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Product Feasibility of Developing a Learning Model for Counting in Elementary School Based on Motor Skills

Tyas Herwinda[1], Gunarhadi[2], Sri Yamtinah[3]

[1,2,3] Graduate Faculty of Primary School Teacher Education, Universitas Sebelas Maret, Surakarta, Indonesia

ABSTRACT: The development of learning models needs to be done every time by taking into account the performance of students and technological developments. The purpose of this study is to describe the feasibility of product development of learning models for counting in elementary schools (SD) based on motor skills. The type of research is Research and Development using the ADDIE development model. The study population was fourth grade students in Karanganyar district, Central Java. Data collection through: limited trial, feasibility trial and hypothesis testing. The results of the study were limited tests obtained the number of scores obtained from teachers and students, namely 239 over the range 194.25≤x, so it can be concluded that the score is in the very feasible category; the feasibility test of the test results increased from 61.25 to 89.50; hypothesis testing obtained t count (19. 305) > t table (1.72913); experimental group hypothesis test t value (23.399) > t table (1.711) and control group t value (16.593) > t table (1.714), this shows that the learning model developed is feasible to be applied to mathematics learning. The conclusion of the research is that the development of a learning model for counting in elementary schools based on motor skills is categorized as feasible to be applied in learning mathematics.

KEYWORDS: Development product, counting learning model, motor skills.

INTRODUCTION

Improving the quality of learning can be started through the development of learning design. This development can be done using a wide selection of models according to learning needs. A model is a pattern born from thoughts and ideas to realize in the form of an innovative work born from the process of creativity (Rohaeni, 2020). A model can also mean something that illustrates a pattern of thinking. A model usually describes the whole concept that is interrelated (Mirdad, 2020). According to Zubaedi (2012) the learning model can be interpreted as a pattern used for curriculum preparation, organizing materials, and providing instructions for teachers in the classroom. Meanwhile, according to Rusman (2013) explains that the learning model is a plan or pattern that can be used to form a curriculum, design learning materials, and guide learning in the classroom or others. According to Cahyadi (2019), in developing teaching materials, it is necessary to pay attention to the development model, because it basically includes a process that is linear with the learning process. One of the learning material development designs that is often used is the ADDIE model.

ADDIE (Analysis, Design, Development, Implementation and Evaluation) is a model that is easy to use and can be applied in curricula that teach skills, knowledge and attitudes (Asmayanti et al., 2020). According to Kurnia et al., (2019) the ADDIE model is one of the models that guides in developing effective and dynamic learning. Diofanu et al., (2019) also explained that the ADDIE model can be used for various learning strategies, various models, teaching materials and media. ADDIE model instructional design is a process used to develop educational products that can be accounted for with a development research approach (Research and Development) (Rohaeni, 2020). Based on the description above, it can be synthesized that the ADDIE model is a learning design model that can be used to develop learning materials effectively.

This ADDIE model consists of 5 stages, namely 1) Analysis, this stage is carried out to determine learning needs and identify problems, 2) Design, this stage designs teaching material validation sheets and student response questionnaires in the form of practicality sheets, 3) Development, this stage is carried out to develop teaching materials according to the results of the analysis and design stages, 4) Implementation, this stage is a limited trial stage which is carried out simply, and 5) Evaluation, this stage is the final stage where improvements (revisions) are made after receiving suggestions, comments, and input from students, teachers, and the three validators (Sugitono, 2015).

The concept of mathematics learning according to Gagne's theory has several kinds of learning outcomes, one of which is motor skills. Motor skills are a process where a person develops a set of responses into a coordinated, organized, and integrated motion (Nasution, 2018). Motor skills also describe a variety of physical competencies, including balance and stability, coordinated

movements, and object manipulation (Nasution and Sutapa, 2021). Children's motor skills are divided into two, namely, gross motor and fine motor. Gross motor is an activity that involves large muscles with activities using members of the whole body, for example running, jumping, and walking (Claudia et al., 2018). Meanwhile, fine motor skills are movement patterns to manipulate objects using small muscles of the hands and fingers (Abd, 2016). Examples of fine motor activities are grasping, cutting, pinching, tearing, and so on (Paramitha et al., 2019).

Based on the description above, the purpose of this study is to describe the feasibility of developing products for learning counting models in elementary schools (SD) based on motor skills. So that researchers can formulate the title of their research, namely: Feasibility of Product Development of Counting Learning Model in Elementary School Based on Motor Skills.

METHODS

This research uses a type of research, namely Research and Development (R&D) using the ADDIE development model. A research method is a systematic research and development process with the aim of producing new products and testing their effectiveness (Okpatrioka, 2023). Meanwhile, the ADDIE model (Analyze, Design, Develop, Implement, and Evaluate) is a framework used to guide the product development process (Soesilo and Munthe, 2020).

The research population used was fourth grade students in Karanganyar district, Central Java. Research data collection using limited trials, feasibility trials and hypothesis testing.

RESULTS AND DISCUSSION

Results

Limited Trial

Limited trials were conducted to obtain feedback on the fluency of each component of the prototype of the motor skills-based mathematics learning model developed in learning. The limited trial was conducted for two meetings on April 10 and 11, 2024. After using the prototype, the teacher filled out a questionnaire and filled in the comments and suggestions column. While students, data collection through structured interviews. The results of the limited test are as follows:

Table 1. Limited Test

No	Aspects	Questionnaire Score	
		Teacher	Learners
1	Clarity of message demonstrating gross motor movements	5	30
2	Ease of demonstrating gross motor movements	5	29
3	Clarity of drawing models performing gross motor movements	5	28
4	Sentences accompanying the demonstration activity are easy to understand	5	30
5	The sentences in the Demonstration are the same as the math operation symbols	5	27
6	Directly related to the math problem material being taught	5	30
7	Easily work on the problem material given after the demonstration	5	30
Total		35	204

Based on the results obtained, the number of scores obtained from teachers and students is 239 over the range 194.25≤x, so it can be concluded that the score is in the very feasible category. Thus, it can be concluded that the development of a motor skills-based mathematics learning model can proceed to the feasibility test stage.

Feasibility Trial

The feasibility trial was conducted to obtain feedback on the feasibility of the developed motor skill-based mathematics learning model prototype, in the fluency of each component of its syntax and measurements which include: knowledge, independent character, and skills, which consist of agility and accuracy. The feasibility trial was conducted for two meetings on April 23 and 24, 2024. After using the prototype, teachers filled out a questionnaire and filled in the comments and suggestions column. Meanwhile, students were interviewed whose data were collected through structured interviews (read by the teacher).

Table 2. Feasibility Trial

No	Aspects	Questionnaire Score	
		Teacher	Learners
1	Clarity of message demonstrating gross motor movements	5	100
2	Ease of demonstrating gross motor movements	5	98
3	Clarity of drawing models performing gross motor movements	5	98
4	Sentences accompanying the demonstration activity are easy to understand	5	100

5	The sentences in the Demonstration are the same as the math operation symbols	5	97
6	Directly related to the math problem material being taught	5	100
7	Easily work on the problem material given after the demonstration	5	100
Total		35	693

In addition, pretest and posttest tests were conducted to test the feasibility of the developed motor skill-based mathematics learning model prototype, in the fluency of each syntax component. The test was carried out in writing, the pretest was carried out before learning and the posttest was carried out after motor skill-based mathematics learning. The test results showed an increase from 61.25 for the pretest and 89.50 for the posttest.

Hypothesis Test

The results of the pretest and posttest in the intermediate test, researchers can describe as follows:

Table 3. Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre-test	61.25	20	8.091	1.809
	Post-test	89.50	20	7.592	1.698

Based on the table above, it can be seen that there was an increase in the average test result of 28.25 with an improved standard deviation of 7.592.

Table 4. Tests of Normality

	Class	Shapiro-Wilk		
		Statistic	df	Sig.
Results	Pretest Score	.911	20	.067
	Posttest Score	.946	20	.072

Based on the calculated significant value in the pretest and posttest results, the data obtained that sig. Pretest (0.067) > sig. (0.05) and sig. Posttest (0.72) > sig. (0.05), it can be concluded that the data is normally distributed.

Table 5. Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Pre-test & Post-test	20	.653	.002

Based on the table above, it is found that sig. count (0.002) < sig. (0.05), so it can be concluded that there is a relationship between pretest and posttest.

The magnitude of the relationship between pretest and posttest is positive 0.653, which means that there is a positive and strong relationship between pretest and posttest. So, it can be interpreted that learning mathematics based on motor skills has a positive and strong influence on the cognitive development of students.

Table 6. Paired Samples Test

		Paired Differences					t	Df	Sig. (1-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Posttest – Pretest	28.250	6.544	1.463	31.313	25.187	19.305	19	.000

Based on the table above, the value of sig. count (0.000) < sig. (0.05) or the value of t count (19.305) > t table (1.72913), this can be interpreted that there is a meaningful effect with the implementation of learning mathematics based on motor skills.

DISCUSSION

Based on the results of the above research, some data on the results of limited trials, feasibility trials and also hypothesis testing were obtained. The results of the limited trial were carried out to obtain input on the fluency of each component of the prototype of the motor skills-based mathematics learning model developed in learning. The component of the developed learning model is learning syntax. The results of the limited trial, namely: 1) The teacher conveys the objectives and prepares students by getting the maximum score of 30. This stage is described by the acquisition of scores on aspects: clarity of messages demonstrating gross motor movements; 2) Demonstrating gross and fine motor skills, for sentences that accompany demonstration activities get a score of 30, which means that teachers and students can carry out the development of learning models very well. While the aspect: The sentence in the demonstration is the same as the math calculation operation symbol, gives a score of 27, which means that the teacher and students have carried out the learning process according to the stages; 3) Testing understanding and feedback, giving a score for aspects directly related to the math problem material is 30; 4) evaluation of experience, the score on the aspect of easily working on the problem material given after the demonstration is 30. This means that students have benefited from the development of a motor skills-based mathematics learning model in learning mathematics.

The feasibility trial was conducted to obtain feedback on the feasibility of the developed motor skills-based mathematics learning model prototype, in the fluency of each component of its syntax and measurements which include: knowledge, independent character, and skills, which consist of agility and accuracy. The measurement results of the syntax component, namely the aspect of clarity of the message demonstrating gross motor movements, obtained a score of 100; the aspect of ease of demonstrating gross motor movements and the clarity of drawing models performing gross motor movements, obtained a score of 98 and 98, respectively; the aspect of testing understanding and feedback, in the sentence in the demonstration is the same as the symbol of mathematical arithmetic operations and is directly related to the mathematics problem material, obtained a score of 97 and 100. This stage also obtained measurement results on the aspect of evaluating experience, on the ease of working on the problem material given after the demonstration, for students obtained 100. In addition, pretest and posttest tests were conducted in the feasibility test.

The pretest and posttest results in the feasibility test, obtained data on the mean test results increased from 61.25 to 89.50, so there was an increase in the mean of 28.25 with a standard deviation of 7.592. the existence of this increase can be seen from the hypothesis test, namely the value of sig. count (0.000) < sig. (0.05) or the value of t count (19.305) > t table (1.72913), meaning that there is a significant effect with the implementation of motor skills-based math learning. Based on these statistical data, it can be understood that the learning model developed has an influence in learning mathematics.

The results of the prerequisite test, obtained data that the normality test, homogeneity and balance obtained data Sg. Count> 0.05, so it can be interpreted that the sample comes from a normally distributed population, has a homogeneous variant, and has the same strength before treatment. The results of hypothesis testing obtained data, namely for all groups the value of sig. Count (0.000) < sig. (0.05) or the experimental group t value (23.399) > t table (1.711) and the control group t value (16.593) > t table (1.714). It can be interpreted that there is a meaningful influence with the implementation of motor skills-based math learning.

Based on the description above, the trial of the motor skills-based mathematics learning model has qualified as a learning model. This is because the syntax that has been determined, meets the requirements to be called a learning model. Mirdad and Pd (2020) explain that learning models need to have parts of the model called: a) a sequence of learning steps (syntax); b) the existence of reaction principles; c) social system; d) support system. In addition, the developed learning model has been proven to improve math tests and student achievement. This is in line with research from Wulansari and dwiyanti (2021) which explains that building simple mathematical concepts with the traditional game Dakon (motor skills) to develop counting skills in children with high-level thinking abilities provides better results.

Based on the description above, the product of developing a motor skills-based early grade elementary school counting learning model is feasible in learning and to improve student achievement in Karanganyar sub-district, Karanganyar district.

CONCLUSION

Based on the research data and discussion above, it can be concluded that the product of developing a motor skills-based early grade elementary school counting learning model to improve student achievement in Karanganyar sub-district, Karanganyar district is said to be feasible. This is because the syntax set, fulfills the requirements as a learning model, namely: having a sequence of learning steps (syntax); the existence of reaction principles; social system; and the existence of a support system.

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