

Effectiveness of Module Based Problem Based Learning (PBL) Toward Student's Achievement Motivation

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Abstract

The aims of this research is to know the effectiveness of PBL based Chemistry module on hydrocarbon compound and its derivatives toward student's achievement motivation. This research used experimental research. The PBL based Chemistry module was applied in two schools, SMK Kesehatan Bakti Indonesia Medika and Rahani Husada. The PBL based Chemistry module was conducted simultaneously upon 4 expert judgment, three expert and a chemistry teacher. Syllabus, lesson plan, instrument evaluation of achievement motivation were used as instrument of learning. The effectiveness of the PBL based Chemistry module according to the data post test scores from the treatment class and base line class were taken. While the data of achievement motivation were measured by Likert scale. Based on the results of this study, it can be concluded that the PBL based Chemistry module on hydrocarbon compound and its derivatives is effective to improve student's achievement motivation.

Keywords : PBL (*Problem Based Learning*), chemistry module, hydrocarbon, student's achievement motivation.

Preliminary

UNESCO cit. Depdiknas(2008: 1) formulate the four pillars of education to deal with and adapt to the rapid development of the world, namely: (1) learning to know, (2) learning to do, (3) learning to live together, and (4) learning to be, learning to thrive in their entirety.

Pongtuluran and Rahardjo (2011: 1-2) states that in the stage of learning to know, students are not only prepared to be able to answer the problem in the near term, but to encourage them to understand, develop intellectual curiosity, stimulate critical thinking and the ability to make decisions independently, in order to be equipped throughout life. Pongtuluran added that in the stage of learning to do, students are expected to have the ability to work in teams, communicate and handle and resolve the issue. Learning to live together to develop an understanding of other people by identifying themselves and appreciate all mutually dependent's, carrying out joint projects and learning to resolve conflicts in a spirit of respect of pluralism, mutual understanding and peace. While learning to be it means develop the personality and the ability to act independently, critically, and responsible.

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Depdiknas (2008: 1) perform a variety of strategies to improve the quality of human resources (HR) and the implementation of learning in school to achieve the four pillars of education. Improving the quality of teaching practices in schools conducted by various strategies, one of them through the application of the approach learning and competency based education and training. Competency based approach is used as a reference in curriculum development, development of teaching materials, implementation of learning, and the development of assessment procedures.

Lampiran Permendiknas No. 22 Tahun 2006 states that the curriculum vocational subjects were divided into three groups, namely the normative, adaptive and productive. Normative group is the group of subjects who serves shaping students into well-rounded individual who has norms of life as individual beings and social beings. Adaptive group focuses on understanding and mastery of basic concepts and principles of science and technology that can be applied in daily life. Student groups learn to function productively in order to have a working competence.

Productive programs taught specifically according to the needs of each program expertise. SMK Kesehatan Bakti Indonesia Medika and Rahani Husada have different skills program. Vocational skills program in SMK Bakti Indonesia Medika consists of pharmaceutical, health analysts, and nursing. The vocational skills program in SMK Kesehatan Rahani Husada is nursing.

The implementation of this material in the form of group learning activities include face-to-face activities, school practice and industry practice. Overall this learning activity aims to increase student competence in the area of cognitive, affective, and psychomotor.

Adaptive chemistry subjects is a compulsory subject that is taught to every SMK. Adaptive chemistry subject that support learning process of productive chemistry considered important in setting up basic capabilities that have the power transfer to all subjects so that development research is directed for the development of an adaptive chemistry subjects.

Questionnaire needs conducted on 30 students, including 15 students of SMK Kesehatan Bakti Indonesia Medika and 15 students of SMK Kesehatan Rahani Husada, 90% of students choose hydrocarbons and their derivatives as materials that are considered difficult to understand. Hydrocarbon compounds are basic chemical material which is closely related to daily life, which is useful for studying the chemistry concepts further. However, the concept is very broad hydrocarbons, are abstract and have a braid between concepts, so the learning necessary

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continuity. It cause hydrocarbon concept very difficult to understand. It possible in studying the hydrocarbon material required appropriate learning model, so that students are motivated to learning more. In addition, the selection of material hydrocarbons and its derivatives because this material must be studied to achieve the standard competencies which communicates hydrocarbon compounds and their use in order that students can find many kinds of hydrocarbon compounds that students encounter in their daily life. Based on the advice of teachers, hydrocarbon contains very much materials with the allocation of time is so limited that it deems necessary special handling.

The process of learning in the classroom is still a teacher centered, this is in accordance with the discussion forums and teacher needs analysis. In the hydrocarbon material, students did not experience the learning activities that are hands on and minds on (thinking skills) which resulted in students tend to be passive in learning activities. Students became less motivated to learn and tend to be passive in the learning process. As a result, low student achievement as summarized in Table 1.

Tabel 1. The Achievement Student in Material Hydrocarbon Compounds SMK Bakti Indonesia Medika Academic Year 2012/2013

Class	Complete (%)	Not Complete (%)	KKM
XI Analyze	68	42	73
XI Pharmacy	65	35	73
XI Nurse I	71	29	73
XI Nurse II	65	35	73

Data collection phase is done by the analysis of the curriculum, analysis of the characteristics of learners, materials analysis and formulate objectives are summarized in the form of needs analysis questionnaire. Based on the results of questionnaires needs that have been carried out on 15 students of SMK Kesehatan Bakti Indonesia Medika and 15 students of SMK Kesehatan Rahani Husada, as much as 100% of students want to support learning module. Students want a module that is easily understood by students, there are a lot of pictures and contains application in daily life. Apart from the students, based on a discussion forum, a teacher wants a learning media that is both easy to understand students and contains the complete material for students to study independently at home and at school.

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Russel cit. Wena (2012: 230) argues that the system of learning modules will make learning more efficient, effective and relevant. The module is indispensable in the learning process in SMK Kesehatan Bakti Indonesia Medika. This is due to the lack of dedicated modules Health vocational students..

Most of students are lacking motivation during the learning process. Most of students are still do not pay attention when teachers teach and it indicates that they have low achievement motivation. Motivation becomes the background for someone to get a high achievement. Achievement motivation according to Uno (2013: 30) greatly affect the performance.

McClelland cit. Velmurugan (2013: 7) uses the term need for achievement (N-Ach) as an encouragement to the person to be successful in competing against a standard of excellence. Uno argues achievement motivation can help in understanding and explaining the behavior of individuals. Important role in the achievement motivation are, (1) to determine the things that can be used as reinforcement in the achievement, (2) to clarify the purpose of achievement to be achieved, (3) to determine the range of control to stimuli achievement, and (4) to determine the persistence of learning. Motivation is an important role in learning and student achievement as it pertains to the way of thinking, feeling and behavior of students (Mokhtar et al, 2013: 2003)

The module has a wide variety of uses, Andriani cit. Prastowo (2012: 109) said that module as a provider of basic information, because the modules are presented a variety of subject matter that can still be developed further, as material or user instructions for students, as supplementary material with communicative illustrations and picture. Andriani added that the module can be an effective teaching guide for teachers as well as being material to practice for students in conducting its own assessment.

A variety of reasons why we need a learning model that interesting, fun and developing thinking skills (minds on activity). Students do not feel burdened by the material that must be learn. If students themselves are looking for, process and conclude on issues learned, the knowledge gained will be longer attached to the mind. Hopefully, by using a specific model of learning, students have high achievement motivation.

Model Problem Based Learning (PBL) is learning that makes the problem as a basis for students to learn, where students can apply critical thinking, solve problems and apply knowledge in real-world situations (Levin, 2001: 1).

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The basic principle of learning is learning PBL initiated with problems, questions, or puzzle that make students want to solve it (Boud and Feletti cit. Duch et al. 2000). Tosun and Taşkesenligil (2011: 128) in the journal mentions that PBL has a positive impact on the target orientation, values and self-efficacy which is a sub-dimensions of student motivation to chemicals.

Graaff and Kolmos (2003: 661) states that PBL learning can enhance the basic concept, expectations, and interests of students. Etherington (2011: 50) adds that the PBL learning can define, organize, and recognize something that is needed by students who has open inquiry.

Chemistry module based PBL which was developed to meet the needs of students, are expected to improve the achievement motivation. The existence of a problem-based learning model into a special characteristic that is able to develop hand skills and thinking ability of students. This study aims to determine effectiveness module based PBL toward student's achievement motivation.

Research Methods

This research aim to determine effectiveness module based PBL toward student's achievement motivation. Methods of this research is *Posttest Only Group Design* experimental method.

Field test of this research divided into two classes, treatment and base line classes. Treatment class is a class that is treated in the form of modules and PBL learning model, while the base line class is a class that is not given any treatment. Furthermore, the data obtained were tested prerequisite before transactions are carried out t-test.

Results and Discussion

a. Results of Trial Main

Field trials conducted in two schools, such as SMK Kesehatan Bakti Indonesia Medika and SMK Kesehatan Rahani Husada. Every school divided into two classes, treatment and base line class.

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Table 4. Description Data Rate of Achievement Motivation

	SMK Kesehatan Bakti Indonesia Medika	SMK Kesehatan Rahani Husada
	Mean	Mean
Treatment Class	85,12	90,06
Base line Class	80,90	84,23

Furthermore, the data obtained were tested prerequisite before transactions are carried out t-test.

Tabel 5. Analysis Test

Aspect	Test	SMK Kesehatan Bakti Indonesia Medika	SMK Kesehatan Rahani Husada
		t sig	t sig
Achievement Motivation	Ind. Samples Test	0,04	0,001

b. Discussion and Assessment Product Development

Needs analysis questionnaire showed most students have difficulty in learning chemistry. This difficulty makes the students tend not to like chemical subjects. Chemistry has specific characteristics, such as (1) abstract, (2) simplification of the real situation, (3) sequentially and tiered. That characteristics make chemistry difficult to learn by students. So we need a learning media that serves to concrete abstract chemistry concepts.

Based on the curriculum analysis and interviews with the chemistry teacher, curriculum that conducted in vocational health school is Kurikulum Tingkat Satuan Pendidikan (KTSP) where competency standard (SK) and basic competency (KD) accordance with the content standards (Permendiknas No. 22 Tahun 2006). Material hydrocarbon compounds and their derivatives are an important material in our daily lives. On this matter, students are required to think abstractly so that most of students have difficulty in understanding the material. Students tend to memorize without understanding the concepts in the material so that the learning of the student becomes meaningless. As disclosed by Ausubel cit. Dahar (2011: 95-96) meaningful learning is a process where new information on relevant concepts contained in the person's cognitive structure. With the ongoing study, it produced changes in brain cells, particularly cells that have stored information similar to the information that is being studied.

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Competency standards must be achieved by students, such as communicating hydrocarbon compounds and their uses that described in two basic competencies which describe the peculiarities of the carbon atoms that make up hydrocarbon compounds and characterize hydrocarbon compounds and their derivatives. With limited time allocation that is 6 x 45 minutes, to reach the target of the curriculum, the teacher would choose the easiest way to inform the facts and concepts through conventional methods where the teacher becomes the only source of information. As a result, students have a lot of knowledge without trained to find knowledge, discovered and developed the concept of science (Semiawan, 1992: 18).

Developed module is integrated with PBL learning model where students can foster thinking skills by solving problems related to real world issues. Through the issue, the teacher needs to assist students as a good facilitator. At the time of discussion stalemate, the teacher can provoke students' ideas with questions that lead to the discovery of answers. According to Duch, et.al. (2000: 3) the role of teachers in PBL is a guide, dig a deeper understanding of, and support the initiative of the students, but did not give a lecture on the concept directly related to the essential problems are solved, and also did not direct or provide an easy settlement.

The module integrated with PBL learning model is based on components or steps of PBL learning. Learning step by Arends cit. Trianto (2010: 71) include, (a) the presentation of the problem, (b) the organization of students, (c) the investigation group, at this stage the student conduct some activities (d) the development and presentation of the work, (e) evaluating the results of the investigation.

Description of trial main are presented in Table 4. In the table indicates that the assessment of achievement motivation, treatment classes to get the average value higher than the class of the base line.

The effectiveness of both classroom learning is measured using t-test. Based on sig. (2-tailed) in the column assumed equal variances, the data of achievement motivation is smaller than 0.05, then H_0 is rejected, meaning that the average value of treatment classes and class base line is not the same.

Achievement motivation in class treatment showed an average value higher than the base class line. This is because in the PBL learning, students are more motivated to carry out tasks in the form of formative tests on each learning module. In the course of the discussion, the students

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actively discuss to resolve any problems that are presented in the module. Each group seeks to be the most superior group. As disclosed Tosun and Taşkesenligil (2011: 128) in his journal that PBL has a positive impact on the target orientation, values and self-efficacy which is a sub-dimensions of student motivation. Aaron (2012: 233) that supports student achievement motivation is the key to the success of the implementation of PBL learning model. He added that in PBL, students are taught to become independent learners, it is very effective in a group to resolve the issues presented. Students will not get the information if they do not read, explore and ask for information. They must work cooperatively, exchanging ideas and opinions, debating what other people think, and practice to accept failures and mistakes.

PBL learning integrated with chemistry module is effective in improving achievement motivation of students. Etherington (2011: 50) states that the PBL learning can define, organize, and recognize something that is needed by students who inquiry open. Students are taught using the PBL learning model requires an effort to change from passive students into active students in learning science.

Graaff and Kolmos (2003: 661) adds, PBL improving learning basic concepts, conjectures, and interests of students. It is common to increase the motivation to work harder with PBL learning model than conventional methods. Participation of students in a less conventional learning, many students are not faced with the problems related to everyday life.

Conclusions and Recommendations

Results of the data analysis and discussion can be drawn several conclusions, learning by using chemical module based on material PBL hydrocarbon compounds and derivatives in terms of student achievement motivation more effective than conventional learning. In trial test t students' average score was 85.12; 90.06 for class treatment, while in class base line to get the average value of 80.90; 84.23.

Suggestions and recommendations can be given with regard to the results of this study, among others, 1) the development of the module should be continued until the dissemination and implementation, 2) need to do a similar study can be done on different materials in accordance with the PBL learning model and carried on the curriculum in 2013, 3) The teacher must understand the characteristics of students and learning model that will be used for teaching and

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learning activities, 4) In selecting instructional materials for learning implementation, material characteristic and characteristics of students should be analyzed to determine the teaching materials needed by the students.

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