

The Effect Of Using *Loose Parts* Learning Materials On The Mathematical Skills Of Year 2 Pupils At SD Negeri 09 Sayan

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Abstract

The purpose of this study was to determine whether the application of loose part learning media can improve students' numeracy skills in mathematics learning. This study employed a quantitative method using a One-Group Pre-Posttest design with a sample comprising 16 Year 2 students. Data were collected through validity tests (trial questions) and reliability ($\alpha = 0.7$), then analysed using the Wilcoxon test with SPSS 21. The results showed a significant increase (Sig. $0.001 < 0.05$), with the post-test mean (66.56) higher than the pre-test mean (52.19). This finding demonstrates that loose parts are effective in improving students' numeracy skills. Consequently, the null hypothesis (H_0) is rejected and the alternative hypothesis (H_a) is accepted. It can therefore be concluded that there is a difference in the average learning outcomes between the pre-test and post-test, indicating a significant change following the intervention. This confirms that there is an effect of using loose parts as a learning medium on the numeracy skills of Year 2 pupils at SDN 09 Sayan.

Keywords: *Loose Parts; Numeracy Skills, Mathematics*

1. INTRODUCTION

Learning resources are tools used in the teaching and learning process to enhance the quality of learning, thereby improving learners' knowledge, attitudes and skills. Learning resources play a vital role in education. They are an integral part of the learning process, providing meaningful experiences. The use of learning resources is crucial for improving the quality of learning and clarifying the presentation of messages and information, thereby facilitating and enhancing the learning process and outcomes.

Loose parts are materials made up of separate components that can be moved, carried, combined, redesigned, separated and reassembled in various ways according to the child's creativity (Nurfadilah et al., 2020:227). Loose parts encourage children's creativity because they can create without limits whilst playing with them during learning activities. These materials, which can be moved, carried, combined, redesigned, separated and reassembled in various ways, create endless possibilities for creativity in classroom learning activities. This medium can be used on its own or combined with other objects to form a single unit, and once finished, it can be returned to its original condition and function (Sunarti et al., 2023). Therefore, loose parts are a medium that is easy for pupils to play with because they can be easily adapted in various ways according to the pupils' own creativity.

Numeracy is an introduction to mathematics that concerns the properties and relationships of real numbers and their calculations, particularly with regard to addition, subtraction, multiplication and division, which are the most basic arithmetic operations () (Romlah et al., 2020:73). Pupils' numeracy skills in primary school are greatly influenced by the quality of the learning process in the classroom. Difficulty with

numeracy, or ‘ ’ (dyscalculia), is a developmental disorder affecting arithmetic or mathematical skills that impacts pupils’ academic achievement and their daily lives (Valentina & Wulandari, 2022). One needs to learn arithmetic because it is necessary in work and in human life. Arithmetic ability is a skill possessed by every child; it is not merely about reciting written language or repeating the teacher’s words quickly and accurately, but rather arithmetic ability is an action performed through the coordination of several individual skills in observing, naming, understanding, and writing numerical symbols that are precise and consistent with the information.

Based on the above description of the findings from the observation conducted on 27 September 2024 at SD Negeri 09 Sayan, the researcher noted that some pupils lacked confidence in their answers when responding to questions posed by the teacher; they continued to ask how to solve the problems set by the teacher. The researcher also interviewed the Year 2 form tutor, who reported that the teacher faced the challenge of pupils’ arithmetic skills being low or not yet at their full potential in mathematics lessons. This was evidenced by the results of the test set by the teacher, which averaged 44.37, whilst the minimum passing mark (KKM) for the test was 55.

Having reviewed the results of observations, interviews and pupils’ test results, the researcher was motivated to conduct this study by implementing loose parts as a learning resource. The rationale for selecting this resource was to develop pupils’ abilities through its use, making learning more engaging and encouraging pupils to take a greater interest and be more active in the learning process, whilst also improving their numeracy skills.

2. METHOD

The research method employed in this study is a quantitative research method. The type of research design used is *a pre-experimental design*. The research design employed in this study is *a One-Group Pre-test-Post-test Design*. In this design, *a pre-test* is administered to the sample first, followed by the application of the predetermined treatment, and finally *a post-test* is administered to the sample. Consequently, the results of the treatment can be determined more accurately, as they can be compared with the situation prior to the treatment.

The sample for this study consists of all 16 pupils in Year 2 at SDN 09 Sayan. This comprises 9 girls and 7 boys.

The research will be conducted at SDN 09 Sayan, Nanga Sayan Village, Sayan Sub-district, Melawi District.

The research will be carried out from March 2025 until completion. The steps or procedures to be followed in this study are as follows:

1. Research Preparation Stage: Selecting the school to serve as the research site; conducting observations; preparing teaching materials in the form of lesson plans or modules (); preparing research instruments in the form of *pre-tests* and *post-tests*; validating the teaching materials and research instruments; revising the teaching materials and research instruments; pilot-testing the research instruments; analysing the data from the pilot test.
2. Implementation Stage: Administering *a pre-test* prior to the intervention to assess the students’ initial abilities; implementing the intervention on the sample group using

loose parts as a learning medium; administering a *post-test* to assess the students' final abilities following the intervention. Changes in *pre-test* and *post-test* scores are used as a basis for comparison using appropriate statistical calculations.

3. Final Research Stage: Processing data from the pre-test and post-test; describing and analysing the results obtained; drawing conclusions to address the research questions; and summarising the research findings.

The data collection method used was a test. The data collection instrument was a test paper. In this test, the researcher used a *multiple-choice test*, which is a form of objective test consisting of items that can be answered by selecting the correct alternative from a number of options provided. This test was conducted to collect data on the use of *loose parts* as a learning medium in order to assess the numeracy skills of Year 2 pupils at SDN 09 Sayan in the subject of mathematics.

The data analysis techniques employed in this study involved testing the validity and reliability of the instruments. Hypothesis testing was conducted using the Wilcoxon test, with data processed using SPSS (*Statistical Product and Service Solutions*) version 27 to assist the author in analysing the data from the *pre-test* and *post-test* results, in order to determine whether there was a significant effect on pupils' numeracy skills following the use of *loose parts* as a learning medium.

3. RESULTS AND DISCUSSION

Based on the results of the research conducted, this study was carried out at SD Negeri 09 Sayan over a period of one month. The subjects of this study were 16 Year 2 pupils, and the title of the study was 'The Effect of Using Loose Parts as a Learning Medium on the Numeracy Skills of Year 2 Pupils at SDN 09 Sayan'.

The aim of this study was to determine the extent to which the use of loose parts as a learning medium influences the numeracy skills of Year 2 pupils at SDN 09 Sayan. In the initial stage of the study, the researcher developed the instruments to be used. These instruments comprised pre-test and post-test questions, which were used to measure the pupils' level of understanding of the material taught. To ensure the instruments were of high quality, they were tested prior to use. The questions were multiple-choice, comprising 25 pre-test questions and 25 post-test questions.

Before the questions were used, the researcher first pilot-tested the questionnaire on pupils at SDN 06 Emang Bemban; the questionnaire was tested on 20 pupils. The validity of the questions was tested using Pearson's product-moment correlation technique with SPSS version 27. The validity test was conducted using a cut-off value of $r = 0.443$, which is considered valid. The validity test calculations showed that, of the 25 pre-test questions, 20 were valid, whilst 5 were invalid as they did not reach the minimum value of 0.443; the post-test yielded the same results, with 20 valid questions and 5 invalid ones. The valid questions represented the indicators being measured and could therefore be used as a research instrument.

The next instrument test was the reliability test. The reliability test was conducted using SPSS version 27 with the Cronbach's alpha method. The results of the reliability test showed that the Cronbach's Alpha value for the pre-test was 0.879 and for the post-

test was 0.894. Both values were greater than the minimum threshold of 0.7 (the general standard), so the instrument was deemed reliable and consistent in repeated measurements.

The students' learning outcomes prior to the intervention, as indicated by the pre-test results, showed that the highest score was 75 and the lowest was 20, with an average score of 52.19. This data illustrates the students' initial abilities prior to the implementation of the loose parts learning media. The students' learning outcomes following the intervention—which involved the use of loose parts learning media over three sessions—showed an improvement in scores, as evidenced by the post-test results. The highest score rose to 100, the lowest to 40, and the average increased to 66.56. A total of 11 students succeeded in exceeding the Minimum Passing Grade (KKM) of 55.

Based on the analysis of the pre-test and post-test data, there was an improvement in students' conceptual understanding, with the average score rising from 53.18 to 66.56. The maximum score increased from 75 to 100, and the minimum score increased from 20 to 40. The distribution of scores also showed an increase in score variation; for example, a student named Afifah Zahra saw her score increase by 20 points (from 60 to 80).

The statistical test using the Wilcoxon test showed that the standardised test statistic (Z) was 3.545, with an Asymp.Sig. (2-tailed) value of $0.001 < 0.005$. Consequently, the alternative hypothesis (H_a) is accepted, meaning there is a significant difference between the pre-test and post-test results; in other words, there is an effect of using loose parts learning materials on the numeracy skills of Year 2 pupils at SD Negeri 09 Sayan. Based on these results, it can be concluded that the use of loose parts learning materials has a positive effect on the numeracy skills of Year 2 pupils at SD Negeri 09 Sayan.

5. CONCLUSION

Based on the research findings, it can be concluded that there is a significant difference in results following the implementation of the loose parts learning medium, proving that the use of this medium has an impact on the numeracy skills of Year 2 pupils at SD Negeri 09 Sayan. This is evidenced by an analysis of the mean pretest score of 53.18 and the mean posttest score of 66.56. Furthermore, statistical analysis using the Wilcoxon test indicates that the standardised test result (Z) is 3.545, with an Asymp.Sig. (2-tailed) value of $0.001 < 0.005$. Consequently, the alternative hypothesis (H_a) is accepted, meaning there is a significant difference between the pre-test and post-test results; in other words, there is an effect of using loose parts learning media on the numeracy skills of Year 2 pupils at SD Negeri 09 Sayan. Based on these results, it can be concluded that the use of loose parts learning media has a positive effect on the numeracy skills of Year 2 pupils at SD Negeri 09 Sayan.

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