THE DESIGN OF FORMATIVE ASSESSMENT BY INQUIRY BASED LEARNING IN IMPROVING STUDENTS' SELF-REGULATION

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Abstract—The purposes of this research are: (1) To determine the need of teacher and students' formative assessment that is suitable to the increase of self-regulation skills by inquiry based learning; (2) To analyze the learning process of physics (3) designing a model of formative assessment inquiry based in improving self-regulation students'. The research was conducted in three high school in East Lampung. This research to use descriptive method by cluster sampling. The procedure of research that has been done include (1) the initial research and data collection, (2) planning, and (3) developing the initial product. The result of the research show that: (1) teachers and students' high school need assessment model such as of formative assessment inquiry based in improving students' self-regulation in learning physics through the concepts, principle and laws of physics; (2) The implementation of inquiry learning has not been implemented optimally and required model of formative assessment inquiry based corresponding to the learning need of students' as in improving students' self-regulation in the understanding of physics concept better; (3) Design of formative assessment at developing based on the preliminary study. Early stage a model of formative assessment inquiry based consist of several step are: orientation, formulating the problem, hypothesis, analyzing data, and conclusion.

Keywords: *formative assessment, self-regulation, inquiry*

I. INTRODUCTION

The achievement of the learning process of students', teachers need to do the assessment activity. Assessment of conducted during the learning process by providing feedback (feedback) and facilitate student self-assessment to monitor the progress and improve the teaching and learning process. Feedback is done at end of the learning as a value and description in the report, does not provide an opportunity for students' improve their learning. Therefore, the feedback is not only done at the end of learning, but also during the learning process. One assessment that provide feedback once the skill to assess the self is a formative assessment.

A formative assessment is formally are designed or planned activities before the teaching, consists of three phases: eliciting, interpreting and acting on information assessment [1]. Formative assessment have the concrete step, such as (a) to anticipate and led to the idea of students', (b) evaluate the idea of students', and (c) preparing the next step in the instructions that explain the idea of students'' and support student learning [2]. At formative assessment process, where teacher can manage the attention and think response students' to assisting students' in improving learning [3]. Formative assessment is not a test or a tool but a process with the potential to support learning outside the school with developing individual learning strategis [4]. In addition, formative assessment in the classroom is a process of instruction that have the strong potential for the task can provide information that supports learning assessment into the design of learning process [5]. The investigation formative assessment in the form of question to use determine a students' knowledge before the learning and determining the methods to teach the learning objectives [6]. The purpose offers feedback is to help students' achieve success desired performance [7]. The use of feedback is closely related to student engagement and peer assessment [8]. Formative assessment through feedback impact on student learning activity [9].

A self-regulation is an activity of self-control leads to mastery of specific techniques to actual learning, such as self instruction, compare, focus, strategy tasks, connect and seek helping [10]. Self-regulation (SR) is a process of self-assessment in which students' tasks represent, plan how to implement, monitor and assessing whether the implementation is sufficient, able to overcome difficulties and emotional that normally arise, assessing performance and make the relationship conclusion about the result [11]. Self-regulation is defined as a form of learning individually as includes independence that is starts from social learning, such as seeking help from peers, coaches, and teachers [12]. Construction of self-regulation will be specifically related to the emotional experience and expression [13]. Thus, students' with higher levels of self-regulation show a higher level anyway to get involve in demonstration [14].

Formative assessment by components of related to the ability of self-regulation is the feedback, self-assessment and peer assessment. This assessment has not been fully to use by the teacher in learning. Self and peer the assessment are the two most common forms used in formative assessment [15]. If the assessment is carried out with the involvement of inquiry activity can help teachers assessing students' affective aspects. Also active by students' through are self and peer assessment can improving students' engagement in facilitating individual feedback and make students' more responsible about their learning progress. A physics is one of the subject that are considered difficult by most students', learning physics are faced with a variety of concept and formula. Students' who are to use independently will not have trouble learning. Positive emotion will show a positive assessment of the value of the task and/or the results of achievement, and positive emotion should improve cognitive and motivational processes inherent in self-regulation [16].

One of the learning activities used to measure students' activity and to the controlling of ability by students' as independently is inquiry learning activity. The concept of inquiry learning is a pedagogical approach to the character of the students' in learning activity in driving ability through scientific knowledge that the content and process skill [17]. An inquiry group can create a collaboration based on the concept of knowledge [18]. Teachers provide opportunities to more accurately gauge students'' knowledge through scientific idea and the process involved in the class [19]. Inquiry based instruction requires a new way of student engagement in the learning process and that is why teacher need to look at important factors as changes [20]. Thus, inquiry based learning is very good as a center learning activity [21]. However, the idea of such an inquiry is still rarely developed back through reflection science [22].

Based on the explanation above, the purpose of this study are: (1) To determine the need of teacher and students' formative assessment that is suitable to the increase of self-regulation skills by inquiry based learning; (2) To analyze the learning process of physics (3) designing a model of formative assessment inquiry based in improving self-regulation students'.

II. RESEARCH METHOD

This research method to use the method of research and development. In this developing research generated design of formative assessment by inquiry based to improving students' self-regulation in the learning high school physics. The development procedure refer to a procedure conducted research [23], which include the step of: (1) research and data collection beginning; (2) planning; and (3) developing the initial product.

Method of data collection and analysis of need carried out to use sampling techniques such as cluster sampling, that the sampling carried out on the sampling unit, where the sampling unit consist of one group (cluster). This research was conducting in three high school in East Lampung. The research subject class X SMA numbered 40 students'. Research subjects three teacher of physics. That matter aim to obtain a description of the analysis of the need of the developing of formative assessment by inquiry based to improving students' self-regulation in the learning high school physics. Meanwhile, for the design developing of formative assessment by inquiry based to improving students' self-regulation is done through the study of literature. The new design developed until the early stage of developing a product to produce the prototype I by model formative assessment through cycle of activity inquiry based learning.

The data collection phase initial conducted by questionnaire analysis of the need of teacher and students'. Questionnaire data analysis technique performed by several stage; (1) giving the code of the distribution of data to the questionnaire; (2) The data tabulation is based on the classification made; (3) the analysis of qualitative data that outline as well as connecting the data

with information related to the research of focus; and (4) interpret of the result at thorough analysis and making conclusion.

III. Result and Discussion

The development of new research conducted up to the third stage of the research procedure [24] is planning to developing of the initial product, so that the results of the design is successfully developing a prototype I called. However, before producing the first prototype, the researcher conducted the analysis of the need of teacher and students'.

The results of questionnaire analysis disclosure need of teacher, gained P1 to P3 answer: as much as 66.67% of the teacher are already to use the assessment of instrument learner outcome learning end of each chapter analyzing the answer P5 total of 100% of teacher agree that organized inquiry learning activity when conducting by the assessment.

Analysis of the questionnaire answer reveal P6 to P18 stage of inquiry learning activity are: the orientation stage, 33.33% of the teacher do not direct to lead a study plan to motivate of interest students' learning. The second stage of the formulating problem P7 to P9, as much as 66.67% of teachers leave are question related to current example of learning physics of this case students' have not been able to formulate the problem individually. The third phase of the hypothesized P10: as much as 33.33% of teacher do not lead students' to this proces temporary answer. The fourth stage of the analyzing data P11 to P17, there are 33.33% of the teachers encourage students' to comparing at answer according to the theory. The fifth stage concludes P18, 66.67% of teacher give students' with an opportunity to conclude of the data which have been obtained.

The analysis an answer P20, P21, and P22, as many as 66.67% of the teacher are still experiencing trouble making a instrument of the learning outcome. Much as 100% of teacher in need of assessment sheet for measuring result of learning students' and the need to developing of formative assessment by inquiry based to improving students' self-regulation. Based on the analysis of an answer is known that most teacher have not been up applying inquiry learning activity because for teacher are still applying the conventional method. Implementation by of activity inquiry learning to be able controlling the students' self-regulation. Self-regulation is very important for the students' to carry out academic and a key factor in understanding, intervening, and experiencing academic difficulty [25]. So the researcher concluding that teacher need model of formative assessment by inquiry based to improving students' self-regulation.

Whereas, the results of questionnaire the disclosure need of high school students' can be known that a student need to once the assessment of the learning outcome. The average analysis of the answer P1 to P3, many as 62% of students' need a formative assessment for improving of physics concept is a carefully. Into the bargain, a students' of need are physics learning which is interesting and fun by mean of inquiry learning activity. The average analysis of the answer to P5 to P18, 60% of students' need at inquiry learning activity in problem solving, orientation, formulate hypotheses, analyzing data and concluding when the learning activity increase of the ability, controlling, and monitoring the knowledge of at each individual.

The analysis of an answer P19, P20: as much as 83% the students' need a result value after a conducting an investigation and 100% the students' need a sheet of the assessment for measuring learning outcome by the obtained. Based on the analysis of this answer, it is known there are students' which is have difficulty in understanding the concept, law and principles of physics through by the inquiry learning activity for establish and improving self-regulation of this each individual. A inquiry based instruction requires a new way of student engagement in the learning process and that is why teacher need to look at important factor as change [26]. So the researcher concluding that it need to be developing of formative assessment by inquiry based in improving students' self-regulation.

A formative assessment model that will be developing more are orientation to the students' self-regulation approach through is inquiry, so that the students' will participate in the cognitive by are learning environment, it is based on the result of a development analysis. Once the researchers obtain of descriptive conclusions about the need for development, researcher follow in by step procedure are developing early product. The stage that have been conducted by researcher to produce model of formative assessment by inquiry based to improving students' self-regulation explaining as follow.

The first phase, which is constructing the basis of reasoning or framework. Researcher create a framework to explain the process of learning and assessment through the model to be developed. The second stage, which bring about a study literature to determine the formative assessment process by that teacher, opinions of teachers and students' on model of formative assessment by inquiry based, and is support by a study theory of contributing to the concept from model will be developing.

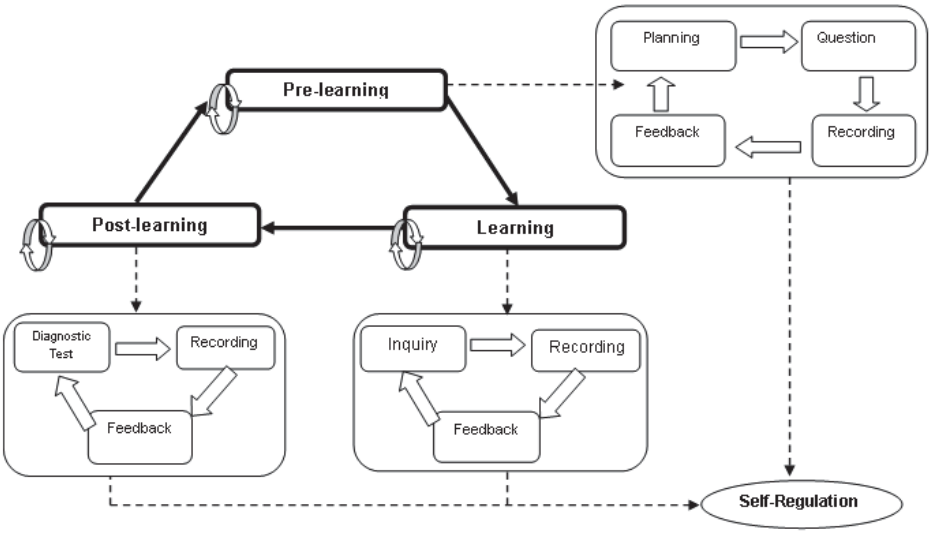

Figure 1. The Design Of Formative Assessment By Inquiry Based

Furthermore, the development of planning stage to model of formative assessment by inquiry based were developing to assist teacher in implementing at formative assessment so as to improving students' self-regulation in at learning. The model successfully developed the researcher focused on formative assessment by inquiry based. Such an approach would emphasize on this students' self-regulation at learning activity. Figure 1, researcher presented the formative assessment cycle through inquiry based at learning activity.

The model of formative assessment consist from a prelearning, learning and post-learning. The learning activity in the by inquiry activity conducted by researcher at through several stage, including orientation the problem, formulate hypothesis, analyze data, and concluding. Planning researcher in stage pre-learning and post-learning at contain a quiz with question adapted to all component that support by continuity of the learning device. In providing feedback at each stage to know the extent of the feedback that will be developing in accordance with aspect of the formative assessment. The result of formative assessment design are designed the researcher through inquiry approach to in providing feedback every learning process, students' can improving self-regulation in particular the ability of understanding the cognitive independently.

IV. CONCLUSION

Based on the research this purpose and the above presentation, it can be concluding that: (1) teacher and students' high school need assessment model such as of formative assessment inquiry based in improving students' self-regulation in learning physics through the concept, principle and laws of physics; (2) The implementation of inquiry learning has not been implemented optimally and required model of formative assessment inquiry based corresponding to the learning need of students' as in improving students' self-regulation in the understanding of physics concepts better; (3) Design of formative assessment at developing based on the preliminary study. Early stage a model of formative assessment inquiry based consist of several step are: orientation, formulating the problem, hypothesis, analyzing data, and conclusion.

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