THE MASTERY IMPROVEMENT OF SCHOOL I PHYSICS CONCEPT THROUGH CONSTRUCTIVISM LABORATORY ACTIVITY BY USING OF SIMPLE SCIENCE MEDIA

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Abstract
Constructivism laboratory is a learning strategy, where theory and experiment which are in progress at the same time. Experiments in this case use simple science media. This research aims to improve the concept mastery of physic learning school I through the improvement of student learning activities and the quality of simple science media made by students about kinematics and dynamics. The instruments were used in collecting data: student activity observation sheet, media quality assessment sheet, questioner of student motivation and achievement test. The subject of this research is 25 students of physic education program. This action research uses Kemmis model which based on 4 components research like planning, action, observation and reflection. Based on data analysis, it can be shown that: the quality of simple science media increased in each cycle which high category in third cycle. The learning motivation increased from 2.9 to 3.1 in high category. The student physics concept achievement is 65 higher than previous physic class, 62. So, it can be concluded that physics concept mastery in " physics school 1" for physics education students can be improved through learning activities of constructivism laboratory.

Keywords : constructivism laboratory, learning activity, learning motivation, simple science media

Introduction

Physics School 1 Course is mandatory skills courses in Physical Education Curriculum Studies Program. Very important benefit of this course is to provide supplies to the teacher candidates to explore physics concepts contained in the high school physics learning, because as a teacher candidate they not only know about the concept, but they should be able teach these concepts to their students later. Evaluation of the value obtained by the students for the last 3 years shown the average value of students on this course were unsatisfied. Students are generally able to do mathematical calculations which given by the teachers, but when they asked to apply the concept in real life, it was very difficult for them. Indications were found in this fact are students good in learning and memorizing the course workmanship problem, but was unable to

solve the problems they have never met. It likes they have a good manual routines (routines), but bad in expect thinking (thinking ahead).

The recovered material can only remember for a short period of time and not effective. That means even though his study results can be a good value, but the value is obtained by considering the process of after to memorize. This indicates that the results obtained by the student is a bad result of studying (not last long).

Laboratory activities didn't coincide with the learning of physics concepts, made these experiments as a tool to prove the concept, not to find a concept. It caused the student memorize about a concept not last longer.

If the situation keep changing, ideally the education is not oriented only in the past and the present, but it should be a gradual process of talking about a future. Education should be far ahead and think about what students will face in the future (Trianto, 2007)

Studying Science in principle is not enough merely to memorize a concept, but more than that, its a physics learning activity with the process and the product. Those can be done with various ways such as an object of observation, measurement, design, and conduct experiments. By involving students in perform experiments, they will be easier to understand subject as a whole. This is the basis of the theory of constructivism. This is consistent with studies Ergul (2011) that immediate experience (hand-on activity) in learning science can enhance the scientific process skills and attitudes toward science and contribute positively to the learning outcomes.

The limited effects on cognitive domain of laboratory operations, can be caused by the applied of laboratory activity model. The most common laboratory study was carried out in the traditional model which deductively structured (Collette & Chiappetta, 1994: Gangoli, 1995). In this experiment all the clues have been provided with the details (Swzart, 1998) refer to its experimental recipes (Cookbook recipe experiment). Practicum like this have low cognitive demands. Studied by Spear and D. Zollman (Toothacker, 1985) suggests that traditional experimental approaches can't be improve the critical thinking skills significantly.

In the last decade of the view constructivism in the learning process received broad support. In this view conceptual development is a process which learners restructure their pre-concept into scientific concepts. Experiment not only served to verify the concept, and develop manipulative skills, but to change misconceptions into scientific concept (Gunstone dan Champagne, 1991)

Changes in the function and role of laboratory activities is a need to modify the basic laboratory activities in view of constructivism. Suma K, (2005) stated that the effectiveness of constructivism laboratory activity based on learning can enhance the mastery of physics concepts, because constructivism laboratory activities provide the opportunities for students to develop the ability to think and reason both quantitatively and qualitatively.

Puskur (2007) said "science is a bunch of knowledge about objects and natural phenomena derived from the thinking and research scientists who conducted the experiment using the scientific method skills.

Implementation of the experiments that applied in class will certainly need tools and materials in the laboratory. To overcome this, a simple media from the environment can be used as a substitute for such former media bottles, rocks, water, plastic, pieces of flip-flops, tables, chairs, floors, and even students themselves can be used as a media demonstration. This means that any media used naturally adapted to the learning topics being taught. Media that can not be replaced from the environment of the lab can used other media such as Ohaus balance, spring balance or a thermometer and so on.

The used of simple media intended by the researchers is safe to use and effective in teaching students physics concepts. Research on the utilization of simple science of secondhand goods as a medium of learning science has been done by Sahrul Saehana, Muhammad Ali and Supriyatman, (2007) showed that students' cooperative learning with the media following the simple science tools better than students who take lessons cooperatively without using media.

The advantage of using this simple science media is inexpensive, available and familiar for students. Besides this experience they will be taught by a teacher to not rely on the existing media which usually limited so it often broken and insufficient for all students especially in remote areas, and sometimes they are not available. Using simple science media will be able to make students more motivated to learn to get better and better, because to study physics should not use ingredients that are readily available, but it can be done with simple media.

Starting from the above student weaknesses and theoretical studies that have been obtained, the researcher believes that the concept of learning that may be able to solve learning problems in school physics courses 1 is the application of laboratory science media constructivism with a simple optimization.

Literature Review

Learn can be defined as the change behavior (Sudirman, 2001). Learning in the view of BF Skinner (Syaiful Sagala, 2007) is a process of adaptation or adjustment behavior. Learning is also understood as a change in behavior. According to Ratna WD (1999), learning is defined as a change in behavior caused by experience. Meanwhile, according to Morgan (in Wisnubrata, 1992), is quick to say that learning is any change in a relatively sedentary in behavior that occurs as a result of training or experience.

Educational experts generally argue that in terms of learning contained several elements. Constituents learning as a process, the acquisition of knowledge and skills, behavioral change and self-activity. Based on the description above, it can be concluded study is an attempt by the individual to acquire knowledge, skills and behavioral changes that persist through self-activity or experience either direct or indirect interaction with the environment.

One of the process of the human effort to understand the science of natural phenomena can be regarded as the Natural Sciences. A certain procedures that are analytical, accurate, complete and connect the other natural phenomena to form a whole new perspective on the observed object is needed. Physics can also be seen as a product of human effort to understand the various natural phenomena. This product is in the form of principles, theories, laws, concepts and facts which all of it explain various natural phenomena. Physics is the result of human activity in the form of knowledge, ideas and concepts which arranged about the natural surroundings obtained through several scientific process.

Student achievement in the study of science is influenced by various factors, among others: the learning environment, methods, media, management classes, interaction in class, intelligence, formal reasoning, and others.

There are several things to note in the constructivist learning theory, Hanbury (1996) suggests a number of aspects in relation to learning, namely (1) students construct knowledge by integrating the ideas that they have, (2) learning becomes more meaningful because students understand, (3) students have more valuable strategy, and (4) students have the opportunity to discuss and exchange experiences and knowledge with friends.

In an effort to implement the constructivist learning theory, Tytler (1996) put forward a few suggestions pertaining to the lesson plan, as follows: (1) provide an opportunity for students to express their own ideas with the language, (2) provide an opportunity for students to think about the experience so that it becomes more creative and imaginative, (3) provide an opportunity for students to try out new ideas, (4) provide experiences that relate to the idea that has been owned by the student, (5) encourage students to think about their ideas change, and (6) create a learning environment conducive.

The term motivation comes from the Latin is movere, which means "move". Motivation has a very important function in an activity because it will affect the success of an activity. The higher the motivation caused the success of the activities carried out so as to achieve the purpose of the activity.

Hudoyono (1990) states that motivation is the driving force that is inside of a person to perform certain activities to achieve a goal. Teachers are expected to create the conditions for learning with good motivation as proposed by Sardiman (2001) that is required to learn both the process and the motivations are good also. Without the motivation of the learning outcomes will be difficult to achieve, because the motivation is one of the causes of the change in energy in every human being. If a student is motivated to learn physics, the students will learn earnestly so as to achieve the purpose of learning physics. Sardiman (2001) says that students' motivation to cover 4 categories: 1) Interest Category (Category interest refers to the factors attention and curiosity) 2) Relevance Categories (Category relevance refers to goal-oriented activities, including the desire achievers learning and perceived functional value). 3) Expectations category (Category expectation refers to expectations for success and are associated with self-confidence and feelings). 4) The category (category refers to the value that results strengthen the interaction and the perceived sense of satisfaction for the success obtained).

Method

This research was conducted at the Physics Education Study Program Faculty of Teacher Training and Educational Sciences University of Riau. The study began in July to November 2012. Subjects in this study were approximately 25 students physical education courses. Action research uses Model Kemmis. Consists of four components, namely action research: planning, action, observation and reflection (Sukardi, 2004).
Parameters, instruments and techniques of data collection in this study are shown in Table 1.

Table 1 Parameters, instruments and techniques of data collection

No	Parameters	Instruments	Techniques of data collection
1	Simple test media quality	Assessment sheet media containing indicators of good quality media	Judging by using the assessment sheet with a scale of 1 to 4.
2	Activity group presentation audience members	Observation sheets containing group member activity indicator renderer	Observer observe the activities of group members during the learning process and presentation
3	Learning Motivation	Observation sheet containing motivational assessment indicators	Judging by using motivation questionnaire given prior to cycle 1 and after the third cycle
4	Learning Outcomes		Given after the third cycle is completed

Discussion

Simple media has been made in accordance with the learning material consists of 8 media including about 1) straight uniform motion and uniformly accelerated motion 2) motion parabola 3) uniform circular motion, 4) circular motion uniformly accelerated 5) spring constant, 6) legal archimedes 7) friction force 8) expansion of the substance. Assessment data is made simple by the media and presentations judged by the score 1-4 and expressed in scale scores were analyzed with respect to each indicator, and the researchers noted weaknesses and suggestions for improvement of media appearances in the next cycle. Average score of each indicator media assessment for each subsequent cycle is presented in Table 2

Table 2. Quality Of Simple Media

No	Analysis Aspect	Average score of each group		
		Cycle 1 (3 media)	Cycle 2 (3 media)	Cycle 3 (2 media)
1	Suitable of Contents	2,3	3,0	3,5
2	Practicallity	2,3	3,0	3,0
3	Aesthetics	2,6	2,6	3,0
4	LKS Display	3,0	3,0	3,0

5	Easy to understand	3,0	3,0	3,5
Average Score		**2,64**	**2,94**	**3,2**
Criteria		**Low**	**High**	**High**

Quality of the media at all times have increased. At the first meeting of the media still has not shown up, the media made was about the uniform rectilinear motion (GLB) and uniformly accelerated motion (uniformly accelerated motion), expansion of matter and motion parabola. Media are difficult to use and sometimes done repeatedly. Because the media is also crucial to the success of learning, and the use of media to train science process skills of learners. This media is advisable to rigorously validated first by the researchers before being displayed. Because according to Yager & Akcay (2010) Exercise science process skills as an approach to teaching is very effective to help students in understanding the concepts and use of science process skills in everyday life.

Activity data presentation activities of members of both presenters and audience activity scores were analyzed with respect to each indicator, and the researchers noted weaknesses and suggested improvements to the appearance of activity in the next cycle. Based on the presentation activity score for each cycle, the level of activity can be expressed renderer or audience members with criteria as shown in Table 4.

Table 3. Data of activity the students by each cycle

	Aktivitas mahasiswa (%)		
Simple Media	Cycle 1	Cycle 2	Cycle 3
Media 1	67	67	83
Media 2	50	67	83
Media 3	50	83	-
Average	**55,67**	**72,3**	**83**
Category	**Medium**	**Medium**	**High**

Data Table 3 shows that each cycle can be presented three simple media. When a group of media present, then the responder group responded. Each group consisted of three people, which means every media appearance involved only 6 people, while other students observe and give feedback, but not recorded in these observations. Activities that are considered by observers: Responding to a question, answer a question correctly, discuss answers to questions, help prepare group presentations, Ask questions and give feedback

From the analysis of the activity data presentation both presenters and audience members seem that activity presentations on cycle and cycle-2-3-cycle higher than 1. This suggests that more students need to be more active in the discussion. Motivation can be done when they first read the material they will be learning before attending. At first not much to ask or answer or provide feedback, students are encouraged to be more active lecturer and always wanted to know, especially in the presentation at the end of the meeting. Opinion Ruhimat, (2011) stated that free human individual is an active and curious, the teacher in the learning process should be able to explore and develop activity student-centered learning. Similar studies have also been performed by Hidayati, (2009) which utilizes the junk to find the mathematical study of learning outcomes that can enhance communication students learn mathematics.

Comparison of absorption in the classical style in the previous academic year (2011/2012) with the absorption after the implementation of this strategy (academic year 2012/2013) are presented in Table 4.

Table 4. Comparison of learning outcomes School Physics Lesson 1 academic Year 11/12 and 12/13

No	Interval of Learning Absorption (LA) %	Total (%)			
		Mid Test		Total Grade	
		A.C 11/12	A.C 12/13	A.C 11/12	A.C 12/13
1	80-100	10	20	7	22
2	66-79	28	46	38	22
3	51-65	36	19	30	41
4	45-50	14	13	16	15
5	< 45	12	2	9	0
Average of LA		**55**	**66**	**62**	**65**
Category		**Medium**	**High**	**High**	**High**

Table 4 it can be seen that the students' learning outcomes with simple science using the media to improve student learning outcomes. This is in line with the opinion Sahrul Saehana #, Muhammad Ali and Supriyatman, (2007) showed that students' cooperative learning with the media following the simple science tools better than students who take cooperative learning without the use of media.

Sahrul (2007) suggests that student learning outcomes of cooperative learning with the media following the simple science better than students who follow the media without the use of cooperative learning.
Students' motivation after following Table 5.

Table 5. Data Motivation student learning

No	Motivation Aspect	Student Learning Motivation	
		Before Use a Simple Media	After use a Simple Media
1	Confidency	3.2	3.3
2	Attention	3,0	3,2
3	Relevance	2,9	3,0
4	Satisfaction	2,9	3,1
Average		**2,9**	**3,1**
Category		**High**	**High**

Motivation to learn students after attending Physics School 1 increased for each component. The largest increase was at attention and satisfaction component. This means that the strategy of using simple media lectures attracted students and creates curiosity. Curiosity about how these concepts that seem theoretically it can be proven to capitalize simple media. So in the end students were satisfied with what he had accomplished. In general, students' motivation after learning this strategy increases the motivation scores at the high category. Motivation is increased due to a boost in yourself to do something. Dimyati and Moedjiono (2002) states that

motivation is seen as the impetus that drives and directs human behavior to achieve certain goals. The use of this simple medium in teaching school physics I can increase student motivation.

Summary

Quality of presentation media is increasing every meeting from 2.64 to 2.94 at the meeting I and meetings to 2 and 3.2 at the third meeting. Student Activity increases every meeting from 55.7% at the meeting I and 72.3% in the second meeting and 82% at the third meeting. Learning outcomes increased from an average absorption of 62% to 65 % students. Student motivation to learn before applying laboratory strategy constructivism 2.9 to 3.1 after the learning process.

From the above data it can be concluded that the constructivism learning can improve student learning outcomes and motivation at physics school 1 course.

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