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Implementation of Scientific Attitude Learning Models in Science Learning In SMP Negeri 1 Cirebon (Cirebon Middle School)

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Abstract

The scientific attitude is important for students developed in schools to support spiritual and social attitudes that are listed in the curriculum of 2013. The scientific attitude of students will not appear suddenly, if it is not constructive directly by the teacher. The learning models of scientific attitude is done with seven steps (syntax) namely: 1) formed the Group; 2) designing the program activities; 3) produce; 4) get an understanding; 5) internalizing the scientific attitude; and 6) conducting an assessment of attitude. Qualitative indicator appears as a lot of the results of the study which is characteristic of the attitude of the scientific domain with objective, systematic, logical and empirical. This learning can build models of mindset of students and scientific attitude of the students. However, the average test results scale attitude shows instead that these models do not differ significantly between the experimental and control classes. There needs to be a follow-up study to refine the syntax this model are the details.

Keywords: *Learning Model, Scientific Attitude, Spiritual Attitude, Social Attitudes, and Mindset*

1. Introduction

Attitude is considered important, but the process of attitude learning in school lacks the teachers' attention. Social problems that arise in the society are mostly due to the low level of intellectual, attitude, and awareness. Several results of studies show that the intellectual level is closely related to students' attitudes, behavior, and awareness (Basri, 1991; Langgulung, 1991; Fishbein & Ajzen, 1975; Brehm & Kassim, 1990; Sax, 1997; At-Tamimi et al., 2001; Bruce & Weil, 1985; Mar'at, 1982; Robert et al., 1995; and Wahidin, 2004). The phenomenon that is considered difficult for teachers in the implementation of the 2013 curriculum is the achievement of target of the attitude Core Competencies (spiritual attitude/KI.1 and social attitude/KI.2). This attitude learning is considered new, because in KTSP 2006, it is not as explicit as in 2013 Curriculum. The aspect of attitude is believed to be an important part that contributes greatly to the dignity of students in their lives. However, how to effectively achieve the target? The teachers find it difficult to carry out the planning, process, even the evaluation of attitude learning. Currently, teachers carry out attitude learning that are 'not programmed' even though the teacher knows the graduation standard of attitude in the curriculum. The teachers are not accustomed to present concepts of subjects in an integrated manner for students to achieve certain attitudes, such as scientific, social, and spiritual attitudes. For example: How can the concepts of science increase students' belief in natural law (sunnatullah)? How does the teachers' explanation increase students' confidence in the creation of nature? How does a science practicum train students about honesty and objectivity? This is because attitudes that are based on understanding are the basis for forming students' awareness (Joice, 2010).

The nature of education actually trains people to think according to criteria in scientific attitudes. In education theory, it is stated that the brain work is based on the concepts that enter the brain and then processed to produce an understanding of a particular object. This

ISSN: 2005-4238 IJAST

understanding will dilute an attitude to act on the object, and eventually this attitude will produce awareness to act or take action on the object continuously. As an educational goal, behavior is formed through a scientific attitude approach. Scientific attitude is based on scientific thinking process. Scientific thinking is a complex mental process that involves the brain, heart, and taste to make a decision (Wahidin, 2004). In this study, attitude theory is used in reading the reality that occurs in student activities in conducting learning process activities. Attitudes are influenced by cognitive as an understanding requirement and awareness theory as behavioral requirements. Therefore, the attitude that appears in students is as their choice themselves. Attitude is a process of brain work supported by awareness, trust, empathy, a sense of humanity, belief, and hope for the future as a function of the heart.

The reality of social, behavioral, and spiritual attitude of the society above add to the burden of external factors of our education. In facing with the ASEAN Economic Community in 2016, external factors are challenges that demand the strength of both attitude, knowledge, and skills that must appear to be bold and competitive. Meanwhile, current public perceptions of education still emphasize cognitive and skill aspects. The aspects of character (attitude, awareness, and personality) are needed, but are neglected in the learning process (Anas, 2013). In fact, the development of knowledge and pedagogy has been more advance, such as the fields of neurology, psychology, and observation based [discovery] learning and collaborative learning. Therefore, school can provide better intake to students to protect against negative phenomena that emerge in the community such as student fights, drugs, corruption, plagiarism, cheating in exams, and public turmoil (Yaumi, 2017).

The target of learning is to optimize the achievement of learning outcomes for all domains of learning, namely cognitive, affective, psychomotor, and creativity. In learning process, teachers are expected to be able to use the community and the environment as an effective learning resource and touch the humanity dimension. There are several things that must be a teachers' attention, namely the local wisdom (cultural, values, religion, and beliefs) and local potential that exists in the community. Related with the problem of how the skills of teachers in designing, implementing, and evaluating scientific attitude learning of students in school, this study has a specific purpose which is to find out the skills of teachers in designing, implementing, and evaluating scientific attitudes learning of students in school. To validate the scientific attitude learning model in optimizing the achievement of learning objectives in the cognitive, affective, psychomotor, and creativity domains, researchers find out the skills of teacher using the community and the environment as an effective learning resources and touch the dimension of humanity, revealing teacher skills in using local wisdom (cultural values, religion, and beliefs) and local potential that exists in the society.

2. Literature Review

2.1. Learning Model

Learning theory according to Bruner (1960; Novak & Gowin 1985; Bloom, 1956) stated that attitudes can be formed as a result of learning. The learning process as part of a conventional education system contains elements such as input, process, and outcomes. Outcomes can be measured after the graduate is in the community. The learning model used in this study is adopted from the study from Wahidin (2015) as follows:

ISSN: 2005-4238 IJAST

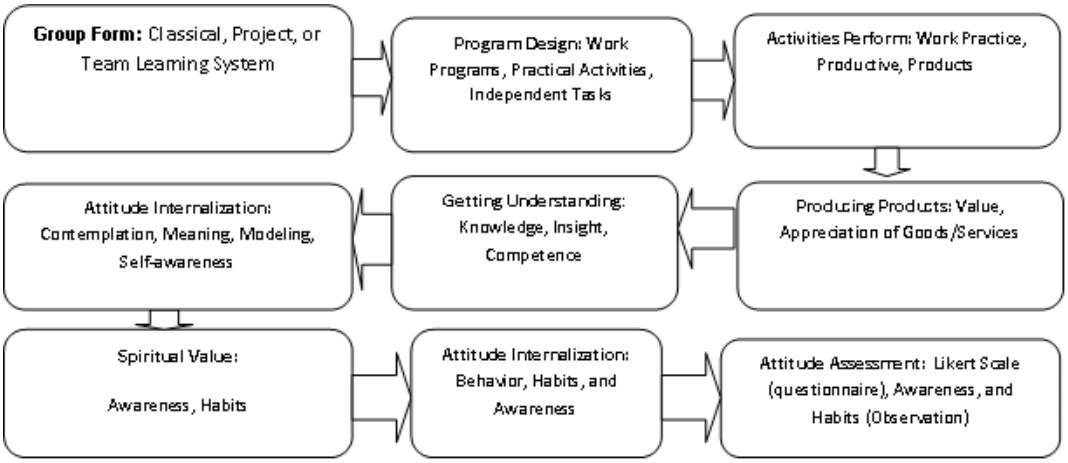

Figure 1. Learning Models

2.2. Attitude Theory

In the school curriculum, attitude is a core competency that is needed. Attitude determines behavior and way of thinking, thus it is important to be taught to students in school (Swadarma, 2013). The attitude in a person is influenced by his knowledge, beliefs, thoughts, and experience. Attitudes that arise are also as a result of thinking which is realized as a scientific attitude (Bronowski, 1978; Diederich, 1967; Whaley & Surratt, 1967; Waston, 1961, Wahidin). Individual attitudes can shape community attitudes so that it becomes a permanent culture. The culture of society in each region of Indonesia is diverse. Diversity should enrich people's attitudes, awareness, and wisdom, but the things that often occur is sometimes the opposite, namely the trigger of division. The reality in society shows that sometimes cultural diversity, religion, and ethnicity is a potential conflict cause. Conflict essentially occurs because of differences in mindset, attitude, and behavior both individually and in groups. Conflict arises when individual differences arise and strengthen when there is interaction with each other, and eventually there will be attitudes and behaviors that offend each other (Covey, 2002).

2.3. Scientific Attitude

Salam (2005) suggested that scientific attitude is a person's view of ways of thinking that are in accordance with scientific methods, so that arise a tendency to accept or reject the way of thinking that is in accordance with the science. A scientist must have a positive attitude, or a tendency to accept ways of thinking in accordance with scientific methods, which are manifested in his cognition, emotion, or feelings, and his behavior. Gega in Anwar (2009) suggested four scientific attitudes that must be developed in science, namely: (a) curiosity; (b) inventiveness; (c) critical thinking; and (d) persistence. These four attitudes are actually inseparable from one another because they complement each other. Curiosity encourages the discovery of something new (inventiveness), that by thinking critically (critical thinking) will establish the position (persistence) and dare to disagree.

2.4. Spiritual Attitude

Spiritual attitude according to the 2013 Curriculum is a person's tendency in dealing with something based on their beliefs and submission to the God Almighty. Spiritual attitude means an attitude that leads to universal truth and has emotional qualities that tend to be consistent. This spiritual attitude is more religious. Moreover, the 2013 Curriculum explained that spiritual attitudes include aspects of observance of worship, gratitude, praying before and after doing activities, and tolerance in worship. These aspects are also the object of learning assessment (Yaumi, 2017).

ISSN: 2005-4238 IJAST

2.5. Social Attitudes

Social attitude is characterized by able to work together, able to compete positively, able to share with others, have a desire for social acceptance, depend positively on others, and have good attachment behavior (Kusumaningtyas, 2013). Social attitude can be described as actions that are based on the founding of a person who is built from the social skills possessed by individuals to interact positively with others repeatedly and consistently. The social attitude can be seen with indicators namely: (a) relationships with peers; (b) self-management; (c) academic ability; (d) compliance, and (e) assertive behavior.

2.6. Mindset

Mindset are a set of beliefs or ways of thinking that affect a person's behavior and attitudes, which will eventually determine the level of success in his/her life. Beliefs or trust determine how a person thinks, communicates, and acts (Gunawan, 2007). Basically, there are two types of mindset of human, namely permanent and developing mindset. The developing mindset has the characteristics of growing alternative and constructive views, allowing others to take a different point of view to be able to see the deficiencies in the position (Dweck, 2008). According to Iskandar (2008), there are 7 sources of power that influence the human thinking process, namely: parents, family, community, school, friends, mass media, and yourself.

3. Research Methods

The population and sample of this study are science teachers and 7th grade students who had implemented the 2013 Curriculum. The sample of this study is determined by purposive sampling, namely students of SMP Negeri 1 Kota Cirebon and teachers of SMP Negeri 1 Kota Cirebon who have had technical guidance of the 2013 Curriculum. Class sample that is used as a control class and experimental class is the 7th grade, which is determined using simple random sampling method. This study uses mix method approach, and the data obtained is quantitative data, namely the measurement of students' attitudes as learning outcomes, and qualitative data, namely the teachers' perception. In addition, there is also the behavior that reflects students' scientific attitude as learning outcomes using attitude learning models based on local wisdom and local potential (Creswell, 1994). This study is conducted through several stages, namely: (1) Designing the preparation of learning with the teacher through the study of lesson plans (RPP); (2) Improving the RPP; (3) Trying out model for validating the scientific attitude learning model; and (4) Carrying out learning with scientific attitude learning model. The research instruments used in this study are shown in the table below:

Table 1. Research Instrument

No.	Theoretical Review	Data	Data Source	Interview/Test Material
1	Attitude (Panggabean, 2014; Kaiser 2000; Marzano *et al*., 1988; Stanehouse, 1975; Mar'at 1982, Fishbein & Azjen, 1975, Bruner, 1960)	Attitude Scale Test Result	Middle School Students	Indicator: Scientific Attitude, the 2013 Curriculum Number 54 of 2013, Number 65, and Number 66 of 2013
2	Scientific Attitude of the Local Wisdom, Local Potential, and Attitude Assessment (Ainon & Abdullah, 2000; De Bono, 2000; Kirby & Jeffery, 1999)	Interview Result	Science Teacher and Middle School Students	Indicator : Scientific Learning, Thinking Pattern, Feeling, Internalization Process, Local Wisdom, Awareness, Habit, Scientific Attitude Assessment

For quantitative data analysis, this study involves indicators of scientific attitudes that are logical, empirical, systematic, and objective, which are the learning outcomes. All

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data will be analyzed using different tests to measure research hypotheses, with the pattern of Posttest Only Control Group Design. In the initial stage, a preliminary test is conducted, namely the normality of data distribution test and homogeneity test of variance on each research cell. Then, the results of research data are analyzed to validate the accuracy of information from the informant in the form of raw data (transcription, images, field data, etc.), process, prepare data for analysis, read the entire data, encode the data in the form of themes and descriptions, and then link the themes/description to be interpreted and concluded.

4. Results and Discussion

4.1. Results

4.1.1. Description of the Students Scientific Attitude Achievement

The comparison of scientific attitude domains that is obtained as a result of attitude scale test in the experimental class and the control class can be described as follows:

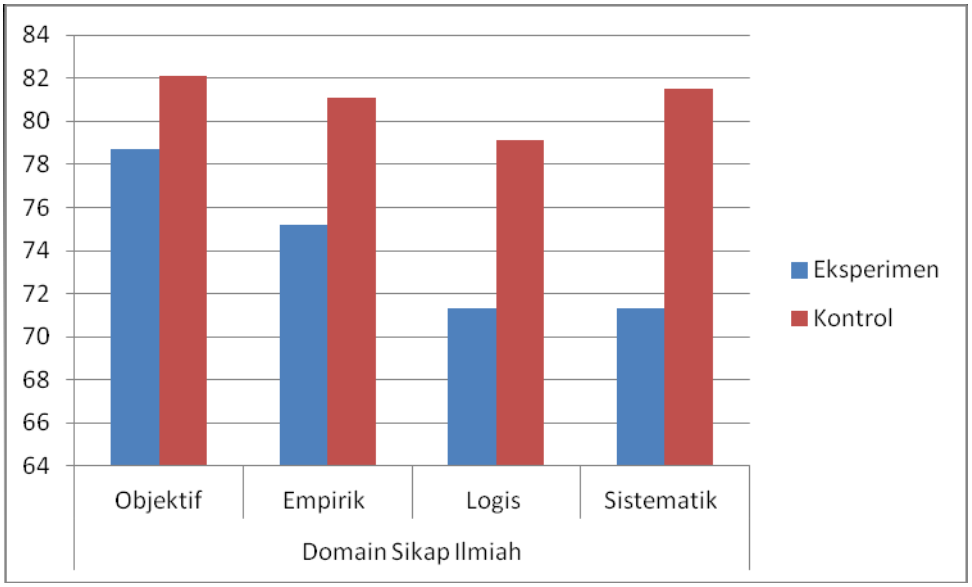

Figure 2. Comparison of Scientific Attitude Domain

Based on the Figure 2 above, it can be known that students generally obtain a scientific attitude as learning outcomes. There are differences in students' attitudes in the domain of objective, empirical, logical, and systematic attitudes. However, it is almost the same for the control class. In the experimental class, it turns out that the average objective domain attitude test results are the highest compared to the others, while the scientific attitude of the logical and systematic domain is relatively low. It can be explained that the 7th grade middle school students are still dominated by objective and empirical ways of thinking, while the use of conceptual thinking that is logical and systematic is still low. It is almost the same in the control class because in general the students of SMP Negeri 1 Cirebon have joined many extra and intra activities that have supported the improvement of students' scientific attitudes. Moreover, most of the students in SMP Negeri 1 Cirebon are middle to upper class students (from the academic aspect), and can be said that they are the 'chosen' students. There is only a small part of their parents' background that comes from the village and classified as a poor family. The students' lives at home and in their environment are accustomed to heterogeneous, open, collaborating, grouped in various activities, colliding arguments, and thinking logically; for example in making book synopsis

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through literacy program every Saturday. Besides, they also have out bound activities, in which the students are invited to get along and live in a community in a camp village outside the city for a few days. The school activities also include participation in competitions between schools at the city level, so that the students become accustomed to competing. Therefore, SMP 1 Kota Cirebon has become a reference for other schools because of the experience, achievements, and age of the school which are classified as an 'old school', and the community itself even considered this school as a favorite school in Cirebon City. Many alumni who already have achievements and hold state policies pay special attention to the development of the school.

Based on the test results, the average score of the attitude scale of the control class is higher than the experimental class. This shows that the use of attitude learning model does not have an influence on improving students' scientific attitude. However, qualitatively it shows a change in attitude during the learning process from the aspects of curiosity behavior, mutual respect among fellow students, willingness to work together, and much more as described above.

In general, the scientific attitude of control class student is different from the scientific attitude of the experimental class students (quantitatively). Qualitatively, the experimental class showed different activeness, and the attitude indicator that is shown from the behavior of the experimental class appeared more than the control class. This is one of the weaknesses of measuring attitude using quantitative method. There are several indicators that are difficult to measure with attitude scale tests. For example, the attitude of respecting others' opinion, the attitude of honesty in data collecting, the attitude of responsibility in carrying out tasks, and so on are difficult to be measured with the attitude scale test. It is clearer to be done through observing the discussion in the learning process in class. Therefore, there is a difference in the average score of the test results between the experimental class and the control class.

Student activities are taught conventionally: teacher is more dominant doing the activities in the classroom, while students learn to listen, write, and accept the assignment from the teacher. On the contrary, student activities that are taught using the scientific attitude learning model is done by letting students to work together in groups to design subject material, discuss the work program, teamwork presentation, and agree or disagree on the results of cooperation. In all of the process of the experimental class, the students play more dominant role than the one in the control class, so qualitatively, the experimental class does a lot of things that enhance scientific attitudes. At that moment, it is possible that the statements in the attitude scale test tend to be answered by students with normative statements than according to reality and their self-confidence. Indeed, there is no problem, because that way of thinking also shows the indicators of student attitudes. However, it is admitted that this scientific attitude learning model needs to be re-evaluated and revalidated in several aspects, and it will be tested again.

4.1.2. Hypotheses Test Results

This study uses null hypothesis, namely "there is no significant difference in the average score of the results of the students' scientific attitude scale test between the classes being taught with the scientific attitude learning model and those that are not." The data from Table 2 below shows the hypothesis test analysis result of the average score on the attitude scale test results between students' scientific attitudes between those who taught by using a scientific attitude learning and those who are not.

ISSN: 2005-4238 IJAST

Table 2. Hypothesis Test of Experimental Class and Control Class

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Exp. Class	55.000	1	.012	2.2000	1.6918	2.7082
Cont. Class.	157.667	1	.004	2.3650	2.1744	2.5556

Based on Table 2, it shows that the result of the null hypothesis test (Ho) in this study is accepted; there is no difference in the average score of the results of the scientific attitude scale test of students being taught with scientific attitude learning models and classes that were not. This means that the use of the scientific attitude learning model has no influence on the improvement of students' scientific attitudes. This finding is very useful for the development of future learning models. This means that this learning model still needs to be refined and adjusted to the appropriate material and syntax framework. The improvement aspect starts from the framework of the scientific attitude learning model (syntax or steps of the learning process), improvement of the aspects of the quantitative assessment instrument, including the components that become the indicators of students' scientific attitude. In this context, attitude indicators that are difficult to be measured quantitatively such as respecting others' opinion, responsibilities, and curiosity do not need to be tested for attitude scales. It is because the student statements are sometimes not in accordance with the activities when the learning process is carried out. This means that qualitative matters need to be observed and researcher need to conduct interviews with students.

From several reasons, it can be concluded that: (1) The teacher feels reluctant to do learning with scientific model because it is out of habit; (2) The attitude learning model that is used is an effort to empower students; (3) Students are not accustomed to work independently and think objectively and critically with social interaction that is integrated with the subject; (4) The number of students study group in one class is too much (44 people per class), while the laboratory equipment, book, worksheets, and other materials are still limited; (5) Student awareness to develop themselves in learning is still low; (6) The teacher is not used to give in the teaching material discussion to be designed by students, worrying that the concept will not be reached; (7) Teamwork has not become a habit of learning in school, so teachers worry that teaching materials will not be reached; (8) The individual assessment system still dominates the education in school; (9) Grade or values are still the main goal of learning, instead of the awareness and culture of knowledge that is built; (10) National Examination (UN) is still become a target of curriculum achievement, while thinking skills are a nurturing effect; and (11) Attitude learning is still become the second target, while the most preferred by students are to master the concept in accordance with the target of school exams.

4.2. Discussion

The results of this study show that there is a difference on the average scores on the attitude scale test results between the experimental class and the control class. Qualitatively, the learning process shows many attitude behaviors that appear in the experimental class. However, the quantitative analysis results showed that the control class has higher average score of the attitude scale test results compared to the

ISSN: 2005-4238 IJAST

experimental class. Therefore, the null hypothesis is accepted, and then the use of the scientific attitude learning model has no significant influence on student attitudes. The reality of students from the observations and records show a lot of things related to student attitudes. This is in accordance with the statement from Allen et al., (1980) that the formation of attitudes in a person can occur very diverse and with various dimensions, both from perceptions, beliefs, responses, and habits. As stated in the findings in this study, students' scientific attitudes that come as learning outcomes are obtained from observations.

Every syntax that is performed in the learning process shows student behavior that characterizes scientific attitudes. This is consistent with the study from Fisbein and Ajzen (1975) that behavior is directly proportional with attitude and several other variables that support it. Students' behavior in the first syntax form a group that is "open, accepting the reality of life, accepting facts, cooperation, accepting differences, have good communication, honest, and willing to act for the common good" is a good behavior important to do. The success of improving students' skills and behavior towards subjects and cognitive aspects of students depends on students' attitudes. This phenomenon has the meaning that the process of forming work groups by students can help build a mindset of "open and accepting reality". This means that the process of working together with fellow students through existing facts, deciding together, and accepting differences (the thoughts of colleagues in a team) in terms of deciding is a valuable learning process.

Communication, both verbal and non-verbal by internal team and the desire to act in the interests of group is an educational process that builds attitudes and trains mindset. The process of forming a scientific attitude based on a mindset needs to be done massively and integrative. Massive means all the stages and work done by students in the learning process have a relationship with the interest of attitude forming. Integrative means that the cognitive, psychomotor, and attitude domains are carried out at the same time by students. As a result of learning, scientific attitudes and mindset are the main part, because human behavior that appears is supported by these two main domains; attitude and mindset.

The second syntax, namely 'the activity of designing programs', which is conducted by students and teachers shows the behavior of responsibility in work, motivation for group success, adjustment to work guidelines, and arise ideas to complete assignments together. This is a form of receiving messages received by students. Students' attitude is influenced by the form of teacher and student communication when the learning process is carried out. This phenomenon in the second syntax is interesting and it occurs when students work in groups while designing programs. Communication between students is a form of intra-group and inter-group social responses. It occurs because of social communication between students designed by the teacher. The teacher creates learning design that supports social communication within the team, so the social response can occur. The work program in this syntax is left to the students themselves, so that they can communicate, get to know each other, decide things together, and take responsibility for the success of their team; while the teacher accompanies them attentively. The first and second syntax are supported by the study from Lickona (2015)

The next syntax is 'conducting program activity', and in this stage, there is a team work or collaboration between students and teachers in a group. The programs designed by students are carried out at this stage and then jointly carry out an evaluation. This phenomenon is interesting because student activities are more measurable. These findings are relevant with the view from Schiffman and Kanuk (2008) that attitude is the tendency to learn to behave in a pleasant or unpleasant way to a particular object. The attitudes that arise in this syntax support the indicator of scientific attitude that are difficult to be measured quantitatively.

Merton (1957) emphasized the importance of formulating the development patterns of educational institutions that are oriented to scientific attitudes which are commonly used by scientists. Objectivity, open-mindedness, unbiased, curiosity, suspending judgment,

ISSN: 2005-4238 IJAST

critical thinking, and rationality are things that scientists usually use. In the syntax of 'producing products', it is found that there are several indicators that indicate scientific attitudes, namely: an attitude of willingness to cooperate, an attitude of honesty in collecting data, an attitude of respect for the work, an attitude of openness, an attitude of responsibility, an attitude of respecting others' opinion, an attitude of togetherness or team work in doing work, and attitude of achieving the targets to be obtained, an attitude of courage to share opinions and convey ideas,

The view that scientific attitude is necessary for the development of one's scientific behavior has an impact on productive behavior. Students' scientific thinking dilute the scientific attitude and the results is success in learning. The cognitive, affective, and psychomotor domains are needed in the framework of developing scientific attitude. As an example, scientific attitude is diligent: not bored with conducting investigations, willing to repeat experiments whose results are still doubtful, will not stop doing activities if it is not finished yet, and try to work carefully on the things that he/she wants to know about. It also has open attitude which is seen in the habit of listening to the opinions, arguments, criticisms, and statements of others, although in the end those are not accepted because they have different agreement or not in accordance. This attitude is a capital for the development of permanent understanding and skills in students.

The results of the observations on students' scientific attitudes related to understanding can be presented in the syntax to gain understanding, namely: open attitude, attitude to accept, attitude to share experience/to give, attitude to ask questions, attitude to choose and make decisions, attitude of curiosity, and courage to express ideas (group presentations). This is consistent with the research results from Schiffman and Kanuk (2008) that attitude is the tendency to learn to behave in a pleasant or unpleasant way to a particular object.

As a conclusion, attitude and learning outcomes influence each other, as stated that attitude has a strong influence on students' behavior and way of learning. Attitude helps students to feel what they are experiencing and it provides guidance to their behavior, so that it can help to explain what they are experiencing. Therefore, the learning process that is oriented to the formation of attitude needs to have an attitude phase, namely doing internalization. When a teacher observes scientific attitudes carried out by students, it is a process of internalizing students' attitude. The phenomenon obtained shows that:

- Teachers find it difficult to pay attention to each student one by one, including in the process of teaching attitude
- Schools make literacy and program and reading Qur'an every morning for all students.
- Students present in front of other students about books they have read
- There is a teacher tutor for each group of students who conducts student guidance in extracurricular activities.
- Pay attention to student behavior in the classroom and outside in the school environment.

Based on this phenomenon, there are several improvement programs related to learning outcomes, especially attitudes, namely the curriculum, student capacity development, teacher competence, and school culture.

5. Conclusions & Suggestions

The teacher understands the need for local culture (values, religious norms, habits, and local wisdom) that must be maintained, preserved, and transformed to students in learning in school. The teacher recognizes and understands that students need to have scientific attitude, at least the attitude set forth in the 2013 Curriculum (spiritual attitude and social attitude). However, teachers find it difficult to carry out attitude learning in schools due to many factors that affects it. The family and community environment is more dominant

ISSN: 2005-4238 IJAST

than the school, besides that, the difficulty is the number of students that is too much and the obligation to teach for 24 hours per week, which is quite tiring for the teachers. The potential of students is high enough to receive learning including scientific attitude, motivation, academic potential, parental background, local government policy support, financial support, and society in general, which are also very high. The challenges are the community environment and social media that makes it difficult for students to process education. Through teacher learning, MGMP (teacher group discussion), and in-house training, teachers have sufficient ability to prepare teaching materials and conduct the learning process.

From the findings of this study, it turns out that there is no significant difference in the average score of attitude scale test results between students who are taught with attitude learning models and students who are not in the 7th grade students of SMP Negeri 1 Cirebon. However, it qualitatively shows that many indicators of scientific attitude occur in students. This requires an improvement of model (syntax) which further simplifies the learning process. The internalization of scientific attitudes in the middle school environment is very varied, and it is fundamental for the development of student attitudes. The form is a routine activity of Qur'an reading every day, literacy program every Saturday, art and sport competitions every semester, and the use of school uniforms with 4 different models every week so as to build togetherness in school culture. Factors that influence the success of scientific attitude learning are learning model that is used is according to students' need, in accordance with the material being taught, involves students as subjects, supportive environment as part of internalizing attitudes, availability and utilization of local potential, student potential, and time used. In addition, the factors also include appropriate evaluation tools and teachers who want to carry it out with full responsibility. A common perception between teachers and parents about the need for attitudes to be taught directly is also necessary.

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