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# Fitting Scientific Approach Teaching Models to Higher Order Thinking Skill: Problematic in Indonesian Language Classes at Schools in Madiun

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**ABSTRACT**
The learning process in schools must be carried out by applying scientific approaches based on higher order thinking skill. Paying attention to this policy, teachers can apply various innovative learning models. The implementation of scientific approach - based models with higher order thinking skill can be combined with innovative learning models to gain the meaningful learning that produces positive impacts on the cognitive, affective, and psychomotor development of students. Teacher training institution is in charge to follow the development of a new paradigm of learning in schools. The implementation of effective learning models offers solution for the problem.

***Keywords:*** *Innovative learning model, scientific approach, HOTS.*

## 1. INTRODUCTION

In achieving teaching objectives, a teacher must be able to use various approaches, strategies, methods, techniques, and learning models that are appropriate and relevant so that the subject matter presented is easy for students to understand. This is because the teacher's task is (1) providing a learning experience that can foster a sense of pleasure and satisfaction in students so they continue to learn, (2) helping students find and analyze the information needed so students can make the right decision [1].

The statement is in accordance with the new concept of learning. Teaching means helping students develop knowledge. In line with the statement above, Brown [1] states: "Teaching defined as showing or helping someone to learn how to do something, giving instructions, guiding in the study of something, providing with knowledge, and causing to know or understand." To help students, the teacher can take conducive tactics and strategies. The tactics used by the teacher are (1) giving an opportunity to the students to get acquainted directly with teaching material, (2) giving them an opportunity to find out various questions about teaching material. In line with this, [1] recommends that the teacher needs to give the students sufficient time if necessary, to add extra time / homework assignments.

In accordance with the description above, in the context of teaching, a teacher must think, solve problems, and make decisions, so the students can be more flexible in thinking to be able to develop cognitive abilities more deeply [2]. The above opinion is not excessive because the teacher with the right choice of learning strategies is very influential in creating conditions and ways of thinking of children, that is responsible for the learning outcomes. Therefore, teachers should choose a model that fits their teaching method and philosophy [3]. By mastering various models, the teacher can determine which parts of the model are useful in a given learning situations. The teachers' understanding on the students' problems in learning will be important. "Nevertheless, students are having problems in the aspect of analyzing because they are weak in establishing relevance between the concepts of variables, domain, range and image also state that students are having difficulties in making decisions and providing justifications for such decisions" [4].

Based on the above explanation, the teacher must first, take the initiative to create learning scenarios that will be experienced by children, so the children can gain learning experiences, not only chasing targets (goals)

but also transferring knowledge without caring about the conditions and how children learn. The main learning model must be thought of by the teacher, so the students know how they should experience the learning process optimally. After paying attention to the objectives, indicators of learning success, and teaching material, the teacher should think about the suitable learning strategies for their students. The teacher must know when to lecture and when to provide opportunities for students to be active on their own learning, so the students can get the learning outcomes appropriately.

In general, the learning model is ”a mental picture that helps us understand something we cannot see or experience directly”[5].Learning model is “a description of a learning environment. The descriptions have many uses, ranging from planning curriculum, courses, units, and lessons to design instructional materials – books and workbooks, multi – media programs, and computer assisted learning program”. According to [6], teaching model can be defined as “an instructional design which describes the process of specifying and producing particular environmental situations which cause the students to interact in such a way that a specific change occurs in their behavior”. From the opinions above, it can be concluded that the teaching model is a plan or pattern that is used in preparing the curriculum, organizing the material and students, as well as giving instructions to the teacher in setting the teaching and arranging other components.

In general, the learning model is divided into four, namely: (1) the information processing model has an orientation on cognitive processes, world understanding, problem solving, inductive thinking; (2) personal model has an orientation to group awareness, unique (uniqueness), independence, fostering personality; (3) social interaction models are oriented to group spirit, togetherness, social interaction, individuals as social actors; and (4) behavior models oriented to social learning, self-correction, behavior therapy, response to tasks. [7] introduces a cooperative model that consists of 4 types: Student Team Achievement Division,Team Games Tournament, Cooperative Integrated Reading and Composition, Accelerated Instruction Team, Group Investigation. Anita Lie [8]divides cooperative learning models into several types, they are: make a match, pairing, think-pair-share, numbered heads, structured numbered heads, two stay two strays, group circumferences, jingling buttons, go around the class, small circle big circle, dance bamboo, jigsaw, and storytelling in pairs, etc., For literary learning, there are also several types, they are: the Stratta model, the Rodrigues-Badaczewski model, the Gordon Synectic model, the Taba Inductive model, the Moody model [9]. Moody [10]offer a literary learning model with 6 stages: (1) preliminary assessment, (2) practical decision, (3) introduction of the work, (4) presentation of the work, (5) discussion, and (6) reinforcement / testing. The 2013 curriculum (K13) of the Ministry of National Education for the implementation of the scientific approach recommends four learning models, namely the problem based learning (PBL) learning model, Project learning, inquiry, and discovery.

Learning with a scientific approach is a learning process that is designed in order to make students actively construct the concepts, laws or principles through stages of observing (to identify and find problems), formulate problems, advance or formulate hypotheses, collect data with various techniques, analyze data, draw conclusions and communicate concepts, laws or principles that are sought and found [11]. The important point in learning is the occurrence of scientific process skills. To learn means to think, “being able to think” means students can apply the knowledge and skills they developed during their learning to new contexts. “New” here means applications that the student has not thought of before, not necessarily something universally new”, [12]. Through these scientific approaches, it is expected that students can be active, think scientifically, and creatively in learning. Through the search process, students are directed to discover for themselves various facts, construct concepts, and new values needed for their lives. This scientific approach is believed to be a golden strategy in the formation and development of students' attitudes, skills and knowledge.

## 2. THEORY

The scientific approach is intended to provide an understanding to the students in knowing, understanding various materials. In this process, the students can get information which comes from anywhere, at any time, not dependent on unidirectional information from the teacher. Therefore, the expected learning conditions are directed to encourage students in finding out from various sources through observation and not just being told[13].

The implementation scientific approaches today is in line with the education policies in the country that has adopted a constructivist approach. The constructivist approach means learning through the process of internalizing and forming new knowledge [14]. Knowledge according to the idea of constructivism is built by humans themselves little by little, the results of which are expanded through a limited (narrow) context and not in a sudden condition. The rationale for constructivism is that the understanding of knowledge will further develop if it is always faced with new situations, faced with tests through the acquisition of new inputs. Old knowledge will experience dynamic assimilation or accommodation to adjust and improve new inputs. Therefore, one's knowledge is not done once, but through a process of continuous development [15]and [16].

Based on the explanation above, the steps of the scientific approach can be recorded as follows: (1) Observing. In the step of observing, students do the observations (read a text carefully or observing objects) to find facts according to the object of analysis; (2) Asking. In the questioning step, students develop curiosity through the formulation of the problem/ question according to the object of analysis; (3) Collecting the information. In the step of collecting information, students collect the data/ information through experiments, extensive reading, etc. to find the answers of a problem/ formulate the question; (4) Associating/ reasoning, In the step of associating/ reasoning, students processes, study, and analyze information to determine the solution/ main findings/ answers according to the object of analysis; (5) Communicating, In the step of communicating students delivering findings/ observations to others in writing or verbally.

In order to carry out scientific learning procedures, it is required to have higher order thinking skill. In this industrial revolution 4.0 era, the students should have Higher order thinking skill which includes critical thinking, creative and innovative thinking, collaboration, and communication (4C).In the future, the world of work also requires a mentality of integrity, initiative, motivation, teamwork, ethics, willingness to learn, commitment, resilience, communication, honesty, logical argumentation, and people, who have faith and are devoted to Allah Almighty, we need this way of thinking not only in the presents but also for the future. People also needs creative-innovative-critical ways of thinking, problem-solving skills; how to do communication and collaboration, information literacy, information technology literacy, life as a global citizen, life and personal career responsibility and social awareness as a part of a nation, also politics identity [17].

This high-level way of thinking is the ability to think that is not just to remember (recall), restate (restate), or refer without doing processing (recite). It means that HOTS is a level of transferring one concept to another, processing and applying information, looking for links from different information, using information to solve problems, and critically analyzing ideas and information [18], [17] and [13]. “The ability of higher order thinking skills are activated when individuals encounter unfamiliar problems, uncertainties, questions, or dilemmas. When this skills are nurtured and well developed, one can perform better during explanations and making decisions as well as grow their intellectual skills.” [19].

If we align HOTs in the order of cognitive levels according to [20] then HOTs are at the stage of analysis, evaluation, and creation; MOTs are at the stage of understanding and application; and LOTs are at the knowing stage. The main characteristic of higher-order thinking skill (HOTs) is minimizing aspects of memory or knowledge. The characteristics of higher-order thinking are active abilities: discovering, analyzing, creating new methods, reflecting, predicting, arguing, making correct decisions, based on contextual problems; attractive stimulus; not routine [13]. Some evidence show that some students have little motivation to think and develop their cognitive skills which enable them to be creative and analytical [21].

## 3. METHODS

This research is conducted using a qualitative approach with descriptive methods. The subject of this research is the junior high school in Madiun in the 2018/2019 Academic Year and the Indonesian Language Education Study Program FKIP Universitas PGRI Madiun in the 2019/2020 Academic Year through the grant program assignment of lecturers to schools. In the 2018/2019 school year, the researcherdid the observation trough absorbed experience and knowledge in the form of real teaching practices in junior high schools.In the 2019/2020 Academic Year, there was an evaluation and implementation of PDS results on campus. Data collection using documentation techniques, checking the validity of data using source triangulation and FGD techniques. The FGD was carried out to draw information about: students learning activity and participation, impacts and problems of implementation in classes by teachers. The instruments for the data collection are: field-notes, observation sheets, checklist and interview protocol. The data analysis technique is the Miles and Huberman’s interactive model with content analysis approach.

## 4. RESULTS AND DISCUSSION

The results of the implementation of various innovative learning models for implementing scientific approach Based-Hots are as follows: The complete learning models with their syntax have been applied in harmony with the theoretical concepts in the lesson plan; Indonesian language learning model, for example, this learning model has been understood and applied in the correct sequence syntax, that are; (1) stimulation, (2) problem statement (question / problem identification); (3) data collection;(4) data processing; (5) verification (proof); (6) generalization (drawing conclusions) (Source: Lesson plan of the Exposition Text of the Grade X, Junior High Schools, term 2018/2019). However, the sequence of syntax presented in the lesson plan results by the teacher has not been fully applied to the actual implementation of learning. Teachers provide this explanation because students are not ready to be conditioned using innovative learning models. Real teachers still teach conventionally, have not implemented innovative learning models (source:

interview against the Junior High School teachers in Madiun).

Actually, the innovative learning model has creative learning steps and stimulates student motivation. Based on the researchers' reflection, teachers afraid to apply because they are still unfamiliar and for some teacher, they are not mastered the steps. In addition, teachers are afraid if they apply innovative learning models because it will take a long time so the available hours are not enough.

The scientific approach and steps have been reflected and integrated in the application of learning models. This can be seen in the table below.

**Table 1**: Alignment Steps between the Scientific approach and the Learning Model

| The Scientific Approach | Learning Model |
|---|---|
| Observe | Stimulate |
| Ask | Problem Statement (Question / Problem Identification) |
| Collect Information | Data collection |
| Associate / Reason / Process Information | Data processing and Verification |
| Communicate | Generalization (communicating conclusions) |

(Source: Lesson plan of the 2018/2019; Exposition Text Class X)

The implementation of the stages of the innovative learning model fits to the standard scientific approach, which covers: (1) observing, (2) questioning, (3) collecting information, (4) associating/analyzing information, (5) communicating results. Nevertheless, evidently, teachers often carried out classical technique in the implementation of the scientific approach for the sake of the smoothness of learning activities when students got staged on a certain step. According to the lesson plan, teachers had designed all of the steps required in this model, beginning from the first step, observing/ identifying (phase 1); but because the learning activity often found staged in the next step, questioning (phase 2) , they felt obliged to take over the learning activity by giving explanation which promoted classical technique. The next learning activity did not soon come back to the scientific-based activity, rather than the teachers went on with the classical technique. They went on with the guided-question-and-answer technique. Consequently, the designed scientific learning model had not yet completely carried out in classes (source: interview and FGD with the Subject Teachers Association Junior High Schools in Madiun Municipality). Quantitatively, the evidence of the implementation of the scientific model can be seen as follows:

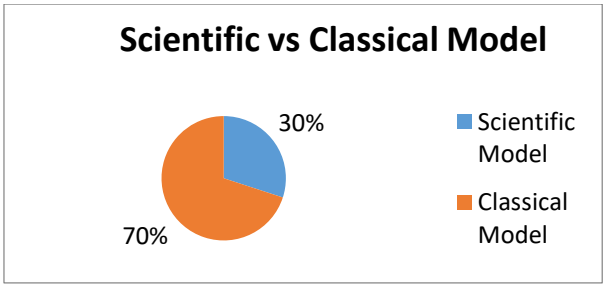


**Figure 1:** Evidence of the implementation of Scientific Model out of the Classical Model

From the researcher analysis, it was found that teachers had designed on the Lesson Plan the Higher Order Thinking Skill learning model, but the implementation in classes, there were many shortfalls. The four characteristics of HOTs should be written completely, but only one of them was written as the subtitle of an activity, such as critical thinking. The example of incorrect description of HOTs can be seen in the description below.

**Table 2:** The example of HOTs in Lesson Plan Description

| | |
|---|---|
| Problem Statement (question/ problem identification) | **CRITICAL THINKING**<br>The teacher gives students the opportunity to identify as many questions as possible related to the picture presented and will be answered through learning activities, for example:<br>→ Asking questions about the material: Definition of exposition text<br>What is not understood from what is observed or questions to get additional information about what is observed (starting from factual questions to hypothetical questions) to develop creativity, curiosity, the ability to formulate questions to form critical thoughts that need to live smartly and lifelong learning. |

(Source: Lesson plan of the 2018/2019; Exposition Text Class X)

From the findings above can be discussed as follows: (1) The teacher has understood and has been able to apply learning models, and has understood the principles of applying a scientific approach; (2) Teachers in general do not fully understand the principle of placing HOTs at each stage of learning. All stages of learning should be filled with 4C (critical thinking, creativity, collaborative, and communicative), in fact, in some parts of each learning phase only one element of 4C is written. The description should be done harmoniously in a complete set of sentences as follows:

**Table 3:** The examples of Correct Descriptions of HOTs in Lesson Plan

| Phase | Main Activity | Time |
|---|---|---|
| Problem statement (question/ | The teacher provides the opportunity for students to identify through critical thinking | |

| | | |
|---|---|---|
| problem identification) | with creative, collaborative, and communicative (4c) as many questions as possible related to the images presented and will be answered through learning activities.<br>Example questions: what is the meaning of exposition text; how is the exposition text elements (ideas and facts); how is the pattern of exposition text development; how is the contents of the exposition text based on the main idea; how is the type of paragraphs in the exposition text; how is the structure and rules of the exposition text; how to arrange the exposition text; how to edit exposition text? | |

## 5. CONCLUSION

Based on the explanation above, it can be concluded that HOTs-based learning has been noticed by teachers in line with the application of a scientific approach both in the realm of lesson plan and its implementation in the classroom. The evidence of the implementation of the HOTS in classes experienced many problems. The first problem was found out when the class should shift away from the phase (1) to phase (2), questioning. Students often misunderstood what and how should be questioned. This event often required teachers' involvement to go on the learning activity by classical technique. The objectives of the scientific model was practically failed to be completely obtained.

According to the interview and the FGD with teachers in Indonesian Teachers' Association, the learning congestion on the phase (2) was merely due to the lack of the students' confidence and understanding to communicate what was already learned. These results of research recommend more communication training for the students during the learning activities by the teachers at schools or even by the parents at homes. It is important to nurture communication skill for the students.

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