# The Implementation of Thematic–Scientific Learning to Build High-Order Thinking Skills of Elementary School Students

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**Abstract:** The curriculum 2013 has implemented in more than 5 years, but the teachers of the primary school still complaints that they have difficulty implementing a thematic and scientific-based learning approach. In fact, because of the Ministry of Education freed teachers and schools to use the Curriculum 2013 or not. Actually, the curriculum 2013 is very good for shaping knowledge and can build high-level thinking skills for learners as provision prepares to be a quality human. This article aims to describe the implementation of thematic-scientific learning in Elementary Schools In Klaten Regency, as a preliminary study to develop Thematic-Scientific Learning Models And devices that involving metacognition to build students' high order thinking skills.

***Keywords:*** *implementation, thematic approach, scientific approach, high order thinking skills, elementary school*

## INTRODUCTION

The 2013 curriculum has been implemented for more than 5 years, but there are still many complaints from elementary school teachers who find it difficult to implement learning with thematic approaches and scientific-based learning approaches. In fact, because of the many obstacles, not all teaching schools use the 2013 Curriculum. Although in fact the 2013 curriculum is very good for forming intact knowledge and can build high-level thinking skills for students as a provision to prepare to become qualified human beings. There are several different opinions about thematic learning approaches. Some teachers, lecturers and instructors of the Education and Training for Teachers Profession (Pendidikan dan Latihan Profesi Guru /PLPG), argued that thematic learning in several subjects on one theme is taught continuously in one lesson given in one or two hours. But there are some who argue that the implementation of learning is carried out with one particular theme and can be taught in one day with several subjects, so that subject changes can be carried out at the turn of the lesson. With the existence of differences of opinion as mentioned above, it makes teachers get confused to carry out thematic learning. In addition to the implementation of learning, the obstacles that many teachers encounter are the availability of textbooks, in the form of teacher books and student books, which are still out of sync. In Curriculum 2013 it is also required to conduct learning evaluations by evaluating processes and results. The teachers have difficulty in making integrated evaluations in accordance with integrated thematic learning and conducting process evaluations, by giving an individual assessment of student learning. Until 2019 there have been several revisions to the 2013 Curriculum. Revision of refining two major parts of the curriculum, namely content standards and assessment standards. The content standard is well

designed so that students are able to think critically and analytically in accordance with international standards by reducing material that is irrelevant and deepening and expanding the relevant material for students, while the standard assessment is done by adapting international standard assessment models gradually. Learning outcomes assessment focuses more on Higher Order Thinking Skills (HOTS) (Kemendikbud, 2013).

High-level thinking skills are skills that include thinking critically, logically, reflective, metacognitive, and thinking creatively. These skills are activated when individuals experience unknown problems, uncertainty, questions, or dilemmas (King, Goodson, & Rohani, 1998).

Hattie convinced many people about student learning outcomes that it would be very good for teacher compilations to stop intervening in every lesson in the classroom, only discussing the ease of being a facilitator (Hattie, 2009). Meanwhile, Piaget in his cognitive development model, the ability to abstract is conceptualized as the basis for formal operational thinking. Leutwyler found that this stage would never reach children before they reached 10 to 12 years (King et al., 1998).

This paper is a preliminary study of research to develop learning models and media by combining thematic approaches, scientific approaches, and involving metacognition to build high-level thinking skills in elementary students. The evaluation tool developed was also made with reference to high-level thinking skills. Research will produce research products in the form of teacher data and descriptions of learning in elementary schools, constraints encountered by teachers in implementing learning with thematic and scientific approaches as mandated in the 2013 curriculum in elementary schools, as a needs analysis for the development of learning models in thematic approaches and scientific approaches.

Elementary School is a place of formal education at the beginning level for every human being to provide the basis for further education and to build good character for students. 2013 Curriculum for Elementary Schools mandates the implementation of learning with thematic approaches and scientific-based learning approaches that lead to the realm of attitudes, skills, and knowledge by emphasizing that students 'know why', 'know how', and 'know what' (Kementerian Pendidikan dan Kebudayaan, 2013). The thematic approach presents learning with one specific theme for several subjects at once. Thematic learning is one integrated learning model that uses themes to associate several subjects so as to provide meaningful experiences for students. Learning this model will be more interesting and meaningful for children because this learning model presents more actual and contextual learning themes in everyday life. Integrated learning is defined as learning that connects various ideas, concepts, skills, attitudes, and values, both between subjects and in one subject. Thematic learning emphasizes the selection of a specific theme that is in accordance with the subject matter, to teach one or several concepts that combine various information. While the scientific-based learning approach includes observing, asking, reasoning, trying, forming networks for all subjects. It is expected that the thematic approach and the scientific-based learning approach will be able to form intact knowledge for students and can build high-level thinking skills for students, as is the goal in formulating the 2013 curriculum (Kementerian Pendidikan dan Kebudayaan, 2013).

Indeed the ability to abstract perfectly and refer to the continuous progress in the use of metacognitive learning strategies will occur in children aged 11 to 15 years (Veenman, Hesselink, Sleeuwaegen, Liem, & Van Haaren, 2014). Chamot and Kupper stated that metacognitive strategies are considered as high-level executive skills that utilize the cognitive process and involve thinking about the learning process, planning learning, monitoring learning tasks, and evaluating how well someone has learned (Tavakoli & Koosha, 2016).

Thematic learning is integrated learning that uses themes to link multiple subjects so that students can provide meaningful experiences. Smalldino argues that thematic learning allows teachers to organize learning in several topics by integrating content and skills from several subjects (Smalldino, 2005). Meanwhile Kovalik argues that thematic learning is a model of curriculum and learning that makes it easier to achieve goals (Kovalik, 2013). Thematic approaches can allow students to better analyze topics thoroughly, understand key concepts and find value in problems.Learning with a scientific approach is learning that consists of observing activities (to identify things you want to know), formulating questions (and formulating hypotheses), trying / collecting data (information) with various techniques, associating / analyzing / processing data (information) and draw conclusions and communicate the results which consist of conclusions to obtain knowledge, skills and attitudes. These steps can be continued with creating activities (Kemendikbud, 2013).

The basic metacognition strategy according to Blakey is by linking new information with previous knowledge, choosing strategies to monitor and evaluate the thinking process (Blakey, Spence, & Sheila, 1990). Metacognitive strategies ensure teaching becomes effective and helps students to learn mathematics effectively (Stephan du Toit; & Kotze, 2009). Aydin concluded that metacognitive skills develop thinking skills, provide active learning, develop general abilities and intelligence, develop problem solving skills (Aydin, 2011).

Meanwhile, high-level thinking skills include critical, logical, reflective, metacognitive, and creative thinking. They are activated when individuals face unknown problems, uncertainties, questions, or dilemmas. Successful application of skills produces valid explanations, decisions, performance, and products in the context of available knowledge and experience and that promotes sustainable growth and other intellectual skills (King, Goodson, & Faranak, 2004).

Anderson and Krathwohl revised Bloom's Taxonomy into six thinking skills, namely, remembering, understanding, application, analyzing, evaluating, and creating. Of the six thinking skills grouped into two thinking abilities, namely higher order thinking, which includes analyzing, evaluating, and creating, and low order thinking skills which include remembering, understanding, and application (Anderson, L. W. & Krathwohl, 2010). Barak introduced elements of constructivist pedagogy combined with specific steps aimed at encouraging high-level thinking in science classrooms needed to make the development of higher-order thinking a regular ingredient in current school science teaching (Moshe Barak & Shakhman, 2007). Madhuri and friends researched how to improve high-level thinking skills by using inquiry-based learning (G. V. Madhuri, Kantamreddi, & Goteti, 2011). Anat Zohar's findings in his research involving high-thinking skills concluded that students with high academic achievement scored higher thinking scores than their counterparts with low academic achievement, but even students from low groups made great progress. Zohar strongly recommends teachers to encourage students from all academic levels to engage in tasks that involve high-level thinking skills (Zohar & Dori, 2009). In subsequent studies Anat Zohar and Schwartzer increase the assignment of tasks that require high-level thinking by giving a variety of thinking strategies; increase student involvement in metacognitive thinking; and use "language thinking" in class (Zohar & Schwartzer, 2011). Barnett in his research gave high-level thinking questions to improve critical thinking (Jerrold E. Barnett & Francis, 2012). To practice high-level thinking skills students are developed evaluation tools by tackling high-level thinking skills. Research takes learning in elementary school, so that high-level thinking skills of students can form early.

## METHOD

This study revealed the implementation of learning in elementary school related to the implementation of the 2013 curriculum and the results of student evaluations related to higher order thinking skills of students. The data for thematic-scientific learning were collected by questionnaires for teachers, observing the implementation of learning, and interviews with teachers. Meanwhile the scores related to High Order thinking skills (HOTs) from students were computed by giving learning outcomes tests that are developed with reference to high order thinking skills.

### *Research Subject*

The research subjects were 140 teachers from Public Elementary Schools and private elementary schools in Klaten Regency. For observations of learning, one was chosen from the Public Elementary School and one from the Private Elementary School at random. While for student scores related to high order thinking skills are also taken from elementary school students who observed the learning process.

### *Research Instrument*

Instruments for collecting data include learning observation sheets, questionnaires, interview guides, and teacher tests, learning outcomes tests related to HOTs. All instruments were validated by 3 experts, then revised based on suggestions from the validator. Questionnaire is made to be circulated through social media.

## RESULT

### Description of Survey Result of Scientific Thematic Learning Implementation in Elementary School of Klaten

From the results of a survey of 149 respondents using questionnaires distributed via Whatsapp social media and questionnaire sheets, data were obtained that used the thematic approach as follows:

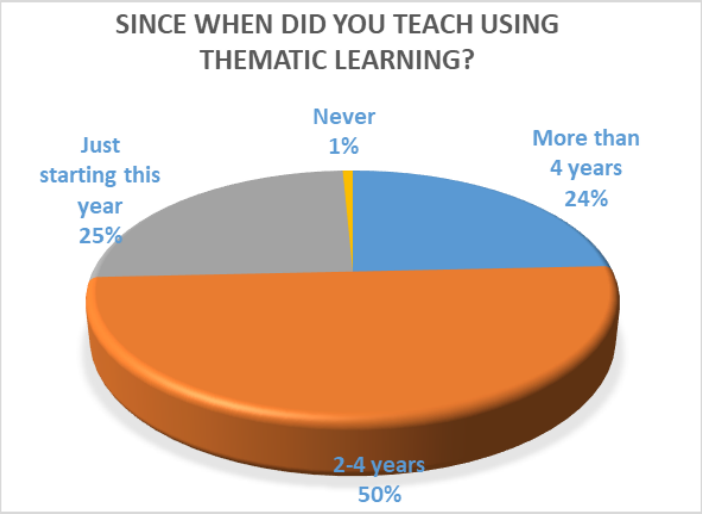


**Figure 1.** Percentages start using the thematic approach

It appears that only 24% of respondents taught using a thematic approach for more than 4 years. As many as 1% have never taught using the thematic approach, 25% have only started this year and 50% have used a thematic approach for 2-4 years.

According to the interviewees, this situation was caused by the fact that it was only in the 2019/2020 school year that all classes in elementary schools were required to use a thematic approach. In the previous year, only class I and class III were required. From this situation, many teachers are not ready to apply a thematic approach. Out of 149 respondents, 43% of teachers never use power points and teachers who sometimes use power points only 47%. More can be seen in the following chart:

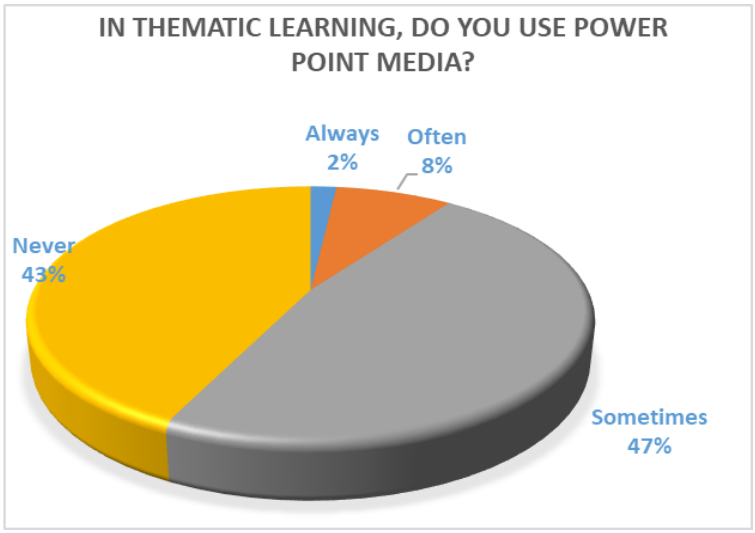


**Figure 2.** Percentages who used power point media

While the data regarding the use of teaching aids in learning are as follows:

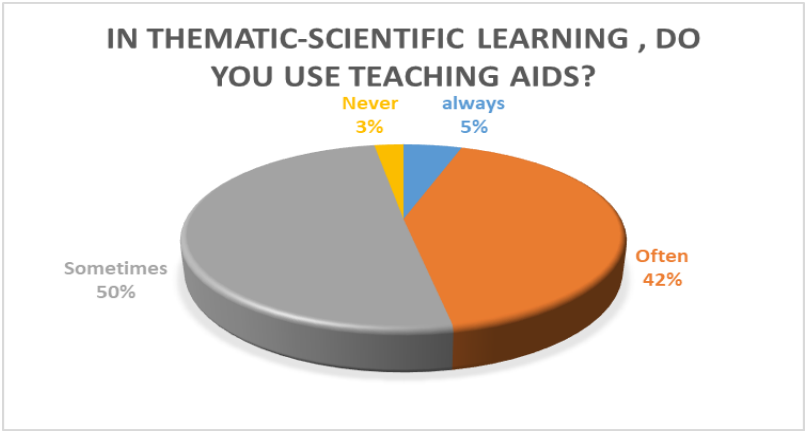


**Figure 3.** Percentages who used teaching aids

As many as 50% of respondents only occasionally use teaching aids in learning.
Regarding the formation of HOTs, in fact the questions and activities that have been written in the student book have led to the formation of HOTs. For example in one sub topic in class IV

Table 1. The Question in The Student's book that lead to formation of HOTs

Now, look at you. Do you use plants wisely?

| Statement | Description | Bloom Taxonomy |
|---|---|---|
| Give the example of your wise attitude towards plants | | To analyze |
| The impact of your attitude on the environment | | To analyze |

| Statement | Description | Bloom Taxonomy |
|---|---|---|
| Give the example of your unwise attitude towards plants | | To analyze |
| The impact of your unwise behavior on the environment | | To analyze |
| What are your plans to fix it | | To create |
| Taking adequate food is a wise thing that can be done to save food. You are obliged to save food | | |

But the test questions made by the teacher still do not lead to the formation of HOTs. For the evaluation questions, the teacher still had a lot of difficulties in making questions with HOTS.

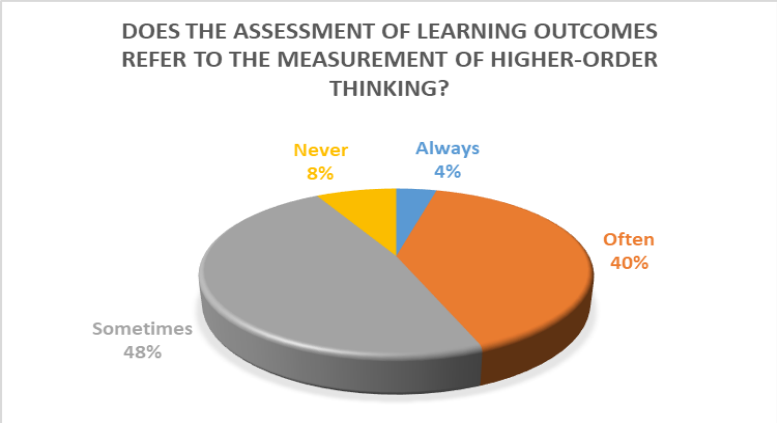


**Figure 4.** Percentages who used HOTs Assesment

**Description of Learning Conditions in Elementary School of Klaten**

In observing thematic learning, most teachers have not been able to teach thematic learning well. Learning seems to jump up and down, not coherent and unable to focus.
The following is an observation in one of the elementary schools:

1) Syntax

In the preliminary activities, the teacher generally does not communicate the learning objectives, but rather motivates by showing the usefulness of learning the material. The preliminary activity is preceded by linking the lesson with the previous lesson. The teacher does not use learning media or power points. The teacher presents the theme only orally.

In the core activities, in general the implementation of learning is still behavioristic in nature, after being explained, students are asked to work on the questions according to the teacher's explanation. Students are asked to work in groups, but in reality, students do not work in groups. Only a few students do the work, others just keep quiet. Teachers are less able to dig into students 'knowledge and respond less to students' opinions. Teachers are less able to reveal the initial knowledge of students so that learning is less developed and less gives students the opportunity to build their own knowledge. It appears that learning has not been constructivist.

In closing activities, teachers generally close by doing reinforcement, making a material summary, and giving homework.

The scientific approach is still invisible. The teacher has not done the 5M stage (Observing; Asking; Gathering information or trying; Reasoning or associating; and

Communicating). At the change of class hours or change of subjects, the teacher did not mention the theme again.

2) Support system

For the support system, the teacher makes a lesson plan that is made together in a KKG or downloaded from the internet. Students have student books issued by the Ministry of Education. In teaching, teachers do not use media in the form of power points or learning media.

3) Social system

Regarding the social system, this study revealed that learning with a scientific thematic approach in the classroom was carried out with the main activities being lectures, guided discussions by the teacher, followed by group discussions and presentations guided by the teacher. In group discussions, only a few students could work, others were silent, did not solving problems. 2-way interactions occur, but sometimes the teacher did not respond to students' opinions or questions, the teacher did not pay attention if what the student said is inappropriate.

4) The principle of reaction

Regarding the principle of reaction, the teacher presented the material and guided students in working on the questions. But in the learning process, teachers didn't respond to students, so teachers didn't know when students make mistakes.

5) Instructional effects and nurturant effects

Since thematic-scientific learning has not been able to run smoothly, learning for each subject is not deep enough, making the mastery of the material in each subject less than optimal. Likewise the students' high level thinking skills have not been well honed. It can be seen from the scores of learning outcomes related to HOTs that there are still many students stand below the Minimum Completion Mark (KKM)

According to the 2013 Curriculum, Class I, II and III should be taught with thematic learning, but in reality, teachers have not taught thematic approaches. Based on the results of interviews with teachers, it was revealed that the teachers taught with thematic learning if there was only supervision. If the learning uses a thematic approach, since the teacher is not yet accustomed to teaching thematic learning, learning is still unified, learning seems to jump up and down, resulting in not being able to instill the concept well. From the results of interviews with teachers, according to the teacher, although thematic learning has been written in previous curriculum, which means it has been existing since 2006, but they still consider thematic learning as a discourse. Teachers have not applied it to everyday learning. They applied thematic learning only at certain times, for example when they were watched by supervisors or were currently accredited, so that they still felt unfamiliar with thematic learning.

The obstacles encountered by teachers in learning by using a thematic approach are as follows:
Constraints encountered by teachers in using thematic approaches are

1. Because in one theme there are several subjects, the presentation of the material is not coherent, this causes children to be confused. For example on a theme, in teaching the addition of fractions students have not been taught the Least Common Multiple (KPK)
2. The subject matter is not deep, too narrow and simple
3. The teacher has difficulty connecting one subject to another so it is difficult to give understanding to students.
4. Teachers have difficulty fostering students 'reasoning, difficulty growing students' critical thinking skills

5. The exam for grade 6 are based on subjects, so the thematic learning is very troublesome for the teacher

**Discussion**

This study produced a profile of learning in elementary school that implements a scientific thematic approach. Regarding the learning syntax in learning models such as those written by Joice and Well, teachers carry out three stages of learning implementation, namely preliminary activities, core activities, and closing activities, but that has not reflected a particular learning model. About social systems, this study revealed that this learning was carried out with the main activities of lectures, guided discussions by teachers, presentations guided by teachers. However, since many of the teachers who are the subject of research, have not mastered how to teach using thematic and scientific approaches, they become less focused when entering subjects. Two-way interaction occurs, but sometimes the teachers do not respond to students' opinions or questions, do not pay attention to what the students' wrong statement. Regarding the principle of reaction, the teachers convey the material and guides students in the execution of the questions. Within support systems, teachers make lesson plans that are made together in the Teacher Working Group (KKG) while students have their own student's book (LKS). But that is also not developed by the teacher either. Meanwhile instructional impacts and nurturant effects, for instance, in learning mathematics, did not seem to clearly appear as teachers only teach procedural methods, resulting in less solidifying the concept. Because the teacher in teaching mathematical problem solving does not write down what is known and asked, students are not used to doing it. Likewise the teacher does not write down the subject and unit in solving the problem, the important thing is to do the calculation, resulting in the students not being used to writing it, if solving the problem directly the numbers are seen then counting.

The scores of elementary students related to HOTs, still do not provide satisfactory scores. This is because students' curiosity still cannot be generated through learning. Group discussions have not been able to run well, It seems students still work on their own, so students are not accustomed to asking questions and communicating the results of their thoughts.

Meanwhile, according to some researchers, proving that HOTs can be improved through learning, such as the Purnamawati's research proves that the use of metacognition-based learning tools in the field of Industrial Electronics Expertise was effective for growing HOTS capabilities (Purnamawati & Saliruddin, 2017). HOT skills acquisition can also be enhanced through science teacher in-service professional development programs on how to use the curriculum to impart understanding of scientific concepts and their applications in daily life (Saido, Siraj, Bakar, Nordin, & Saadallah, 2015). The study about Teaching Science through Inquiry contributes to the body of knowledge on the development of higher order thinking skills in general, and inquiry skills development in particular. (Hugerat & Kortam, 2014)

## CONCLUSIONS

This study obtained an overview of elementary schools leaarning and the results of students' higher order thinking skills in Klaten Regency. The conclusions are as follows: In the 2018/2019 school year, learning still uses the old curriculum, because those who are required to use the 2013 curriculum with thematic approaches are only class I and class IV. So, not all teachers have implemented the 2013 Curriculum for classes II, III, V, and VI. Teachers who use KTSP are more likely than those who use 2013 Curriculum. Teachers use thematic learning only if there is supervision or accreditation. In teaching with a thematic approach, learning still lacks a lot, especially in presenting themes at the beginning of learning. In addition, learning for

each subject becomes less focused, because the teacher only focuses on how the subject changes to look solid in accordance with the theme. The teacher has not been able to condition students to be able to "ask", one of the stages in the scientific approach. In terms of communicating the results of learning, students have not been able to communicate coherently. This will affect the high-level thinking skills of students, It appears that the scores of student learning evaluation results related to high order thinking are still low.

From the results of this study, it is necessary to develop learning models and learning media related to thematic-scientific learning based on metacognition in order to improve students' high order thinking skills.

## ACKNOWLEDGMENTS

This work would not have been possible without the financial support of DRPM Kemenristek Dikti. Especially to the Head of the Education and Culture Office of Klaten Regency and the teachers in the elementary school who were very cooperative, helped complete the research. We are grateful to all of those with whom we have had the pleasure to work during this and other related projects.

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