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RESEARCH ARTICLE

MOMENTUM AND IMPULSE LEARNING HELPED BY WORKSHEET BASED RGM TO SMA BY USING PBL MODEL.

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Abstract

This article discusses momentum and impulse learning helped by worksheet based RGM to SMA by using PBL model. The purpose of this article is to describe how momentum and impulse learning helped by worksheet based RGM representation using PBL model. The investigation method used in this article is a descriptive method by describing the result of research data qualitatively in the form of written knowledge that had been written by the expert from various resources. The information resource obtained is in the form of data, journal, text book, proceeding or scientific article. The steps used in the article are the data, collected through a scientific journal, book, observation, and the internet, after getting the data, done by analyzing the data as a classification process and grouped data. The result of the investigation data show that momentum and impulse learning helped by worksheet RGM in SMA by using PBL model become guided because the students joined directly in the learning process, so it can increase students learning activity and student retention in material

Introduction:-

Education is an effort to humanize or effort to help people to be able to manifest itself in accordance with the value of humanity. One way to manifest is by learning, learning is a two-way interaction of teachers and learners, where communication occurs between the two (transfer) intense and directed toward a predetermined targets (Trianto, 2010: 17). Physics is the science that much about nature and symptoms that are real to the abstract or even merely theoretical discussion shaped involves the ability of imagination or the involvement of a strong mental image (Sutarto and Indrawati, 2010: 1). Physics is a subject that is not just theories and formulas to memorize, but requires an understanding of the concept that places the emphasis on the process of formation of a knowledge through a trial, presentation of the data mathematically, and based on certain rules. So the physics is the study of phenomena that occur in nature in the real and abstract that it becomes a concept to increase knowledge

Therefore teachers should improve its ability to manage the information in accordance with the needs of the profession included in chose appropriate learning models and the use of learning resources which exists. In choosing a learning model should be taken to student characteristics, learning objectives and learning materials. Thus the learning model used must be in accordance with the scientific approach, because the implementation of the curriculum in 2013, emphasizing the teacher to use a scientific approach (*scientificapproach*) in learning. The learning process by using a scientific approach consists of 5 basic learning experience. In fact the results of

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interviews with some high school physics teacher in Jember. It was found in general that the learning model used is a model *of Direct Instruction*, although not all schools use the learning *Direct Instruction* model. Shoimin (2014: 64) states that the learning *Direct Instruction* is a model that is designed to support the students' learning process associated with declarative knowledge and procedural knowledge of the patterns of activity gradually. in the learning process *Direct Instruction* is not centered on the students but still centered on the teacher *(TeacherCentered).* By learning steps the teacher explains the material at the beginning of a new student learning then resolve problems that were given by the teacher. In resolving these problems, teachers using group discussions, and assignmentsor recitation. if the material being taught have done some experiments for goal then teachers also used the experimental method. Lecture and discussion groups used by teachers because it is more effective to deliver material to students with limited learning time. Though the teacher know if that method has not implemented the 2013 curriculum using a scientific approach. So from the data obtained by learning the physics that take place in schools are still stuck in a routine, the routine in question is the teacher gives the formula, example problems and exercises undertaken students, making the students will get bored in learning.

Efforts to overcome these problem can be done with the use of the learning model and the right media. Indrawati, (2013: 17) states that the learning model is a regular arrangement (systematic) about teaching methods or conditions so that learning can be run effectively and efficiently. In the teaching and learning activities, learning model has several functions, which helps teachers to: (1) choose the techniques, strategies, and methods of learning to the learning objectives achieved, (2) create behavior change learners, (3) determine the ways and means to create environment suitable for implementing the learning, (4) create interaction between teachers and learners to be desired during the learning process, (5) constructing the curriculum, syllabus, or content in a lesson or course, (6) selecting learning materials appropriate for teaching prepared for college or in the curriculum, (7) designing educational activities or learning appropriate, (8) develop materials and learning resources that are attractive and effective, (9) to stimulate the development of educational innovation or new learning, (10) to help communicate information about teaching theory, and (11) helps to build relationships between learning and teaching empirical (Indrawati, 2011: 1.10).

The learning model is one of them is a model of *Problem Based Learning* (PBL) combined with LKS Image-based Representation and Mathematics (RGM). Model *Problem Based Learning* (PBL) is an innovation in teaching because in PBL thinking abilities of learners truly optimized through group work or team systematically, so that learners can empower, honing, testing, and develop the capacity to think on an ongoing basis (Tan in rusman, 2012: 229). In this model the teacher help learners define the problem or organize the students into small groups so that learners can decompose into a problem-solving activity stages. According Shoimin (2014: 132), PBL models has several advantages such as the following are

1. Students are encouraged to have the ability to solve problems in real situations.
2. Students have the ability to build his own knowledge through learning activities.
3. Learning to focus on issues that matter that has nothing to do not need to be learned by the students. This reduces the burden of students by memorizing or storing information.
4. Scientific activity occurred in students through group work.
5. Students accustomed to using resources better knowledge of the library, internet, interviews, and observations.
6. Students have the ability to assess their own learning progress.
7. Students have the ability to conduct scientific communication in discussion or presentation of the results of their studies.
8. Individual students' learning difficulties can be overcome through group work in the form of *peer* teaching.

Major Heading:-

To support the on going learners in applying the model of *Problem Based Learning* (PBL) in need of media. Media is the media referred to Student Worksheet (LKS) is based Image and Mathematical Representation (RGM). Prastawo (2011: 205) describes the LKS function, namely: (1) as teaching materials that can minimize the role of an educator but rather to enable learners; (2) as teaching materials that facilitate learners to understand the material provided; (3) a concise instructional materials and rich duty to practice; (4) facilitate the implementation of the teaching to the learner. LKS as a support to increase the activity of students in the learning process can optimize learning outcomes. Representation is one good method and is expanding to cultivate an understanding of physics concepts. In physics lesson is closely related to the concept of verbal, images, graphics, and mathematics (Mahardika, 2010: 183).

According to Goldin (in M. Joseph,2009) states that representation is a configuration (shape or composition) that can describe, represent or symbolize something in a way. According Dufrense, et al. (2004), a special representation used in the study of physics has three ways *(modes)*. These three ways are: a) as a means or a tool to decipher the issues *(problems)* that occurs when students create or draw a sketch of the situation of physical and supplemented the information, b) as an issue when students are explicitly asked to create a chart or look for the value of a physical quantity using charts and, c) as a step or a formal procedure when students are asked to draw a free-body diagram.

Student Worksheet (LKS) -based Pictures and Mathematical Representation (RGM) is a student activity sheets designed in which there is a problem. The problem is presented in the form of pictures of the incident, which in turn requires students to be more active thinking and at the final stage students can conclude with mathematical problems. So that these problems students can understand the concept of matter itself.

Research Methods:-

This research tends as *survey* research,with an emphasis on the study: 1) books starting reference source; 2) scientific journals; 3) The initial condition learning model; and 4) the results of previous research related to PBL learning model; 5) the results of previous studies related to media LKS; 6) the results of previous research related to the representation; 7) the results of previous research related to learning activity and student retention. Based on studies undertaken activities in research, then study the data tend to be descriptive qualitative data. The data obtained by observation, questionnaires, documents and literature to various sources, such as: books, journals, articles, research reports and proceedings so as secondary data. To obtain the results and conclusions of the study, the data was analyzed descriptive analysis. Subjects in this study is accompanied LKS PBL learning model-based image and mathematical representations that can enhance students' learning activities and student retention in the material impulse momentum in high school.

Results and Discussion:-

Study Relating to the model PBL:-

On previous research related to learning PBL obtained from scientific journals, articles, and research reports showed that PBL learning model provides a good impact on the activity of student learning. Some research can be seen in the table below.

Year	Products and Researchers
2014	Demonstrate that an increase in student activity by 81.5% after using Problem Based Learning model in learning activities. Dudeliany, I Ketut Mahardika and Maryani
2012	There are significant differences in student learning outcomes using model Problem Based Learning (PBL) with flash Makromedia computer media using conventional learning in physics teaching in high school. Gilang Candra Setiawan, Tjiptaning Suprihati Sri Astutik
2011	results for the critical thinking skills of students has increased significantly between the experimental class that uses the model PBL and control classes that implement DI models with the lecture method U. Setyorini, SE Sukiswo, B. Vali

Assessment Relating with LKS:-

On previous research related to learning using worksheets obtained from scientific journals, articles, and research reports indicate that the learning model that uses LKS a good impact on the activity of student learning. Some research can be seen in the table below.

Year	Product and Researcher
2010	applied student activity sheet to students on momentum and impulse materials have a level of attractiveness of the good and able highly student learning outcomes. Asri Wulandari, Chandra E, I Dewa Putu N.
2013	Application of teaching methods aided 5E learning cycle macromedia include worksheets can improve the quality of the learning process Siti Asiyah, Sri Mulyani, and Nanik Dwi Nurhayati
2016	There are significant differences in student learning outcomes by using sheet

	students work on material physics. Himmatul H, I Ketut M, Bambang S.

Assessment With regard to the representation (RGM):-

On previous research related to learning using representation obtained from scientific journals, articles, and research reports indicate that the learning model that uses the representation of a good impact against, student learning activities. Some research can be seen in the table below.

Year	Product and Researcher
2015	Cruising student for following study uses a model of physics inquiry learning with student worksheets image based on SMP 12 Jember academic year 2013/2014 belong to the active criteria Anashta Verill Vebriana, I Ketut Mahardika,Subiki
2015	increased student learning outcomes after application based learning image representation. Ajeng P, I Ketut M, Bambang S.
2016	There are significant differences in learning outcomes of students with applied learning image representation based on the material physics. Himmatul H, I Ketut M, Bambang S.

With the data from previous studies that show in the table, it can be concluded that the learning materials aided LKS momentum and impulse-based RGM in high school using PBL models can improve students' learning activities in the classroom and the retention of student in material. The sintakmatik of PBL were accompanied by worksheets based RGM is as follows:

Step	No.	Activity teachers
Orientation problem	1	creates a classroom environment that enables the exchange of ideas that is open
	2	Directing the question or problem
	3	Encourage children to express ideas openly
Organize students to study	1	assist students in finding the concept is based on the problem
	2	Encouraging openness, democratic processes, and learning styles of students active
	3	Test the students' understanding of the concept found
help investigate independently or group	1	Provides ease of workmanship students in working student in doing / solve problems
	2	Encouraging cooperation and complete the task - the task
	3	Encouraging dialogue and discussion with friends
	4	to help students definition and organize learning tasks related problems
	5	help students formulate hypotheses
	6	Assist students in providing solutions
Develop and present result		Guiding students in working on Activity Sheet Students (LKS)
		Guiding students in the present work
to analyze and evaluate the results of troubleshooting	1	To help students review the results of problem solving,
	2	Motivating students to be involved in the problem solving
	3	Evaluating material

Conclusion:-

The study of the results showed that the momentum and impulse-aided learning LKS RGM based on high school using PBL models can improve students' learning activities and student retention. With the measures contained in the learning Problem Based Learning setting.

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