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Learning Development based on PJBL in Graphic Media Design Report on Alternating Current Circuit Material at SMAN 4 Kejuruan Muda

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Abstract

This study aims to create a studet agency through fun learning based on Project Based Learning with PTD Miniature media that can improve scientific skills in Alternating Current Circuit material at the stage of studying state electricity flow to customers and recognizing the functions and benefits of electric energy generation, SUTET in electricity transmission. and distribution of electricity to customers.Observation of the students' complete learning outcomes on average 83.14 and the ability of students in Project Based Learning-based learning process skills with an average of 97.75 and proves that students are actively involved in the learning process.Based on the achievement of the growth of life skills regarding the development of media that is oriented towards meaningfull Learning based on PJBL including; 1) Demonstrating the design of PTD miniature products (Generation, Transmission and Distribution) models of the application of alternating current circuits in daily life and 2) Presenting the results of models of applying alternating current circuits in everyday life in the form of reports and links to upload your information media tubes. This shows that the meaningfull learning developed is successful and can be used to improve students' scientific thinking skills.

Keywords
project based learning; PTD miniature; graphic videos; scientific skills

I. Introduction

Self-awareness of learning becomes the right self-preparation to carry out the Strengthening Character Education program in children which must first be formed through planting through religious, cultural and social values. Guiding as a manifestation of the teacher's concern for students and the teacher's responsibility as an effort to introduce students to their talents, interests, potential, spiritual, emotional and social that is useful as a preparation for the interests of children to live in a society and culture and make children dare to tell stories with their teachers about learning obstacles, background and learning needs in realizing learning with the concept of independent learning.

The culture of collaboration in independent learning that is integrated into the learning model in schools is the main thing that is built to create a conducive learning climate so that children are independent, independent, responsible and have curiosity in the learning process. Learning comes from growing self-awareness as a reminder that all children are stars with different colors and light. Understanding the educational philosophy of Kihajar Dewantara's figure about teaching principles is important for all teachers to implement. The science of educating and teaching makes us ready to play a role when we are in front, in the middle and behind them, even side by side following their struggle for happiness.

According to Astuti et al (2019) Education is an obligation of every human being that must be pursued to hold responsibilities and try to produce progress in knowledge and experience for the lives of every individual. Education is one of the efforts to improve the ability of human intelligence, thus he is able to improve the quality of his life (Saleh and Mujahiddin, 2020). Education is expected to be able to answer all the challenges of the times and be able to foster national generations, so that people become reliable and of high quality, with strong characteristics, clear identities and able to deal with current and future problems (Azhar, 2018).

Education that trains tolerance and critical awareness will stimulate the growth of a sense of justice and social sensitivity in the school environment, so as to be able to overcome the crisis of social inequality, cultural differences, character and the nation's economy in order to create changes in mindsets and attitudes in the implementation of the teaching and learning process in schools along with character building program that is emphasized at the time of school administration. This change is very dependent on a fun and meaningful learning experience by each student. The learning experience is used to find solutions as a solution to every problem in the life of students in real life in society, nation and state.

Learning related to the application of alternating current circuits in everyday life has difficulty because students are not faced with real objects, students are invited to fantasize through stories and imaginations that occur through the service system of the state electricity company with the SUTET flow. In ejurnal.bunghatta.ac.id A Lubis, I Darmana about the SUTET flow is written in the study of the short-circuit flow connected to the load flow on the 275 KV Sumatran transmission system. SUTET has an important role in distributing electricity from power generation centers to remote areas or to remote areas. This main function makes SUTET considered unsafe for local residents because it is said to cause several health problems. Besides being able to transmit electricity with high voltage, SUTET also emits electromagnetic radiation

AN Iftitah, SHB Prastowo, A Harijanto - FKIP e-PROCEEDING, 2020 - jurnal.unej.ac.id Quoted from the Journal of Education, University of Jember, it is said that the concept of an alternating current circuit is one of the materials that students must learn in the field of application, so far students have studied the concept through teaching materials provided by the government or LMS. This is due to the limitations of teaching aids and the fear of the danger level of playing with electricity so that students have never experimented with alternating current circuits. Bloom, namely student knowledge reaches 81%, understanding 60%, application 65%, analysis 56%, synthesis 48%, and student evaluation ability reaches 45%. (2) the percentage of mastery of concepts in the current and voltage sub-topics is categorized as poor with the percentage of mastery reaching 50%, the mastery of the concept of RLC series circuits that students have is quite good, reaching 73%, while the mastery of concepts in the sub-topic of RLC circuit power is categorized as less good that is reaching 56%. (3) The types of errors made by students are the average percentage of 2% translation errors, 8% conceptual errors, 21% strategic errors, 24% arithmetic errors, and 5% unresponsive questions. The research above shows that students will quickly understand if they experience directly what they are learning, so that the view of a person's ability to solve problems is one of the critical thinking skills and quick responses that everyone can have. Meaningful education is explained in Law Number 20 of 2003 concerning the National Education System. Article 1 Paragraph (1) explains that "Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength,

self-control, personality, intelligence, noble character, and the necessary skills himself, society, nation and state".

II. Review of Literature

According to Daryanto and Raharjo (2012: 162) Project Based Learning, or PJBL is a learning model that uses problems as the first step in collecting and integrating new knowledge based on experience and real activities. PJBL is designed to be used on complex problems that students need to investigate and understand. Then Sugihartono, DKK (2015: 84) revealed the project method is a learning method in the form of presenting to students subject matter starting from a problem which is then discussed from various relevant sides so that a comprehensive and meaningful solution is obtained. This method gives students the opportunity to Analyzing a problem from the point of view of students according to their interests and talents.

Fathurrohman (2016: 119) also said that project-based learning is a learning model that uses projects/activities as a learning tool to achieve attitude, knowledge and skill competencies. This learning is a substitute for learning that is still teacher-centered. According to Saefudin (2014: 58) project-based learning is a learning method that uses problems as a first step in collecting and integrating new knowledge based on experience in active activities real. Project-based learning emphasizes contextual problems that may be experienced by students directly, so that project-based lessons make students think critically and are able to develop their creativity through development for real products in the form of goods or services. Meanwhile, according to Isriani (2015: 5) project-based learning is a learning model that provides opportunities for teachers to manage learning in the classroom by involving project work.

Based on some of the understanding of the experts above, it can be concluded that the Project Based Learning learning model is a student-centered learning model that departs from a background problem, which is then followed by an investigation so that students gain new experiences from real activities in the learning process and can produce a projects to achieve aspective, cognitive, and psychomotor competencies. The end result of the project work is a product which includes written or oral reports, presentations or recommendations.

According to Fathurrohman (2016: 121-122) the principles underlying project-based learning are as follows:

a) Learner-centered learning that involves real-life tasks to enrich lessons.
b) Project assignments emphasize research activities based on a theme or topic that has been determined in learning.
c) Investigations or experiments are carried out authentically by producing real products that have been analyzed and developed based on a theme or topic that is arranged in the form of a product (tatu report of the work)
d) Curriculum. PJBL is not like the traditional curriculum because it requires a target strategy where the project is the center
e) Responsibility. PJBL emphasizes the responsibility and responsibility of students to their role models
f) Realism. Student activities are focused on work that is similar to the actual situation. This activity integrates authentic tasks and produces a professional attitude
g) Active learning. Growing issues that lead to questions and the desire of students to determine relevant answers so that an independent learning process occurs

h) Feedback. Discussion. Presentations and evaluations of students produce valuable feedback. This leads to experiential learning.
i) General skills. PJBL is developed not only on basic skills and recruitment, but also has a major influence on basic skills such as problem solving, group work, and self management.
j) Driving questions. PJBL is focused on questions or problems that trigger students to solve problems with appropriate concepts, principles, and knowledge.
k) Constructive investigation. PJBL as the central point, the project must be adapted to the knowledge of students.
l) Autonomy. Projects make student activities important. Blumenfeld describes a project-based learning model centered on the process of relatively timed, meaningful learning units.

Based on the explanation above, it can be concluded that the principle of the PJBL (Project Based Learning) learning model is this learning emphasizes that learning must be focused on students because this learning model uses problems that may be experienced in real life whose themes and topics have been determined, then experiments or experiments are carried out research so that it can produce real products according to the abilities of these students, so that students can solve problems with appropriate concepts, principles, and knowledge, so that they become more meaningful.

Sulisworo (2020) explained that Project Based Learning is an approach in learning that provides opportunities for students to deepen their knowledge while developing scientific thinking skills through problem solving and investigation activities. Brandon Goodman and J. Stiver define Project Based Learning as a teaching approach that is built on learning activities and real tasks that provide challenges for students related to everyday life to be solved collaboratively in groups.

Model this PJBL (Project Based Learning) learning does not only focus on the end result, but emphasizes more on the process of how students can solve the problem and finally produce a product.

III. Research Method

The method used in this research is Research and Development Type ADDIE (Analysis, Design, Development, Implementation, Evaluation).

3.1 Analysis

At this stage, Mastercoordination with parents of students is the main thing to realize student agency through the process of developing Miniature PTD innovation based on Project Based Learning in graphic report design in improving student skills in product performance, communication and student learning outcomes with meaningful learning because this learning is carried out outside school hours by signing parental consent for the implementation of PJBL. The author carries out Project Based Learning-based learning as scientific performance through mastery of students' concepts and skills through PTD Miniature innovation as the application of alternating current circuits in everyday life.

3.2 Design

Planning is done collaboratively between teachers and students. Planning includes the rules of the game, the selection of activities that can support answering essential questions by integrating various supporting subjects, and informing the tools and materials that can be used to complete the project.Product design instructions are written in detail and systematically.

Miniature design 3 main components of the application of alternating current circuit.

3.3 Development

Teachers and students together make a schedule of activities in completing the project. Project completion times should be clear, and students given direction to manage the time available. Give students the freedom and opportunity to try to explore something new. Smart teachers still have to monitor and remind if students deviate from the project objectives.

3.4 Implementation

Although students are given the freedom to determine strategies and how to work on their projects, smart teachers are still responsible for monitoring students while completing projects. Smart teachers act as mentors who always direct students to always be focused and focused on working on their projects.

3.5 Evaluation

The assessment that smart teachers do is to assist educators in measuring the achievement of standards in the processes and products produced. Smart teachers also play a role in evaluating the progress of each student and providing feedback. Furthermore, smart teachers can develop the next learning strategy. Product assessment can be done by presenting the product in front of friends or teachers.

At the end of the project based learning learning process, teachers and students reflect on the activities that have been carried out and the products that have been produced opportunity to express her feelings and experiences during LP.

IV. Results and Discussion

Table 1. Mastery Result Data
Student Concept

	EXAM	MIN VALUE	MAX VALUE	AVERAGE
PTD MiniatureLearning PJBL	Precondition	50	80	65.71
	PRETEST	60	80	72.57
	POSTTEST	80	100	83.14

From these data, it can be seen that the results of the PJBL-based Miniature PTD-oriented pritest and posttest can increase the value of students' knowledge, where the lowest initial student score obtained is 50 and increases to 80 so that the range of increasing values reaches a value of 30, while for students in the upper category the initial score is 50 and the final value is 90, so the range of values increases by 40.

The indicators of knowledge achieved by students from development withpritest and posttest learning outcomes test based on Project Based Learning Miniature PTD in the Graphic Design report on alternating current circuit material including: 1) Mastering the concept of alternating current magnitude in a series RLC circuit 2) Analyzing the functions of power plants, generators, transmissions, and Distribution 3) Analyzing the form of AC current and voltage 4) Analyzing several components of physical quantities in a value alternating current circuit 5) Analyzing the benefits and dangers of SUTET electricity

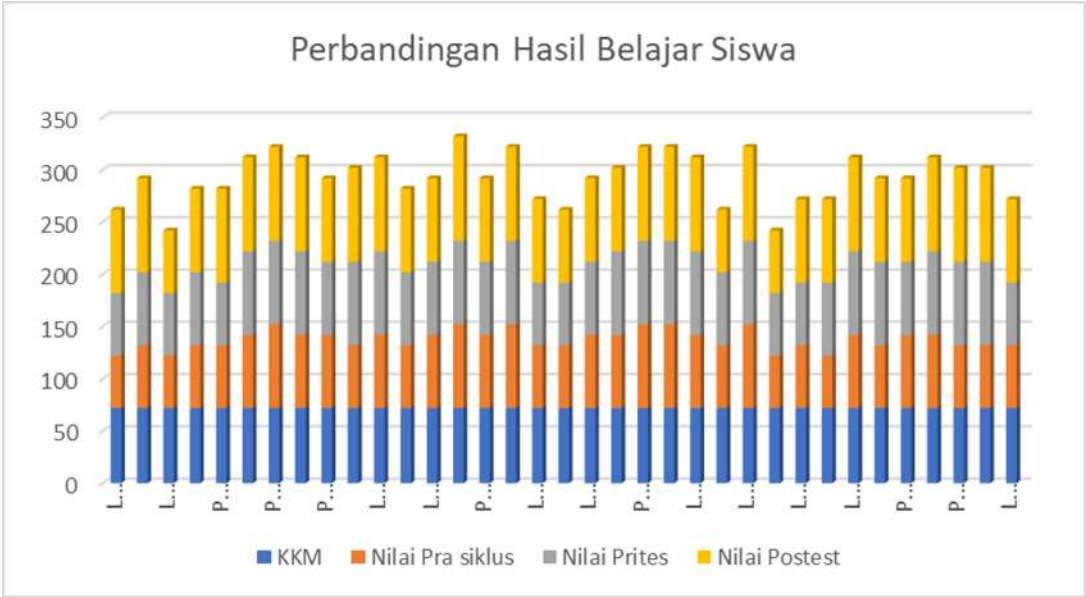

Figure 1. *Increasing the Value of Student Knowledge*

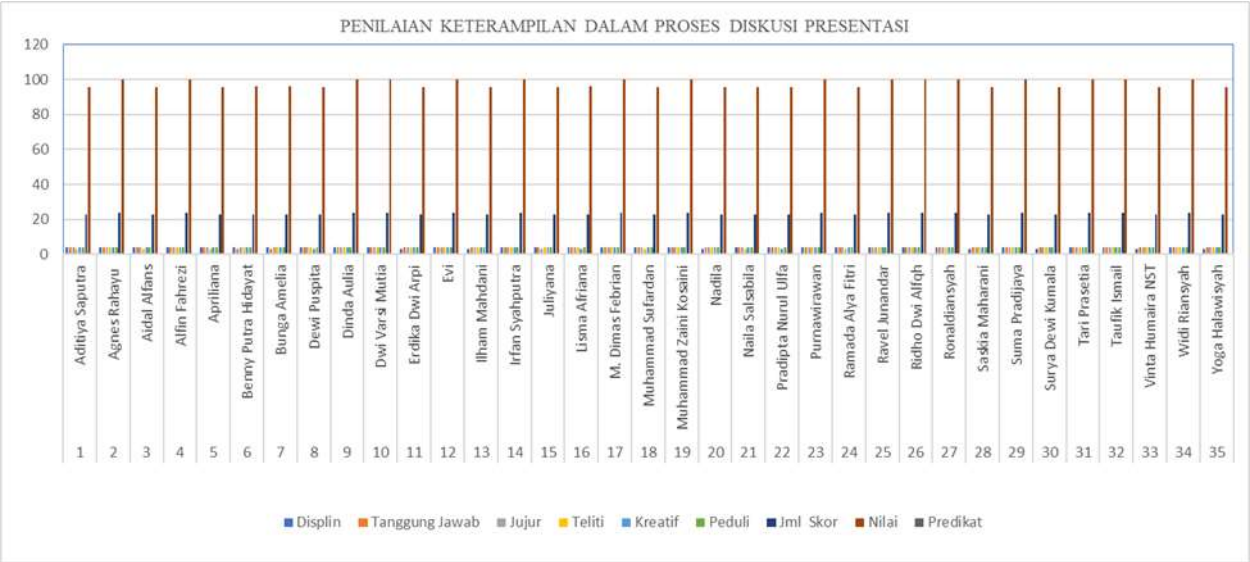

Figure 2. *Increasing the Average Score of Students' Skills*

In Figure 2, it can be seen that using Project Based Learning oriented learning model with Miniature PTD design can increase the average value of student skill activities during practicum to reach a total score of 95.83-100 and completeness in the very good category. The indicators of learning activities achieved by students from development with pritest and posttest learning outcomes tests as well as performance presentations and digital media presentation reports.

In the development of the research implementation, obstacles were found, especially in the testing of PTD Miniature design media as a model for the application of alternating current circuits in everyday life. The constraints referred to at the beginning of the trial, students still find it difficult to change habits so far, especially habits during activities with their groups in finding learning concepts, students still have to practice the ability to dare to appear and speak when explaining the results of the product to be presented and students are constrained on an alternating current source that uses a direct electricity source from PLN which causes the light bulb that is installed to be directly disconnected due to excess electrical power.

The division of groups carried out by the teacher for each group is that there are students who have higher abilities and are faster at understanding and helping guide their friends in a work group and making learning media for PTD Miniature design media as a model for the application of alternating current circuits in life every day makes students more enthusiastic, learning is more fun, student learning outcomes increase, there is positive progress towards the values of cooperation, mutual cooperation, independence, scientific communication, and students are more active in learning and this activity is also known and supported by students' parents by signing a parental consent letter for PJBL.

Implementation of PTD Miniature design media design as a model The application of alternating current circuits in everyday life based on PJBL can be developed using other media such as making a simple AC generator as meaningful and fun learning for students by using a few more lights and a power adapter that bigger with a miniature design that is more adaptive in real life so that it is even more interesting with the addition of a more modern poster graphic design.

V. Conclusion

PTD Miniature Design as a model for the application of alternating current circuits in everyday life that can be applied in the form of student worksheets (LKPD) which refers to the application of concepts in the form of improving Alternating Current Circuit learning.

Based on the validation test on media development, in terms of the achievement of life skill growth in the development of PTD Miniature design media as a model for implementing alternating current circuits in everyday life, it has realized student agency in the process of developing Project Based Learning-based Miniature PTD innovations in graphic design reports improve student skills in product performance, communication and student learning outcomes.

The results of the posttest oriented to the Miniature PTD design media as a model The application of alternating current circuits in everyday life can increase the average value of students' knowledge, where the lowest student initial score obtained is 50 and increases to 80 so that the increase value reaches a value of 30, while in student skill activity obtained with an average of 97.75 for the very good category.

References

Astuti, R.W., Waluyo, H.J., and Rohmadi, M. (2019). Character Education Values in Animation Movie of Nussa and Rarra. *Budapest International Research and Critics Institute-Journal (BIRCI-Journal)*. P. 215-219.

Azhar, A. (2018). Students' Trends in Islamic Communication Postgraduate in2010-2016 State Islamic University of North Sumatera (UINSU). *Budapest International Research and Critics Institute (BIRCI-Journal)*, P.206-214.

Azwar, Saifuddin. (2015). Sikap Manusia: Teori & Pengukurannya. Yogyakarta: Pustaka Pelajar.

Daryanto, dan Mulyo Rahardjo. (2012). Model Pembelajaran Inovatif. Yogyakarta: Gava Media.

Dwi.Sulisworo. (2020) Konsep pembelajaran project based learning. Penerbit Alprin.Semarang

Fathurrohman, m. (2016). Model-model pembelajaran inovatif. Jogjakarta: Ar-ruzz media.

Isriani Hardini dan Dewi Puspitasari. (2012). Strategi Pembelajaran Tepadu.Yogyakarta: FAMILIA

J Afriana, A Permanasari, A Fitriani - Jurnal Inovasi Pendidikan IPA, 2016 - journal.uny.ac.id, diakses 3 Maret 2022

Kılınç, A. (2010). Can project-based learning close the gap.Turkish student teachers and proenvironmental behaviours.

Mardiyanti, D. (2010). Teori belajar bermakna dari David P.Ausubel. http://mardhiyanti.blogspot.com/2017/04/teori-belajar-bermakna–dari–David-p.html, diakses 1 Januari 2022

Saleh, A., Mujahiddin. (2020). Challenges and Opportunities for Community Empowerment Practices in Indonesia during the Covid-19 Pandemic through Strengthening the Role of Higher Education. *Budapest International Research and Critics Institute-Journal (BIRCI-Journal)*. Volume 3, No 2, Page: 1105-1113

Sugiyono. (2012). Metode Penelitian Pendidikan: Pendekatan Kuantitatif, Kualitatif, dan R&D. Bandung: CV Alfabeta.

Suharsini, Arikunto. (2002). Prosedur Penelitian Suatu Pendekatan Praktek. Jakarta: Rineka Cipta