area in the form of traditional games so as to foster a sense of love for their homeland for their nation. This research can be used as a reference for further research that discusses ethnomathematics. students are introduced to local wisdom in their area in the form of traditional games so as to foster a sense of love for the homeland for their people. This research can be used as a reference for further research that discusses ethnomathematics. students are introduced to local wisdom in their area in the form of traditional games so as to foster a sense of love for the homeland for their people. This research can be used as a reference for further research that discusses ethnomathematics.

4. CONCLUSION

The Mathematics Ethnic Learning Program makes use of traditional games with the main objective of increasing conceptual understanding and a sense of love for the homeland which is integrated into mathematics learning at SDN 1 Kauman. In addition, this program is designed to preserve existing local wisdom. With traditional games, students' understanding of math concepts at SDN 1 Kauman can increase because the learning is carried out in accordance with the characteristics of elementary students, involves active student participation, and is meaningful to students. implemented shows a significant increase in both aspects. These results indicate that learning mathematics by applying traditional games can have a significant effect on students' understanding of the concept and character of loving the motherland. Furthermore, after being tested using the n-gain score formula, it shows that traditional games are quite effective in increasing the understanding of mathematical concepts and the character of loving one's homeland. By utilizing traditional games, students become enthusiastic in participating in learning mathematics because this is in accordance with the stages of development and their socio-cultural environment. For the next research, it is hoped that it can create a fun mathematics learning model by integrating technology in learning.

5. REFERENCES

Adpriyadi, A. (2018). Permainan Tradisional Engklek untuk Meningkatkan Kemampuan Motorik Kasar Kelompok B. *JPPM (Jurnal Pendidikan Dan Pemberdayaan Masyarakat)*, *4*(2), 187–198. https://doi.org/http://dx.doi.org/10.21831/jppm.v4i2.10016.

Agra, G., Formiga, N. S., Oliveira, P. S. de, Costa, M. M. L., Fernandes, M. das G. M., & Nóbrega, M. M. L. da. (2019). Analysis of the concept of Meaningful Learning in light of the Ausubel's Theory. *Revista Brasileira de Enfermagem*, *72*(1), 248–255. https://doi.org/10.1590/0034-7167-2017-0691.

Agus, C., Saktimulya, S. R., Dwiarso, P., Widodo, B., Rochmiyati, S., & Darmowiyono, M. (2021). *Revitalization of Local Traditional Culture for Sustainable Development of National Character Building in Indonesia BT - Innovations and Traditions for Sustainable Development* (W. Leal Filho, E. V Krasnov, & D. V Gaeva (eds.); pp. 347–369). Springer International Publishing. https://doi.org/10.1007/978-3-030-78825-4_21.

Ahdhianto, E., Marsigit, Haryanto, & Nurfauzi, Y. (2020). Improving Fifth-Grade Students' Mathematical Problem-solving and Critical Thinking Skills Using Problem-Based Learning. *Universal Journal of Educational Research*, *8*(5), 2012–2021. https://doi.org/10.13189/ujer.2020.080539.

Alam, A. (2022). A Digital Game based Learning Approach for Effective Curriculum Transaction for Teaching-Learning of Artificial Intelligence and Machine Learning. *2022 International Conference on Sustainable Computing and Data Communication Systems (ICSCDS)*, 69–74. https://doi.org/10.1109/ICSCDS53736.2022.9760932.

Ariandi, Y. (2016). Analisis Kemampuan Pemecahan Masalah Berdasarkan Aktivitas Belajar pada Model Pembelajaran PBL. *PRISMA, Prosiding Seminar Nasional Matematika*, *X*(1996), 579–585. https://journal.unnes.ac.id/sju/index.php/prisma/article/view/21561.

Aulia, E. V., Poedjiastoeti, S., & Agustini, R. (2018). The Effectiveness of Guided Inquiry-based Learning Material on Students' Science Literacy Skills. *Journal of Physics: Conference Series*, *947*(1). https://doi.org/10.1088/1742-6596/947/1/012049.

Barnett, S. (2019). Application of Vygotsky's Social Development Theory. *Journal of Education and Practice*, *10*(35), 1–4. https://doi.org/10.7176/jep/10-35-01.

Das, K. (2020). Realistic Mathematics & Vygotsky's Theories in Mathematics Education. *Shanlax International Journal of Education*, *9*(1), 104–108. https://doi.org/10.34293/education.v9i1.3346.

Dewi, C. A., Khery, Y., & Erna, M. (2019). An ethnoscience study in chemistry learning to develop scientific literacy. *Jurnal Pendidikan IPA Indonesia*, *8*(2), 279–287. https://doi.org/10.15294/jpii.v8i2.19261.

Enok, D., & Mayasarokh, M. (2022). Penanaman Nilai Karakter Cinta Tanah Air Pada Anak Usia Dini. *Jurnal Pelita PAUD*, *7*(1), 207–212. https://doi.org/10.33222/pelitapaud.v7i1.2193.

Faelasofi, R., Arnidha, Y., & Istiani, A. (2015). Metode Pembelajaran Mind Mapping untuk Meningkatkan Kemampuan Komunikasi Matematik Siswa dalam Pemecahan Masalah Matematika. *JURNAL E-DuMath*, *1*(2), 122–136. https://core.ac.uk/download/pdf/229584114.pdf.

Fathani, A. H. (2016). Pengembangan Literasi Matematika Sekolah dalam Perspektif Multiple Intelligences. *Edu Sains: Jurnal Pendidikan Sains Dan Matematika*, *4*(2). https://doi.org/https://doi.org/10.23971/eds.v4i2.524.

Fatmawati, L., Pratiwi, R. D., & Erviana, V. Y. (2018). Pengembangan Modul Pendidikan Multikultural Berbasis Karakter Cinta Tanah Air dan Nasionalis pada Pembelajaran Tematik. *Scholaria: Jurnal Pendidikan Dan Kebudayaan*, *8*(1), 80–92. https://doi.org/10.24246/j.js.2018.v8.i1.p80-92.

Firmansyah, D., & Dede. (2022). Teknik Pengambilan Sampel Umum dalam Metodologi Penelitian. *Literature Review. Jurnal Ilmiah Pendidikan Holistik (JIPH*, *1*(2), 85–114. https://doi.org/10.55927/jiph.v1i2.937.

Hardiman, H., & Ardianto, A. (2016). Kabhanti Wuna Media Komunikasi Tradiosonal Dan Tantangannya Di Era Globalisasi. *Potret Pemikiran*, *20*(2). https://doi.org/10.30984/pp.v20i2.751.

Hasyim, I., Utama, A. P., & Setiawan, B. (2022). Urgensi Pendidikan Bela Negara Dalam Membentuk Kecerdasan Sosial Peserta Didik Sebagai Daya Dukung Pertahanan Negara. *Indonesian Journal of Social Science Education (IJSSE)*, *4*(1), 1–10. https://doi.org/10.29300/ijsse.v4i1.6191.

Herawaty, D., Widada, W., Adhitya, A., Sari, R. D. W., Novianita, L., & Falaq Dwi Anggoro, A. (2020). Students' ability to simplify the concept of function through realistic mathematics learning with the ethnomathematics approach. *Journal of Physics: Conference Series*, *1470*(1), 12031. https://doi.org/10.1088/1742-6596/1470/1/012031.

Huang, Y.-C. (2021). Comparison and Contrast of Piaget and Vygotsky's Theories. *Proceedings of the 7th International Conference on Humanities and Social Science Research (ICHSSR 2021)*, *554*(Ichssr), 28–32. https://doi.org/10.2991/assehr.k.210519.007.

Junaedah, J., Thalib, S. B., & Ahmad, M. A. (2020). The Outdoor Learning Modules Based on Traditional Games in Improving Prosocial Behaviour of Early Childhood. *International Education Studies*, *13*(10), 88. https://doi.org/10.5539/ies.v13n10p88.

Kurniawan, M. I. (2015). Mendidik Untuk Membentuk Karakter Siswa Sekolah Dasar: Studi Analisis Tugas Guru Dalam Mendidik Siswa Berkarakter Pribadi Yang Baik. *PEDAGOGIA: Jurnal Pendidikan*, *4*(2), 121. https://doi.org/10.21070/pedagogia.v4i2.14.

Mahmudah, Syahputri, S., & Priyanda, R. (2021). Meningkatkan Minat Belajar Perkalian Matematika dengan Permainan Congklak di SDN Sidorejo. *Pros. SemNas Peningkatan Mutu Pendidikan*, *2*, 44–49. https://semnasfkipunsam.id/index.php/semnas2019/article/view/57.

Makhmudah, N. L., Subiki, & Supeno. (2019). Pengembangan Modul Fisika Berbasis Kearifan Lokal Permainan Tradisional Kalimantan Tengah Pada Materi Momentum dan Impuls. *Jurnal Pembelajaran Fisika*, *8*, 181–186. https://doi.org/https://doi.org/10.19184/jpf.v8i3.15222.

Mustakimah, M., & Mu'amamah, S. (2021). Upaya Membentuk Karakter Percaya Diri dan Kreatif Pada Anak Usia Dini Melalui Permainan Tradisional Jamuran. *Journal of Early Childhood and Character Education*, *1*(1), 35–52. https://doi.org/10.21580/joecce.v1i1.6613.

Nasta'in, T., Nurkholis, M., & Allsabah, M. A. H. (2021). Pengaruh Permainan Tradisional Gobag Sodor Terhadap Minat Belajar Siswa se-Kecamatan Lengkong Tahun Pelajaran 2020/2021. *Indonesian Journal of Kinanthropology (IJOK)*, *1*(1), 29–35. https://doi.org/10.26740/ijok.v1n1.p29-35.

Nurkayati, S. (2020). Peningkatan Minat Baca Pada Peserta Didik Sekolah Dasar Negeri 202/IX Bukit Makmur Kabupaten Muaro Jambi. *Jurnal Ilmiah Universitas Batanghari Jambi*, *20*(3), 1060. https://doi.org/10.33087/jiubj.v20i3.1097.

O'Neil Jr., H. F., & Brown, R. S. (1998). Differential Effects of Question Formats in Math Assessment on

Metacognition and Affect. *Applied Measurement in Education*, *11*(4), 331–351. https://doi.org/10.1207/s15324818ame1104_3.

Oktavia, A., & Agustin, H. (2019). Umbul Card: A Traditional Game as Nutrition Education Media among Elementary School Students. *International Journal of Educational Research Review*, *5*(1), 1–9. https://doi.org/10.24331/ijere.646821.

Partovi, T., & Razavi, M. R. (2019). The effect of game-based learning on academic achievement motivation of elementary school students. *Learning and Motivation*, *68*, 101592. https://doi.org/10.1016/j.lmot.2019.101592.

Puspitasari, R. N. (2022). Efektifitas Permainan Tradisional Terhadap Pemahaman Bilangan. *Jurnal Lentera Anak*, *3*(1), 1–16. https://ejournal.unisnu.ac.id/jla/article/view/3158.

Putri Ningrat, S., Tegeh, I. M., & Sumantri, M. (2018). Kontribusi Gaya Belajar Dan Motivasi Belajar Terhadap Hasil Belajar Bahasa Indonesia. *Jurnal Ilmiah Sekolah Dasar*, *2*(3), 257. https://doi.org/10.23887/jisd.v2i3.16140.

Rakhman, A., & Wibawa, B. (2019). Character learning through traditional games urang banjar. *International Journal of Innovation, Creativity and Change*, *8*(11), 172–180. https://www.ijicc.net/images/vol8iss11/81111_Rakman_2019_E_R.pdf.

Rochmad. (2012). Desain model pengembangan perangkat pembelajaran matematika. *Kreano: Jurnal Matematika Kreatif-Inovatif*, *3*(1), 59–72. https://doi.org/10.15294/kreano.v3i1.2613.

Rosala, D., & Budiman, A. (2020). Local Wisdom-Based Dance Learning: Teaching Characters to Children through Movements. *In Elementary School Forum (Mimbar Sekolah Dasar)*, *7*(3), 304–326. https://eric.ed.gov/?id=EJ1280444.

Rusyda, N. A., & Sari, D. S. (2017). Pengaruh Penerapan Model Contextual Teaching and Learning Terhadap Kemampuan Pemahaman Konsep Matematis Siswa Smp Pada Materi Garis Dan Sudut. *JNPM (Jurnal Nasional Pendidikan Matematika)*, *1*(1), 150. https://doi.org/10.33603/jnpm.v1i1.243.

Sanghvi, P. (2020). Piaget ' s Theory of Cognitive Development. *Indian Journal of Mental Health*, *7*(2), 90–96. https://openlab.bmcc.cuny.edu/ece-110-lecture-summer-2020longley/wp-content/uploads/sites/369/2020/05/ReichShapiro-2018-Piaget.pdf.

Saputro, B. A. (2016). Kemampuan Komunikasi Matematis Siswa Sekolah Dasar Yang Belajar Menggunakan Permainan Tradisional. *Metodik Didaktik*, *10*(2), 63–72. https://doi.org/10.17509/md.v10i2.3790.

Setia, M. S. (2016). Methodology series module 3: Cross-sectional studies. *Indian Journal of Dermatology*, *61*(3), 261. https://doi.org/10.4103/0019-5154.182410.

Sili, K. K., Napfiah, S., & Kurniawati, A. (2018). Pengembangan Modul Materi Barisan dan Deret Kelas X SMK dengan Pendekatan REACT. *PRISMATIKA: Jurnal Pendidikan Dan Riset Matematika*, *1*(1), 10–22. https://doi.org/10.33503/prismatika.v1i1.298.

Taskiyah, A. N., & Widiyastut, W. (2021). Etnomatematika dan Menumbuhkan Karakter Cinta Tanah Air pada Permainan Engklek. *Jurnal Pendidikan Matematika (Kudus)*, *4*(1), 81–94. https://doi.org/10.21043/jmtk.v4i1.10342.

Trajkovik, V., Malinovski, T., Vasileva-Stojanovska, T., & Vasileva, M. (2018). Traditional games in elementary school: Relationships of student's personality traits, motivation and experience with learning outcomes. *PLOS ONE*, *13*(8), e0202172. https://doi.org/10.1371/journal.pone.0202172.

Utami, R. W., Endaryono, B. T., & Djuhartono, T. (2018). Kemampuan Peserta Didik dalam Menyelesaikan Soal Cerita Matematika. *Jurnal Ilmiah Kependidikan*, *5*(3), 187–192. https://doi.org/10.30998/fjik.v5i3.2719.

Wahyuni, A., Aji, A., Tias, W., & Sani, B. (2013). Peran Etnomatematika dalam Membangun Karakter Bangsa. *Prosiding Penguatan Peran Matematika Dan Pendidikan Matematika Untuk Indonesia Yang Lebih Baik*, *1*, 111–118. https://core.ac.uk/download/pdf/18454275.pdf.

Wibowo, S., Anggraini, S. P., Sunaryo, S., Sugevin, W., Nirwana, R. C., & Yuniawatika, Y. (2022). Program Mathematics Ethnic Learning untuk Meningkatan Minat Belajar Matematika Siswa SDN 1 Kauman. *Jurnal ABDINUS : Jurnal Pengabdian Nusantara*, *6*(2), 520–530. https://doi.org/10.29407/ja.v6i2.16666.

Widodo, S. A., Darhim, D., & Ikhwanudin, T. (2018). Improving mathematical problem solving skills through visual media. *Journal of Physics: Conference Series*, *948*(1). https://doi.org/10.1088/1742-6596/948/1/012004.

Yu, Z., Gao, M., & Wang, L. (2021). The Effect of Educational Games on Learning Outcomes, Student Motivation, Engagement and Satisfaction. *Journal of Educational Computing Research*, *59*(3), 522–546. https://doi.org/10.1177/0735633120969214.

Zuliana, E., Retnowati, E., & Widjajanti, D. B. (2019). How should elementary school students construct their knowledge in mathematics based on Bruner's theory? *Journal of Physics: Conference Series*,

1318(1). https://doi.org/10.1088/1742-6596/1318/1/012019.