

Design of Thematic Learning Devices Inquiry Model *Multiple Intelligences*-Based to Improve Cognitive Learning Outcomes of Elementary School Students

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DOI: <https://doi.org/10.52403/ijrr.20221273>

ABSTRACT

This research was conducted based on observations, teacher interviews in the process of teaching and learning activities, many teachers have not used learning tools by applying the Multiple Intelligence-based Inquiry learning model. This study aimed to design thematic learning tools for Inquiry-based learning models based on *Multiple Intelligence* in the thematic learning of class V Elementary School. The research method used is the research and development (R&D) method with the 4D development model (Define, Design, Develop, and Disseminate). This research was conducted at SD Inpres 1 Lewoleba with a small-scale test in class VI with 16 students and a large-scale test in class V with 30 students. In addition to developing *multiple intelligence*-based inquiry learning tools, this research is also to analyze the increase in students' cognitive learning outcomes from the developed multiple intelligence-based thematic learning tools. Data and collection techniques in this study included questionnaires, tests, and documentation. The instrument of this research was carried out by first analyzing the results of trials on a small scale including validity, reliability, level of difficulty, and differential power of the questions. The data analysis technique used the prerequisite test and then carried out with the *N-gain* test to determine the increase in learning outcomes. The results of the research on large-scale tests can be concluded that there was a significant increase in cognitive learning outcomes from the application of the thematic learning device design based on *Multiple Intelligence* Inquiry models. The results

of the analysis of the classical *pretest* data gained a value of 10% after the application of the thematic learning model design based on Multiple Intelligence increased to 90% on the *Posttest score*. The results of the increase from the *N-Gain* test gained an average N-gain value of 0.71 in the high category.

Keywords: Learning Tools, *Multiple Intelligences*, Inquiry, Thematic Learning, Cognitive Learning Outcomes

INTRODUCTION

The rapid advancement of science and technology demands quality human resources (HR). Education is one of the keys to creating quality human resources so that they get recognition from the world (Astalini et al., 2019). Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential (Syahrial et al., 2019).

Education has a very important role in building a quality young generation, therefore, in order to achieve a quality young generation, the quality of education must be improved. The quality of education is closely related to learning outcomes. The quality of education will be good if the learning outcomes achieved are also good. Therefore, in order for the quality of education to increase, every school should try to organize quality learning starting from the elementary level. Teachers are professional educators with the main task of educating, teaching,

guiding, directing, training and evaluating students in early childhood education through formal education, basic education, and secondary education. Professional teachers will always develop a learning tool for the learning process, there is no reason for teachers to teach in class without learning tools (Kurnia et al., 2021). Implementation of learning at the elementary school level currently uses the 2013 curriculum as a reference for learning development, namely thematic learning.

The implementation of thematic learning by combining several subjects in the form of themes aims to help students to understand the subject matter studied more deeply and effectively, also helps students to develop language competence properly by linking learning and students' personal experiences. In carrying out thematic learning besides the teacher must be able to determine the theme in learning, the teacher must be able to understand the characteristics of each student then they can design learning that is easily accepted by students according to the level of intelligence of each student.

The process of thematic learning in schools by paying attention to the characteristics of each student in this case the *multiple intelligences* possessed can increase learning success. The success in means is the learning outcomes gained by students both in terms of cognitive, affective and psychomotor (Alman & Nugrahaeni, 2022). The cognitive domain includes mental (brain) activity where all efforts related to brain activity are included in the cognitive domain; The affective domain is related to the attitudes and values of behavioral traits such as feelings, interests, attitudes, emotions, and values. Furthermore, the psychomotor field is related to skills or the ability to act after a person receives a certain learning experience. In this study the authors focused on improving students' cognitive learning outcomes.

The process of thematic learning in schools in an effort to improve students' cognitive learning outcomes requires collaboration between teachers and students. Learning

tools are things that must be owned by every teacher as a guide or reference in teaching. Learning devices are learning support facilities that contain learning plans that describe in detail the competencies students will achieve, learning designs that follow certain learning model syntax, activity guidelines for students and tools to measure student competency achievement (Karuniawati et al., 2021).

Learning devices are things that must be prepared by the teacher before carrying out learning. Preparation of learning tools is part of learning planning (Rawa et al., 2016). Learning tools needed in managing the teaching and learning process can be in the form of: syllabus, Lesson Plans (RPP), evaluation instruments and learning achievement tests, as well as learning media and student worksheets (Listyawati, 2012). Student Worksheets (LKPD) are printed teaching materials in the form of sheets of paper that contain materials, summaries and instructions for implementing learning tasks that must be done by students, which refer to basic competencies and goals that must be achieved (Pawestri & Zulfiati, 2020).

Teachers are required to have creativity and ideas in developing ways of presenting learning material in class. One of them is making student worksheets based on multiple intelligences with various learning activities and based on the multiple intelligences of students. By developing a *multiple intelligence-based* student worksheet design consisting of depiction of subject matter and questions that hone the brain with an attractive plan with a variety of pictures and colors (Mirda et al., 2018). In designing student worksheets, teachers need to adjust to the learning model that is applied in learning. One of the learning models that is very suitable for use is the Inquiry model. The inquiry learning model is a series of learning activities that optimally involve all students' abilities to search and investigate systematically, critically, logically, analytically, then they can confidently formulate their own findings (Dalimunthe, 2021). The main objectives of teaching

activities in inquiry are: (a) Maximum involvement of students in the process of learning activities (mental, intellectual, and social-emotional activities). (b) The direction of activities logically and systematically towards teaching objectives. (c) Developing self-belief in students about what is found in the inquiry process (Fahmi & Wiguna, 2018). The syntax of the Inquiry learning model includes several stages including: a) Asking questions or problems; b) Formulate hypotheses; c) Collecting data; d) Analyze data; e) Formulate conclusions (Sari & Lahade, 2022).

Cognitive learning outcomes (Pertiwi et al., 2019) are behaviors that occur in the area of cognition. The learning process that involves cognition includes activities from receiving external stimuli by sensory, storing and processing in the brain into information to recalling information when needed to solve problems. Cognitive learning outcomes are changes in behavior that occur within the scope of cognition which do not only address single abilities but abilities that lead to changes in behavior in the cognitive domain which has several levels consisting of, C1-remembering, C2-understanding, C3-implementing, C4-analyzing, C5-judging, C6-creating (Kartini et al., 2022).

Based on the explanation above, it is necessary to develop learning tools in the form of syllabus, learning implementation plans, student worksheets based on multiple intelligences to improve the cognitive learning outcomes of fifth grade elementary school students.

MATERIALS & METHODS

This study used a development research method with a 4D design (Define, Design, Develop, and Disseminate). Thiagarajan, S. et al (1974) the first stage is defined, the initial data collection and definition of the problems found from the research object are

carried out. The second stage is design, starting with designing thematic learning tools based on multiple intelligence inquiry models. At this stage the learning devices are designed by adjusting the devices developed with the Core Competencies, Basic Competencies, Competency Achievement Indicators, Learning Models used. The learning tools developed are in the form of syllabus, lesson plans, student worksheets, and cognitive learning outcomes questions. Learning tools are designed using the Inquiry learning model and based on the multiple intelligences of students. The third stage is the development stage, by testing development products in the form of learning tools that have been produced to get responses and evaluations so as to produce learning tools that are suitable for use and distribution. The final stage is dissemination or distribution.

The research was conducted in class V SD Inpres 1 Lewoleba with a total of 30 students. Data collection techniques in this study included test techniques and documentation. The test technique was a test instrument in the form of multiple choice questions to measure the achievement of cognitive learning outcomes of students in learning theme 3 Healthy Food, sub-theme 1 How the Body Processes Food. The documentation technique is carried out as a source of supporting data to complement the data gained from problem identification activities, photos of student activities and data from the trial results of the developed learning tools. The data processing technique swa by carrying out the prerequisite test, that was the normality test to find out whether the variables are normally distributed or not, then the data normality test is carried out with the help of SPSS using the Shapiro-Wilk test. significance value ≤ 0.05 (Fatimah et al., 2022). The following results of the normality test output are presented in Table 1.

Table 1. Normality Test Result

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pre test	,152	30	,075	,933	30	,059
Post test	,127	30	,200 [*]	,937	30	,077
*. This is a lower bound of the true significance.						
a. Lilliefors Significance Correction						

The results of the data presented on the table can be seen that the significance value of the cognitive learning outcomes of students in class V SD Inpres 1 Lewoleba pre-test data was 0.059 and the post-test value reached 0.077 because the pre-test and post-test significance values were greater than 0.05, it is accepted. This showed that the data on the pre-test and post-test values of cognitive learning outcomes in class V students at SD Inpres 1 Lewoleba are normally distributed. The data analysis technique used is to analyze the increase in the value of student learning outcomes from the results of the pre-test and post-test through the analysis of the classical completeness test and the N-Gain test. To find out the mastery of learning classically by measuring the success rate of student learning completeness as a whole. increasing mastery in classical student learning outcomes, formulated:

$$p = \frac{\sum \text{the number of students who scored} \geq 75}{\sum \text{students follow}} \times 100$$

The increase in cognitive learning outcomes can be seen after the N-gain test is carried out to know the effectiveness of increasing each indicator. Calculations can be started by calculating the results of the average value of the pre-test and post-test cognitive learning outcomes.

Pre test and post test values are calculated using the N-gain formula:

$$N\text{-gain}(g) = \frac{(\text{post test score} - \text{pre test score})}{(\text{Ideal maximum score} - \text{pre test score})}$$

(Yany et al., 2022)

The percentage data gained was categorized to determine the level of effectiveness shown in table 2.

Table 2. Effectiveness N-gain

Normality Gain (g)	Remark
$g \geq 0,7$	High
$0,3 \leq g < 0,7$	Medium
$g < 0,3$	Low

(Wanahari et al., 2022)

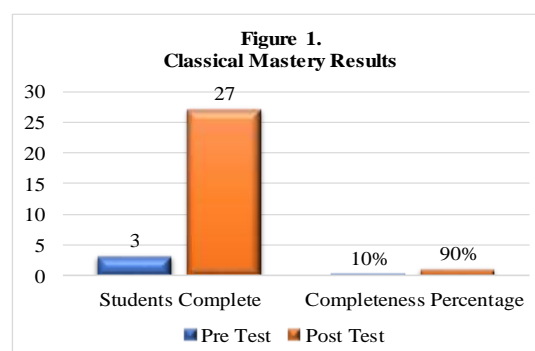
RESULT & DISCUSSION

The results gained by students during learning had an important role in the learning

process. Learning outcomes greatly affect the quality of learning. Learning by using a learning tool based on *Multiple Intelligence Inquiry* model to improve learning outcomes in this study precisely by using Student Worksheets was very appropriate and in accordance with the learning needs of students.

Further, the increase in the cognitive learning outcomes of elementary school students after learning using thematic learning tools based on *multiple intelligences* inquiry models can be shown by using a measuring instrument for the effectiveness of cognitive learning outcomes, namely pre-test and post-test questions. Pre-test questions were given before carrying out learning, while post-test questions were given after learning has been carried out using learning tools that have been developed, especially student worksheets.

Student Worksheets are learning media that can be used by teachers in conveying material and increasing students' understanding of a learning process. LKPD is also an important teaching material used to achieve the objectives of learning activities (Margayu et al., 2020). This is proved by the classical completeness of students which can be declared complete if the pre-test and post-test scores have reached the Minimum Completeness Criteria (KKM). The KKM that has been set for thematic learning at SD Inpres 1 Lewoleba is 75. The results of classical completeness are presented in Table 3.



Based on Figure 1, the percentage of classical completeness in the pre-test score was 10%

with the incomplete category compared to the percentage of classical completeness in the post-test learning outcomes of 90% with complete criteria. it concluded that the cognitive learning outcomes of students can increase after using the thematic learning tools based on Multiple Intelligences inquiry models that have been developed. This aligned with the research of (Misrodin et al., 2017) explained that LKPD using the inquiry model is appropriate for use and can improve the cognitive learning outcomes of elementary school students. In addition, research conducted by (Amini et al., 2020) explained that the inquiry learning model was very effective and suitable for use and can help improve students' cognitive learning outcomes.

Increasing the effectiveness of students' learning outcomes can be determined by the N-Gain test. The average N-Gain score proved that there was an increase from the classical pre-test and post-test averages when learning using Inquiry-based thematic learning tools, especially with thematic Inquiry model LKPD teaching materials. The recapitulation of the results of the calculation of the increase in students' cognitive learning outcomes is presented in Table 2.

Table 2. N-Gain Improve Learning Outcomes Result

Category	Average	N-Gain	
		Average	Criteria
Pre test	61,87	0,71	High
Post test	88,13		

The results of the N-Gain calculations are presented in Table 5. The average N-Gain is 0.71 in the high category and the level of effectiveness of using thematic learning tools based on multiple intelligences on cognitive learning outcomes was 71% in the high category.

The increase in cognitive learning outcomes that occurred in class V SD Inpres 1 Lewoleba certainly cannot be separated from the learning tools that have been designed. This aligned with (Pedaste et al., 2015); (Panebianco et al., 2022) stated that learning with the inquiry model is effective for improving students' cognitive learning outcomes. This learning tool is designed with

an inquiry model based on multiple intelligences where students will be directed to problems such as identifying healthy foods that were often consumed, after which students are expected to be able to formulate the problems found in accordance with learning objectives. Problems can be framed in the form of questions. Then students are directed to formulate hypotheses then collect data, test hypotheses then test hypotheses. Come to the last step in learning, it will involve the intelligence abilities of students. Intelligence cannot be separated from the cognitive learning outcomes of students starting from the stages of low-level thinking skills (remembering, understanding and applying) to higher-level thinking skills (analyzing, assessing and creating/creating). Based on the explanation above, it concluded that there was a significant increase in cognitive learning outcomes from the application of the thematic learning device design based on Multiple Intelligence Inquiry for fifth grade students of SD Inpres 1 Lewoleba.

CONCLUSION

The quality of learning really influences student learning outcomes. Teachers played an important role in learning. In an effort to improve the quality of learning, one of the efforts taken is the use of learning devices that are designed according to learning needs to be able to provide an increase in student learning outcomes. This is proved by the results of student learning outcomes during the pre-test assessment before using the learning device design results obtained an average of 61.87 while the post-test assessment after using the thematic learning device based on Multiple Intelligences obtained an average of 88.13. The classical post test completeness results gained 90% and the pre test gained 10%. Calculation of the average N-Gain at 0.71 with a high category, for the percentage of the effectiveness of the n-gain score of 0.71 category is quite effective. This proved that the use of thematic learning tools based on Multiple Intelligences Inquiry models was

able to improve the cognitive learning outcomes of fifth grade elementary school students at SD Inpres 1 Lewoleba, Lembata Regency, East Nusa Tenggara, Indonesia.

Declaration by Authors

Acknowledgement: None

Source of Funding: None

Conflict of Interest: The authors declare no conflict of interest.

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<https://doi.org/10.36312/jime.v8i4.3973/http>

How to cite this article: Margaretha Novita Rupa Lobemato, Sri Wardani, Sri Haryani. Design of thematic learning devices inquiry model multiple intelligences-based to improve cognitive learning outcomes of elementary school students. *International Journal of Research and Review*. 2022; 9(12):639-645.
DOI: <https://doi.org/10.52403/ijrr.20221273>
