

## **IMPLEMENTATION OF SCIENTIFIC APPROACH BASED LEARNING TO THINK HIGH LEVELS IN STATE SENIOR HIGH SCHOOL IN KETAPANG**

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### **ABSTRACT**

**Wahyono (2017).** Implementation of Scientific Approach Based Learning to Think High-Level in Senior High School in Ketapang.

This research is motivated by the not optimal learning implementation using scientific approach to improve high level thinking in State Senior High School in Ketapang. The purpose is to know the contribution of documents to the implementation of learning reflected from the students' learning outcomes. Because this learning is only implemented in Ketapang on the academic year 2016/2017 and is a government program done gradually until 2019. The approach used is mixed methods with descriptive method and through survey study in State High School in Ketapang with purposive random sampling technique. Respondents are 94 (Ninety-four) people consist of 1 (one) principal, 4 (four) school curriculum development teams, 5 (five) subject teachers, and 20 (twenty) students in each school and 4 (four) district instructors. The results obtained are, (1) teachers in preparing documents, as many as fifty-seven point four percent assess able and twelve percent assess very capable. (2) teachers in implementing a scientific approach correlated with 5M, sixty three point five percent able and ten point one percent rate highly capable (3) teachers in designing scientific learning assessment, as many as sixty point three percent assess capable and eight percent assess very capable.

**Keywords:** Learning Implementation, Scientific Approach, and High-Level Thinking Skills.

## A. Introduction

The completion of policies in the field of education should continue to be done by the government to meet the desires of society and its dynamics, the orientation of change should begin at the most basic level of learning. The logical consequence that has to be done on the improvement is to provide a thorough depth to the teachers, it takes a long time. But it can be done in a simpler way and a relatively short period of time that is by providing in-depth training on the preparation of documents, implementation of learning and assessment of learning outcomes, these three elements become the spirit in learning.

Referring to the learning objectives stated in Permendiknas Number 52 of 2008 about Process Standards outlined that "learning objectives provide guidance for choosing subject content, organizing topics, allocating time, instruction in choosing teaching aids and teaching procedures, and providing size (standard) to measure student achievement", while Sukmadinata, NS, (2002). Suggests the purpose of learning to facilitate, 1) in communicating the purpose of teaching and learning activities to students, so that students can do learning more independently; 2) teachers select and arrange teaching materials; 3) teachers determine learning activities and learning media; And 4) the teacher makes an assessment.

If referring to these opinions, teachers should be able to develop learning by implementing the program that has been prepared. The role that is not less interesting in this learning is as a motivator, in this side teachers are expected to have the ability to, 1) clarify the learning objectives to be achieved; 2) generate student interest; 3) create a fun learning environment; 4) give praise to students' success; 5) provide assessment of learning outcomes; 6) give reward to students' work; And 7) create competitive and cooperation. While Morgan et.al (1986: 24), defines "motivation as a power that leads to a certain purpose", motivation has an important role in the learning because it will awaken the ability of the teacher.

Appropriate motivation will foster a strong will in student learning. This condition should be coupled with the application of appropriate learning too; scientific approach is one of approach that is expected to grow students' learning motivation. Because the learning framework is built on the flow of scientific thinking, such as building concepts, laws and principles through the stages of identifying problems, formulating problems, formulating hypotheses, collecting data with various techniques, analyzing data, drawing conclusions and communicating concepts, theories, laws, and principles that have been obtained. The lesson should be designed using process skills, where teachers should be able to, 1) observe the activities of the students; 2) asking some object related to the subject matter; 3) reasoning a series of activities undertaken by students; 4) try to do something to actualize knowledge; and 5) networking in connecting existing knowledge and activities to make interesting.

Learning using a scientific approach provides a positive influence on teachers and students, because its learning refers to a scientific thinking process that trains systematic and holistic thinking. Because it is not only sees learning as an estuary but further builds the interconnectedness of knowledge reflected in the process skills, to explore and elaborate the subject matter, in addition it provides the widest possible opportunity for teachers to explore students' knowledge according to their abilities and needs. The research results of Rahayu, S., (2016), entitled "Developing High-level

Student Skills through Contextual Chemistry Study of Socio Scientific Issues (SSI) and Nature of Science (NOS)", showed us the results that scientific research approaches have increased to the students' ability to think in high level. Depdiknas it self defines a scientific approach as a learning contained in the curriculum of 2013 that emphasizes or focuses on the modern pedagogic dimension of its learning method, where teachers must create active learners through observing, asking, trying, reasoning and building networks. Meanwhile the result of research that has done by Ayuni, F.N., (2015) showed the level of teachers' understanding of the scientific approach is largely moderate to high. The results of observations conducted by Jaya, G.W., about the implementation of scientific approach through experimental method on the learning of physics class X, MIA majors in SMA Negeri Tenggara with categories exposed in the following table:

**Table 1**

The observation Result of Scientific learning Implementation

No	Type of Skill	Average Score	Category
1	Watching	90.3	Very Good
2	Establishing Hypothesis	82.7	Well
3	Experiments	86.9	Very Good
4	Concluding	79.6	Good
5	Communicating	82.1	Good
	<b>Average</b>	<b>84.3</b>	<b>Good</b>

Observation Results. Jaya, G.W., 2014.

From the results above, the scientific learning is appropriate to be used at this time especially when combined with instill learning using high-level thinking, is expected to grow brilliant ideas, brilliant thinking, the high creativity and innovation, the tough competitiveness, and social-spirited.

High-level thinking influences one's mental ability in combining divergent complex activities, Raudenbush Research, et.al., in (Prasetyani, E.,: 2016). concluded that the teacher's understanding of good high-level thinking would have a significant effect on teacher preparation in teaching materials related to higher-order thinking. Novianti (2014) in her research argued that some of the student's barriers in solving the problem of high-level ability were less tenacious and inaccurate students in doing the thinking steps. In addition Lewy, et al., (2009) through his research suggested that teachers and students to use questions on higher-order thinking skills because they will have a potential effect on high-level thinking skills after a real examare done.

*(Bloom, 1956; Kauchak & Eggen, 1998). In FJ King expected further, "Comprehension and application from linkages to higher order skill; here, the learner uses meaningful information such as abstractions, formulas, equations, or algorithms in new applications in new situations. Higher order skill include analysis, synthesis, and evaluation and require mastery of previous levels, such as applying routine rules to familiar or novel problems", Higher-order thinking skills are built from simple knowledge with continuous improvement to practice thinking skills in interpreting information such as abstraction, formulas, equations, and algorithms by analyzing, synthesizing, and evaluating to use formulas in solving common or encountered problems.*

The ability to implement scientific learning using high-level thinking in teachers will be reflected in a well-organized assessment of students' learning outcome. Teachers are required to be able to arrange and implement learning according to the standard, meanwhile on the level of primary and secondary education refers to the standard of appraisal Permendikbud number 66 year 2013 about assessment standards, with the following principles, 1) objective, in meaning that the assessment refers to the work of students significantly from the activities performed; 2) integrated, which means in the assessment is done in a planned manner so that students do not feel trapped, together with learning activities so that students do not feel valued; 3) economic, which means to know the ability of students both cognitively, affectively, and psychomotor with give attention to student habits undertaken; 4) transparent, which means the assessment is done by giving the students an opportunity to know which elements will be assessed and the deficiency they made after the assessment ends; 5) accountable, which means the assessment can be responsible to students; and 6) educative, which means assessment provides motivation and encouragement.

Teachings and assessments conducted by teachers are reflected in the document prepared, because the document is a guide for carrying out teaching activities, designed in the form of syllabus, annual program, semester program, educational calendar, student presentation, lattice, and RPP referring to standard of content, and in it there are media designs and learning resources, assessment tools, scenarios. The preparation of documents is part of the planning that helps teachers in carrying out learning activities to be more focused, but also need to consider aspects of the format, language, illustrations, materials and objectives also learning approaches that are used. Besides that the preparation of documents is an obligation that must be done by teachers to fulfill their professional responsibility. The document as a guide will direct the teacher in conducting the activity, as for the purpose of making the document for the teacher, 1) as a guide; 2) as a benchmark for success; 3) improvement of professionalism; and 4) facilitate learning. This means that teachers have an obligation to compile a document in a complete and systematic in order to get used to think synthesis, evaluative, and find ideas that can support its activities. (Anderson, 2009).

The success of teachers in learning is not inseparable from a design that will guide in the implementation of activities, Suhardi (2007: 24), emphasizing learning tools is a number of materials, tools, media, instructions, and guidelines that will be used in the activity. As a document, it will be very important for teachers in carrying out their learning, whether in class, laboratory, or outside the classroom. Therefore, the compiled document must fulfill the qualification standards of feasibility and practicality.

The three elements are documents, implementation, and assessment of learning outcomes that can be said as three bottom which mutually influence and complete each other, can be described as follows:

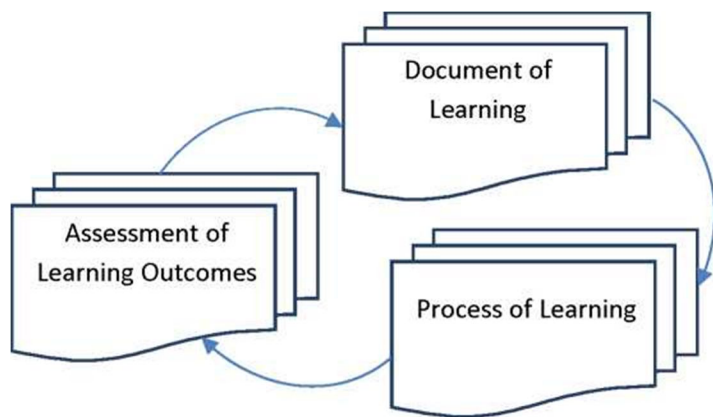


Figure 1

Three Basic Components of Learning

**C. Research Methods**

This research uses mixed method of methodology, by combining the form of research in one activity, and the design used is sequential explanatory design because the first sequence used quantitative and the second used qualitative. This was also put forward by Craswell (1998: 316), sequential explanatory design is the usual research steps used in mixed methods and often used by researchers who lead to quantitative research. In knowing the quality of document, process, and assessment design using scientific approach to think high level in State Senior High School Ketapang that is conducted by teacher. Where the sample is determined by purposive random sampling through certain considerations (Sugiyono: 2010), is State Senior High School 1 Ketapang, State Senior High School 2 Ketapang, and State Senior High School 3 Ketapang from the condition and character of schools are almost the same expected the homogeneous sample.

**D. Research Finding and Discussion**

Based on surveys through observation, question and answer, and questionnaires distributed during the study, the next researcher will reveal the findings in the field based on the implementation of learning done through statistical analysis (quantitative) and descriptive analysis.

1. Findings Based on Quantitative Analysis.

a. The result of the team about assessment of document arrangement is

Has not been able to	Less Capable	Able	Very Capable
%	%	%	%
0.9	28.8	57.4	12.0

b. The average results of the team’s assessment and the student opinions about implementation is

Has not been able to %	Less Capable %	Able %	Very Capable %
1.2	25.2	63.5	10.1

- c. The average result of the team's assessment and the students' opinion about the design of the assessment is

Has not been able to %	Less capable %	Able %	Very Capable %
2.3	29.4	60.3	8.0

## 2. Findings based on Qualitative Analysis.

- The average of the teams assessment believes that 0.9% has not been able, 28.8% has less capable, 57.4% has capable and 12.0% has very capable.
- The average of the team's assessment and the students argue that 1.2% has not been able, 25.2% has less capable, 63.5% has capable, and 10.1% have very capable.
- The average of the team's assessment and students argue that 2.3% has not been able, 29.4% has less capable, 60.3% has capable, and 8.0% has very capable.

This study examines the implementation of a scientific-based learning approach to higher-order thinking, by analyzing instructional documents as guidelines, and designing assessments as controls in learning. To find out the implementation and suitability of the three that have been arranged by the teacher, it is used questionnaires and validation sheets that have been validated by the expert team, and the assessment of research findings on the feasibility of the document, implementation and evaluation of learning outcomes using the formula and conversion are as follows :

Formula

$$\text{PKG Value} = \frac{\text{Obtained Value}}{\text{Highest Value of PKG}} \cdot X 100$$

Conversion 1

Scale	Qualification
81 - 100	High
66 - 80	Medium
51 - 65	Low
50 ≤	Very Low

The assessment refers to book 2 Teacher work guidance (PKG)

Based on the findings 1) compiling the document, average from the assessment team believes that as many as 0.9% has not been able, 28.8% has been less capable, 57.4% has been capable, and 12.0% has very capable; 2) implementing the average learning from the assessment team and students arguing that 2.3% has not been able, 29.4% has less able, 60.3% has capable, and 8.0% has

very capable; And 3) the average learning appraisal of the teams' assessment and students argue that 1.2% has not been able, 25.2% has less capable, 63.5% has capable, and 10.1% has very capable. From these results illustrated that the ability of teachers from the preparation of documents, implementation of learning, and the design assessment of learning outcomes are categorized as low.

1. Preparation of documents by teachers is a Lesson Plans Preparation (RPP) that refers to content standards, the preparation of media and learning resources, assessment tools, and learning scenarios, conformity with regional needs. RPP that is created by teacher : a) have been developed for each of the basic competencies on the topic and uses a scientific approach to increase high-level thinking; b) clear in making stages so that not making confuse; c) procedures used refers to learning of a scientific approach to achieve basic competencies; d) the indicator made refers to the material covering the three domains; e) leads to a product that will be created by student, and f) by performing the learning stages. The results of the teams' assessment are as many as 0.9% has not been able, 28.8% has less capable, 57.4% has capable, and 12.0% has very capable.
2. The implementation of learning uses a scientific approach to conduct excavation, planting, enhancement, and development of knowledge through research, from this activity will form an analytical thinking pattern, and will bring the facts of the phenomenon that occurs. Meanwhile scientific learning is built from learning materials based on facts or phenomena that can be explained by certain logic or reasoning done by teachers, student responses, and educational interactions; encourage and inspire students to think critically, analytically and appropriately in identifying, understanding, and solving the problems, and being able to apply; To encourage and inspire students to be able to think hypothetically in seeing the differences, similarities, and relationships between elements and be able to understand, apply, and develop a rational and objective mindset in responding to the subject matter; based on empirical concepts, theories and empirical facts that can be justified; and learning objectives are formulated in a simple and clear, but interesting in the presentation. The result of the teams' assessment and the result of the students' opinion is that 2.3% has not been able, 29.4% has less capable, 60.3% has capable, and 8.0% has very capable, in accordance with the research results of Ayuni, F.N., (2015) showed the level of teachers' understanding to the scientific approach is largely moderate to high and the results of observations made by Jaya, G.W., on the application of inappropriate scientific approach to be used.
3. Teacher assessment involves observing, questioning, reasoning, trying, and networking comprehensively as learning progresses and not separately. Involving students to engage in activities related to the subject matter, in assessing with regard to students' skills, a) looking at the activities they undertake; b) able to expose problems related to the subject matter by writing, schematic, drawing, and photographing; c) whether to connect the problems that have been built into a concept to continue to be developed; d) whether able to process information from inventory problems by selecting topics, searching and integrating, processing and analyzing information; and e) able to describe the series of activities that have been done. The

assessment result of team and the students' with the average is 1.2% has not been able, 25.2% has less capable, 63.5% has capable, and 10.1% has very capable.

### **E. Conclusion**

Learning that based on sincerity is a capital for teacher to sincere, so that activities that are done will give influence to students in form the best services. Learning that is done on State Senior High School in Ketapang as explained above gives the explanation about teachers' ability in arranging learning document, implementing learning, and assessment to learning outcomes on the low category because assessment of team and students' opinion whether document arrangement, learning implementation and assessment of learning outcomes thoroughly is low. This factor is influenced by some reasons that is found at the time of research, such as less involvement of teacher in arranging the document of curriculum 2013 because most of them are still adopted form other school; on the teacher implementation is not able yet to connect the learning material with students' potency and condition of the area and global; and on the teacher learning assessment need to increase in doing the procedures of evaluation technique in measuring achievement of Standard of Competency, doing analysis to the result of evaluation.



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