

PAPER • OPEN ACCESS

## Project based learning to improve student learning activeness

To cite this article: S N Rohmah *et al* 2020 *J. Phys.: Conf. Ser.* **1613** 012079

View the [article online](#) for updates and enhancements.

### You may also like

- [The effect of motivation in learning used an electric installation automation trainer based on Project Based Learning](#)  
S I Haryudo, L Nurlaela, M Sondang et al.
- [Teaching optics in Covid-19 pandemic through project-based learning](#)  
Nur Abdillah Siddiq
- [Improvement of Student Learning Outcomes through the Implementation of Collaborative-Think Pair Share Project Based Learning Model on Vocational High School](#)  
K Arwizet and Pebri Gandi Saputra



Free the Science Week 2023 April 2-9

Accelerating discovery through  
**open access!**

 [www.ecsdl.org](http://www.ecsdl.org) [Discover more!](#)

The banner features a dark blue background with a futuristic, glowing blue interface. A hand is shown pointing at a central circular element that contains a white padlock icon. The interface is composed of various geometric shapes, lines, and a grid pattern, suggesting a high-tech or scientific theme.

## Project based learning to improve student learning activeness

S N Rohmah<sup>1,2\*</sup>, S B Waluya<sup>2</sup>, Rochmad<sup>2</sup>, Wardono<sup>2</sup>

<sup>1</sup>Department of Mathematics Education, Universitas Ahmad Dahlan, Indonesia

<sup>2</sup>Universitas Negeri Semarang, Indonesia

E-mail: siti.rohmah@pmat.uad.ac.id

**Abstract.** This paper presents the results of a study of the Project Based Learning model to improve student learning activeness. As for the background of writing this paper because to face the challenges of the 21st Century skills needed to apply knowledge including communication, collaborative, critical thinking and creativity (4 C). Communication and collaborative skills in learning aim to make students more active. Project based learning involves the performance of students directly in making a project, the lecturer acts as a facilitator and supervision that monitors student activities in designing activities, arranging schedules, implementing projects, solving problems and making decisions with the final product that will be reported and presented by students as an evaluation activity from the results of project-based learning. Project-based learning can increase student activity in learning.

### 1. Introduction

Education in Indonesia is currently faced with the demand to be able to produce quality human resources (HR), namely human resources capable of adjusting to the era of revolution 4.0 as it is today. So that education is a decisive element in the development of human resources. The intended HR is students who have the competencies needed to enter life, especially the world of work that is full of competition and challenges. Through Education humans will be able to know everything that is not or has not been known before. Thus, it can be clearly seen how important education is in improving the quality of human resources.

To face the challenges of the current century there is insufficient conceptual knowledge, but the skills to apply knowledge are needed. Some of the skills contained in the 21st century are communication, collaborative, critical thinking and creativity (4C). Active learning is learning that involves students with various activities to explore more information from many sources with the aim of enriching the material to be discussed so that it becomes an experience that not only shapes new knowledge but also student communication skills. Students can be free to search various useful literatures directly. These activities enable students to be actively oriented with their environment and groups, as a medium to develop their abilities.

Student learning activeness is seen from the number of student activities as a form of involvement in the learning process, according to Hendriana, Rohaeti and Sumarmo [1] learning activeness is seen when students can pay attention to lecturers' explanations, understand the problems given, actively ask questions



and answer questions presented, cooperate in groups, able to express opinions, give opportunities to friends to express opinions in groups, and present the results of group work.

In an effort to improve learning activeness, innovation is needed in the presentation of material in the classroom in the form of strategies, approaches, methods or models used by lecturers. Project Based Learning is an innovative learning model with the concept of student center learning that facilitates students in discovering new knowledge by carrying out tasks in the form of problems presented by lecturers.

Project Based Learning is learning that presents complex problems involving students in planning, problem solving, decision making and investigative activities and provides opportunities for students to be more independent in gaining knowledge with the final results in the form of real products [2]. Products produced from learning can be in the form of media or reports that are presented. The application of the Project Based Learning model in the lecture on the development of mathematics learning media is expected to improve student learning activeness.

## 2. Method

This research was descriptive qualitative research. The subject was 28 students of mathematics education study program which in fourth semester of Universitas Ahmad Dahlan. The instrument was observation sheet. Analysis technique used Milles and Huberman model.

## 3. Results

Project Based Learning is a structured activity that aims for students to construct new knowledge from these activities. According to William [3-5] PjBL is in accordance with the development process of student thinking, the higher the level of education, the more complex the problems presented. Based on constructivism theory PjBL is collaborative learning this theory states that learning will form knowledge in the minds of students meaningfully by involving students directly in creating a real product, or in other words learning is defined as a learning by making, Warsono [6].

Project-based learning is a learning model that uses projects / activities as a means to achieve attitudinal, knowledge, and psychomotor competencies, where students are required to solve problems by applying skills in researching, analyzing, making presenting learning products based on real experiences [7]. As explained that project-based learning is collaborative learning and projects that are carried out in the form of complex problems, then in learning students work in groups.

The three steps of Project-Based Learning described by Warsono and Hariyanto [6], are as follows:

- a. Planning, consists of activities to select topics, look for references related to the topic chosen and prepare the procedure for implementing the project.
- b. Creating, which is developing a plan based on the previous stage and coordinating and combining ideas in the form of contributions from all group members and starting to implement the project.
- c. Processing / Implementation, where at this stage students carry out and complete the project then reflect on the product of the learning outcomes that have been carried out.

In addition, the NYC Department of Education explains 3 steps of Project-Based Learning [8], including:

- a. Planning, NYC mentions 5 plans carried out on Project Base Learning, namely: determining the content or topics and skills that will be developed, developing problems from predetermined topics, planning the scope of the project, designing activity procedures and finally reviewing the planning has been established.
- b. Teaching the skills and content, there are 2 activities carried out at this stage, namely creating an optimal learning atmosphere and implementing projects based on the procedures set in the previous stage.

c. Managing the project, this stage includes the completion of the project, product presentation of the project results, evaluation and reflection at the end of the lesson.

According to the learning steps above, it can be concluded that the task of the lecturer is as a facilitator in steps 1 and 2 and becomes supervision in the third step where a lecturer directs, observes and supervises student activities in the process of designing activities, arranging schedules, implementing projects, solving problems and make decisions.

Effective implementation of project-based learning by involving students in each step of the learning is expected to have more meaningful and more inherent knowledge in students. The characteristics of effective project-based learning according to NYC [8] include, first, learning that directs students to investigate important ideas and questions, secondly uses the process of creative thinking, critical thinking and information processing skills in investigations, and the impact of learning outcomes can be applied in real life.

The active learning of students Hendriana, Rohaeti, and Sumarmo defines student learning activity as a student activity in learning to develop concepts and knowledge both from themselves and from the surrounding environment [1]. Student activeness as a desire of students to do or implement something in an effort to understand lecture material.

Learning activeness indicators include student activities in learning that involve the whole senses both physically and spiritually, according to Diedrich [1] indicators of student learning activeness are as follows:

- a. Visual activities, which include reading activities, paying attention to explanations, observing images, etc. related to vision.
- b. Oral activities, where students can give statements, questions, respond, give criticism and suggestions, discuss, interview, etc.
- c. Listening activities, such as listening to lecturers' explanations, listening to presentation, listening to friends' opinions when discussing, etc.
- d. Drawing activities, in the form of student activities in drawing graphics, diagrams, tables, flat building, building space, etc.
- e. Motor activities, such as conducting experiments, making construction, playing, etc.
- f. Mental activities, responding activities, solving problems, remembering, drawing conclusions, finding relationships between things with other things, etc.
- g. Emotional activity, including feelings in the form of interest, interest, enthusiasm, calmness, etc.

Project-based learning to improve student learning activeness based on activities carried out at the PjBL step, can increase student learning activeness in lectures on the development of mathematics learning media [9].

The implementation of Project-Based Learning in the lecture on developing mathematics learning media in Figure 1 [7]

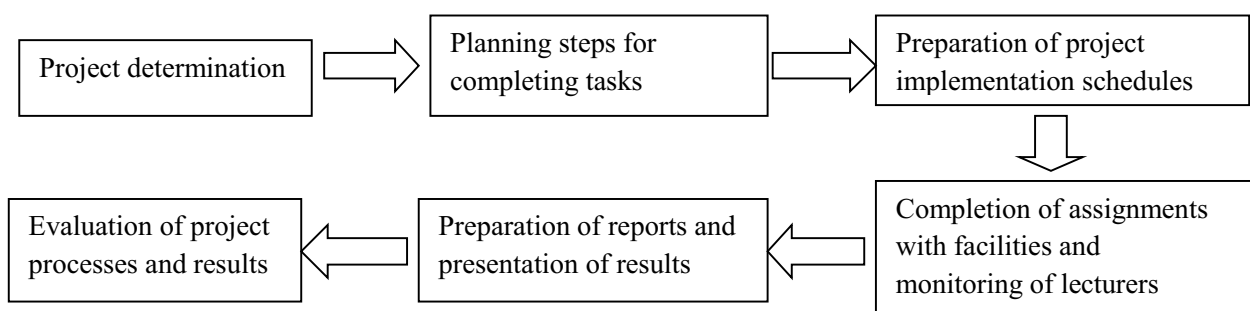


Figure 1. Steps of project-based learning

Assessment of lectures on the development of mathematical learning media carried out on Project Based Learning is a structured task assessment that must be completed within a certain period of time. Assessment starts from the first step to the evaluation step the purpose of this assessment is to determine the level of understanding and process of implementing the project [10-12]. Some things that must be considered in the assessment, including:

- a. Management, is the ability of students to manage activities carried out, work together in groups, manage work time so that they can carry out projects at the right time.
- b. Relevance, namely the suitability of the project undertaken by students with the topic in the subject of learning media development.
- c. Authenticity, is the authenticity of the product produced from the project activities carried out. Furthermore, to measure the level of student activity, observation sheets and questionnaire sheets were used according to the activity indicators to be measured.

#### 4. Conclusion

Project Based Learning is an innovative learning model that can facilitate students to get a more meaningful experience, students can construct their own knowledge by carrying out project tasks in a structured manner with the final results in the form of products that will be presented or presented in front of the class. The learning process fulfills the concept of student center learning, students are directly involved in each activity carried out so that project-based learning can improve student learning activeness.

#### References

- [1] Hendriana H, Rohaeti E E, and Sumarmo U 2017 Hard Skills and Student Mathematical Soft Skills (Bandung: PT Refika Aditama)
- [2] Putra H D and Purwasih R 2015 Meningkatkan prestasi belajar dan keaktifan mahasiswa melalui Project Based learning *Jurnal Ilmiah P2M STKIP Siliwangi* **2** 128-36
- [3] William 2014 The Effects of Project - Based Learning In High School Geometry (Disertation University of Hawaii)
- [4] Bell S 2010 Project-based learning for the 21st century: Skills for the future *The clearing house* **83** 39-43
- [5] Tseng K H, Chang C C, Lou S J, and Chen W P 2013 Attitudes towards science, technology, engineering and mathematics (STEM) in a project-based learning (PjBL) environment. *International Journal of Technology and Design Education* **23** 87-102
- [6] Warsono and Hariyanto 2013 *Active Learning: Theory and Assessment* (Bandung: PT Adolescent Rosdakarya Offset)
- [7] Fathurrohman M 2015 *Innovative Learning Models* (Yogyakarta: Ar-Ruzz Media)
- [8] NYC 2009 *Project-Based Learning: Student to Engage Inspiring Middle School in Deep and Active Learning* (New York)
- [9] Saputra I G N H, Joyoatmojo S, and Harini H 2018 The implementation of project-based learning model and audio media Visual can increase students' activities *International Journal of Multicultural and Multireligious Understanding* **5** 166-74
- [10] Chiang C L and Lee H 2016 The effect of project-based learning on learning motivation and problem-solving ability of vocational high school students *International Journal of Information and Education Technology* **6** 709-12
- [11] Zancul E D S, Sousa-Zomer T T and Cauchick-Miguel P A 2017 *Project-based learning approach: improvements of an undergraduate course in new product development* *Production* **27** (SPE).

- [12] Musa F, Mufti N, Latiff R A, and Amin M M 2012 Project-based learning (PjBL): inculcating soft skills in 21st century workplace *Procedia-Social and Behavioral Sciences* **59** 565-73