



Congklak Learning Media to Increase Student Learning Motivation in Class 2 Elementary School

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Abstract. Congklak game is one of the traditional games that have developed almost throughout Indonesia. However, over time with the development of the era, this traditional toy has begun to be forgotten. Congklak is a game that can teach facts, skills, concepts, and mathematical principles. Congklak is also very necessary to make it easier for students to understand mathematical material, more specifically in multiplication calculations. As a result, the goal of this study is to boost students' motivation as they learn how to multiply and do other arithmetic operations in mathematics. The multiplication calculation operation is an iterative addition process. Multiplication counting operations are also very important because they can help in everyday life. The research conducted is an experimental quantitative research that begins with observations through tests that have been prepared by researchers. In order to introduce the ideas of addition, subtraction, multiplication, and division of numbers operations, the congklak game is utilized as the basis for an analysis of the evolution of mathematics learning methods.

Keywords: Congklak Learning Media · Multiplication Arithmetic Operations · Learning Motivation

1 Introduction

As a result of the COVID-19 pandemic, it has had an impact on the world of education, especially in learning activities. Learning that was originally offline has turned into online and is now offline again. Grade 2 elementary school students who have recently experienced offline learning need a strong motivation to learn. The physiological state and psychological growth of pupils have an impact on learning motivation, which is a psychological feature that is still undergoing development [1]. Learning motivation is needed, especially in learning mathematics which tends to be considered difficult by students. One of the subjects that is crucial and plays a crucial part in the advancement of science and technology (IPTEK) is mathematics, because practicing creative patterns to solve issues is the same as studying maths [2].

One of the materials considered difficult by elementary school students in mathematics is the subject of multiplication counting operations. In principle, multiplication

is the same as repeated addition. However, not a few elementary school students think that multiplication is a difficult topic to understand. It turns out that there are still many students who have problems such as solving math problems in story form, understanding words, asking questions, and doing arithmetic [3]. Mathematics learning in Indonesia still emphasizes memorizing formulas and counting, this causes students' understanding abilities to be less developed [4].

In addition, along with the development of the times, children have started to leave traditional games which are cultural heritages that must be preserved. In Era 4.0. Today's students prefer gadgets as their game [5]. Elementary school students still apply reasoning to the concrete rather than the abstract or hypothetical [5]. Students can see, feel, express with direct thought the object they are studying, so that the abstract concept that has just been understood will settle, stick, and last long if students learn through doing, not just remembering. Thus, something concrete and interesting is needed in learning that contains cultural values for the current generation of the nation. Something concrete and interesting is none other than traditional learning media.

Learning media promotes learning motivation, promotes more direct interaction between students and their environment, and engages students' attention so that they can learn independently according to their interests and abilities. You can elevate and orient [6]. The traditional learning media that can be used for multiplication counting operations in grade 2 elementary school is Congklak. Congklak is a traditional game that can teach children numeracy skills [7]. The use of traditional games is able to foster social values in students from an early age, such as the ability to cooperate, the ability to interact, and respect for friends [8]. In addition, personally, students are also able to control themselves and their emotions. These kind of character values are important for students to be instilled from an early age).

Considering the importance of learning mathematics, we conducted this research with the aim and aim that students can have high learning motivation, especially in mathematics in grade 2 elementary school. The researchers chose Concrac Media because their students needed Concrac to understand the mathematical content, from the abstract to the concrete, especially in multiplication. Additionally, students can learn through play. Because a fun learning experience makes students feel comfortable and enthusiastic about learning [9].

A. Learning Media

The essence of learning is a conscious change in behavior that is cognitively, emotionally and psychomotorically positive [10]. Learning is the gradual adjustment or adaptation of behavior [11]. Learning is a component of education related to both explicit and implicit (hidden) interaction goals and reference materials [1]. In order to achieve the goals to be achieved in learning, media support is necessary [12]. Media is defined as anything that can bring information and knowledge into the ongoing interaction between teachers and students. Learning media is one of the determinants of the success of the learning process [13].

Learning media is necessary, especially when learning mathematics. By studying mathematics, we will learn to think critically, creatively, and actively which is needed by people in solving various problems [14].

B. *Motivation to learn*

In learning mathematics, students need motivation so that they do not feel forced to study the material presented by the teacher. Describes several elements that influence motivation in learning, namely: (1) the ideals and aspirations of the student that strengthen the learner's internal and external motivation for learning; (2) the ability of the student; social life, etc. [1]. The importance of student motivation is: (1) know the starting position, process, and end result of learning, (2) inform strength of learning effort compared to peers, (3) guide learning activities, and (4) generate enthusiasm for learning (5) Awareness of the existence of a continuous learning journey and then working [15].

C. Congklak Game

Congklak game is a game focused on counting skills [16]. On the congklak board there are 14 small holes, each of which two holes are opposite and there is one large hole on each side [9]. Therefore, the congklak game is appropriate to be applied as a learning medium, Developing students learn more enthusiastically and actively to support their ability to rely on concrete multiplication materials. Congklak game proved effective in learning to count [17]. This game is able to develop patience, thoroughness, and how students are trained to set strategies [18]. Using the Congklak game also has a positive effect on teaching number concepts to preschool children [19].

2 Methodology

A. *Research Strategy*

This research is an experimental quantitative research. The purpose of quantitative research is to determine relationships between variables within a population. In this design, the researcher chooses an experiment. Because in experimental studies measurements are made between variables before and after the investigation in order to recognize causal relationships of the phenomenon under study. In this design, at the beginning of the study, measurements were made by teaching in schools first, after that the researchers measured the variables using test questions that had been validated by experts. After being given treatment, the dependent variable was re-measured with the same measuring instrument, namely a questionnaire.

Researchers must be able to design learning systems that are able to motivate and improve students' skills because this will have an impact on the success of students in understanding the concepts being studied. By using congklak media as a motivational material for students to more easily understand concepts in multiplication numbers.

Experimental studies are studies that manipulate at least one variable to investigate causality [20]. Therefore, experimental studies go hand in hand with testing hypotheses to find effects, relationships, or differences in changes in treatment groups.

B. *Population and Sample*

A population is the totality of variables relevant to the problem under study [21]. Samples are partially drawn from the total study population and are considered representative of the population as a whole [22]. Researchers took samples in class 2 SDN 1 Bantargadung, totaling 25 people as the control class and class 2 at SDN 1 Kalaparea with 23 students as the experimental class.

C. *Sampling Method*

Sampling was done by researchers through purposive sampling. Purposive sampling is a random sample taken for research purposes. Purposive sampling is a sampling technique with specific considerations [23]. The reason for using this purposive sampling technique is that it is suitable for quantitative or non-generalized studies [23]. This means that each individual taken from the population is chosen intentionally based on certain considerations. The population is the entire research subject [24].

D. *Data Collection*

Data collection techniques are methods used in research to collect desired data. Data collection techniques used in this study are as follows:

1) *Test*

In this study, testing is a technique used to collect data for motivating students to learn math multiplication numbers using Congklak media. Used to collect data that is used to evaluate, namely to distinguish between initial conditions and conditions. [25] Tests used in education can be distinguished between learning outcomes tests and psychological tests [26]. The test that will be carried out this study is a test of learning outcomes in written or essay form, containing a total of 10 questions, aimed at assessing the value of student learning outcomes.

2) *Interview*

An interview is a technique used to collect data through questions and answers between a questioner or interviewer and a respondent or respondent. An interview is a meeting between two of her persons who exchange information or ideas through questions and answers in order to reduce to the conclusion or meaning of a particular topic [27]. In the description it can be concluded that the interview is a form of question made by the researcher to be submitted to the resource person. In this technique, those who will be interviewed are grade 2 teachers in elementary schools who are targeted by researchers with the aim of finding out related to student learning motivation in learning mathematics, especially in the material of multiplication arithmetic operations (Tables 1 and 2).

Table 1. Research Implementation in Class 2 SDN 1 Bantargadung

Date	Time	Activity
Wednesday	30 March 2022	Problem Observation
Monday	4 April 2022	Activity Program Planning
Wednesday	20 April 2022	Carrying out Learning Activities
Friday	23 22 April 2022	Conducting 2 nd grade teacher interview activities

Table 2. Research Implementation in Class 2 SDN 1 Bantargadung

Date	Time	Activity
Thursday	26 May 2022	Problem Observation
Monday	30 May 2022	Activity Program Planning
Thursday	02 June 2022	Carrying out Learning Activities
Saturday	23 04 June 2022	Conducting 2 nd grade teacher interview activities

E. Data Collection

The instruments used by researchers are in the form of:

1) *Question sheet (test)*

The question sheet (test) is intended for students, consisting of a pretest and a posttest. A pre-test was given to the students before the researchers treated them. A post-test was given to the students after the researchers treated them. Pre-test and post-test measures were given to determine the difference in scores achieved by students before and after treatment and to see if there was an increase when students received treatment by task force.

2) *Interview Sheet*

The interview sheets are intended for 2nd grade teachers in both the control class and the experimental class. The instrument was used with the aim of obtaining more

information related to students' learning motivation and learning media commonly used by grade 2 teachers in the two elementary schools.

F. Data Collection

The data obtained from the research are in the form of quantitative data. To analyze the data obtained, several tests were used, namely:

1) *Validity*

The sheet or instrument made by the researcher has been validated by the validator. Validity is a measure of the degree or adequacy of a means [28].

2) *Normality Test*

Normality tests are used to determine whether the dependent variable, the independent variable, or both are close to normal distributions [29]. This study uses his Kolmogorov-Smirnov test via his SPSS 21 program for Windows to determine the normality of the data distribution. A variable is normally distributed if the value of Asymp is for the variable with Sig. greater than the 5% significance level (>0.050). A variable is not normally distributed if Sig. is less than the 5% significance level (<0.050).

3) *Homogeneity Test*

Homogeneity testing aims to determine whether the object (three or more samples) studied have the same variance [30]. Homogeneity calculations were performed at the beginning of the data analysis activities.

This is done to determine whether the variances of the two study samples are homogeneous. In this study, homogeneity scores were obtained by performing a homogeneity of variance test. To test homogeneity, the researcher used her program SPSS for Windows with determination of her Sig. > 0.05 and the data have the same/uniform variance.

4) *T-test*

Data were normally distributed, followed by independent-samples t-tests using the SPSS version 18.00 program. Hypothesize if P-value (significance) (two-tailed). If 0.05 ; H_0 is accepted and interpreted as there is no significant difference in students' social skills or cognitive learning outcomes between experimental and control classes.

3 Discussion

A. *Implementation of Congklak Learning Media*

Implementation of Congklak learning media begins with implementing learning activities according to a learning implementation plan (RPP) created by researchers. In the experimental class, activities are carried out by delivering learning materials related to the calculation of repeated addition in multiplication. After that, students were introduced to congklak learning media. This is done with the aim of increasing students' motivation in learning mathematics with repeated addition. When the researcher introduced the congklak learning media, the students looked very enthusiastic and eager to learn using

the congklak learning media. This goal is carried out well with evidence in pictures and videos or on student learning outcomes that have been given a score by the researcher. Even though the learning process is going well, there are difficulties that occur when the learning process takes place.

In contrast to the experimental class, the learning activity in the control class does not use the Congklak learning media. This is done so that researchers can find out the differences in student learning motivation in the control and experimental classes, namely student learning motivation between learning using congklak learning media and learning without using congklak learning media. We can see this motivation both in real terms with picture and video evidence, or with student learning outcomes, namely the acquisition of scores from tests given by researchers. Because when students are motivated to learn, they become serious and achieve the greatest learning outcomes. Although in learning, they will definitely experience difficulties, but if the motivation is strong, students will not just give up in solving the problems given.

B. Difficulties Experienced by Students

When learning math, especially multiplication counting, at SDN 1 Bantargadung students learn by rote method, therefore students who remember by rote can answer questions correctly but they do not understand how the multiplication results are obtained. For example, when students are asked 2×3 , students will answer 6. But when they are asked where the number 6 is obtained, students are just silent because all they know is 2×3 is 6 without knowing where the result of the number 6 was obtained. This is also evident from the students' scoring results for question papers No. 1 to No. 4, with many students answering incorrectly.

Even without the use of learning media, students actively asked and responded to researchers, creating a more lively class atmosphere. Student achievement improved.

Each student who successfully answers the question will be given an appreciation according to what the class teacher usually does in learning activities that are usually carried out in the control class. And it is also proven that apart from learning media, appreciation can also affect students' learning motivation.

In learning mathematics, especially in the multiplication operation material at SDN 1 Kalaparea, namely the experimental class, students are accustomed to learning by using the memorization method so that in the practice of repeated addition questions the students do not understand how the multiplication results can be obtained. The case is not much different from what happened in the control class. When the researcher introduced the congklak learning media, the students looked enthusiastic and eager to get to know him. However, during an activity held by researchers related to congklak media, some students looked unmotivated because they looked like they didn't want to be broken by the group uniting with others.

Regarding congklak learning media, previously at SDN 1 Kalaparea there had never been any learning using congklak media. And this is the first time students learn to use congklak. This is in line with the results of interviews obtained by the researcher with

a grade 2 teacher at SDN 1 Kalaparea who stated that “I have never used Congklak learning media. Usually teach multiplication just by asking children to memorize it.”

C. Figures and Tables

According to the research objectives that have been stated previously, data is needed in the form of scores that describe student learning outcomes from the research sample, namely pretest scores, posttest scores and improvement scores. The pretest scores indicate the student’s ability in the control and experimental classes before learning in the learning media using the congklak learning media. Post-test score is a score that states the ability of students after learning mathematics using congklak learning media. Improvement in student performance can be expressed as the difference between posttest and pretest scores.

Since the control and experimental class samples are at the same level, student performance before and after learning is measured on the same instrument. The test is given to students who become the research sample. Thus, after conducting the pretest and posttest, the value data processing for each class in the research sample will be carried out and a description will be obtained as listed in following Table 3.

1) *Normality Test*

A normality test was performed with the aim of testing the difference in post-test student mean ability scores between the experimental and control classes. Table 3 shows the results of computing the normality test for each class:

From Table 3, we can see that the difference between the experimental class with the Concrak learning media and the control class without the learning media received significant values (Sig.) of 0.011 and 0.000 respectively, resulting in the Sig value. Since both classes < 0.05, we can conclude that the value data for the two classes are not normally distributed. Therefore, a Mann-Whitney test should be performed (Tables 4 and 5).

Based on Mann-Whitney test decision showing Asymp scores. If Sig. (2-sided) <0> 0.05, H0 if H0 is accepted if there is no significant difference in learning outcomes between students using Concrac learning media and students not using Concrac learning

Table 3. Tests of Normality

		Kolmogorov Smirnov			Shapiro Wilk		
		<i>Statistic</i>	<i>df</i>	<i>Sig.</i>	<i>Statistic</i>	<i>df</i>	<i>Sig.</i>
Learning Results of Times	<i>Post-Test of Control Class (Without Media)</i>	.200	25	.011	.789	25	.000
	<i>Post-Test of Exsperiment Class (Meida Congklakk)</i>	.284	23	.000	.751	23	.000

Table 4. Ranks

	Kelas	N	Mean Rank	Sum of Ranks
Learning Results of Times	<i>Post-Test of Control Class (Without Media)</i>	25	22.04	551.00
	<i>Post-Test of Exsperiment Class (Meida Congklakk)</i>	23	27.17	625.00
	<i>Total</i>	48		

Table 5. Learning Results of Times

<i>Mann-Whitney U</i>	226.000
<i>Wilcoxon W</i>	551.000
<i>Z</i>	-1.334
<i>Asymp. Sig. (2-tailed)</i>	.182

media is accepted and H1 is rejected. On the other hand, if H1 is passed, if there is a significant difference in learning outcomes between students using and not using Concrac learning media. From the table above, you can see the value of Asymp. (both sides) is 0.182 and H0 is accepted and H1 is rejected if Asymp. Sig. (both sides) > 0.05. Therefore, it can be said that there is no significant difference in learning outcomes between students who use Concrac learning media and those who do not use Concrac learning media.

2. Homogeneity Test

The homogeneity test of the variance of posttest scores for learning materials for multiplication counting operations in grade 2 elementary school students between the experimental and control classes is presented in Table 6.

The decision criterion for the homogeneity test is that study data are said to be homogeneous if the significance value based on the mean is >0.05. However, with

Table 6. Test of Homogeneity of Variance

Levene Statistic		df1	df2	Sig.	
<i>Learning Results of Times</i>	<i>Based on Mean</i>	1.348	1	46	0.252
	<i>Based on Median</i>	0.944	1	46	0.336
	<i>Based on Median and with adjusted df</i>	0.944	1	45.430	0.336
	<i>Based on trimmed mean</i>	1.363	1	46	0.249

a significance value of 0.05 based on the mean $<0>$, or 1.348, the study data were homogeneous.

3. T-test

Mean difference tests between control and experimental classes using t-tests are shown in Fig. 1.

Based on the above table, the values of Sig. (2-tailed) of $0.178 > 0.05$, We can conclude that there is no significant difference between the values of student learning outcomes who use congklak learning media and those who do not use congklak. For more details, Table 7 shows the average post-test scores between students in the control and experimental classes.

From the Table 7, we can see that the average posttest scores do not differ significantly between students in the control and experimental classes. The control class has an average posttest score of 82.4 and the experimental class has an average posttest score of 89.57. So the difference is only 7.17.

According to the hypothesis proposed by the researcher that there is no significant effect on students' motivation in the mathematics learning process in the control class and the experimental class in class II students at SDN 1 Bantar Gadung and class II students at SDN 1 Kalaparea in accordance with the results obtained by researchers. The results obtained are that there is no significant increase in the use of congklak media to increase learning motivation. This happened when the learning process took place at these two different schools.

In the control group, students can follow the lesson well, students who are active can add to the atmosphere of the class to be more lively.

However, it was different during the learning process in the experimental group, students were not good at participating in learning because some of them were less

Levene's Test for Equality of Variances			t-test for Equality of Means							
F			Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
LEARNING RESULTS OF TIMES	Equal variances assumed	1.348	.252	-1.366	46	.178	-7.165	5.244	-17.720	3.390
	Equal variances not assumed			-1.387	43.049	.173	-7.165	5.168	-17.587	3.256

Fig. 1. Independent Samples Test

Table 7. Group Statistics

	Kelas	N	Mean	Std. Deviation	Std. Error Mean
Learning Results of Times	Post-Test of Control Class (Without Media)	25	82.40	20.873	4.175
	Post-Test of Exsperiment Class (Meida Congklakk)	23	89.57	14.610	3.046

enthusiastic about participating in learning using congklak media, and paid less attention to the explanation of the material presented by the researcher. They were given the same post-test questions as the pre-test, but due to lack of attention to explanations, there was no significant change in students' learning motivation in learning multiplication arithmetic operations.

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