Implementation of Project Based Learning (PJBL) Model with the Assistance of Media E-Learning Chamilo to Improve Student's Understanding of Physics Concepts

Mukhammad Nur Chasani*, Agung Suci Dian Sari

Physics Education, Faculty of Education, Teknologi dan Sains Nahdlatul Ulama, Pasuruan, Indonesia

Corresponding Email: sitintamerah788@gmail.com

Abstract. This study aims to: (1) produce physics learning by using Project Based Learning (PjBL) with the assistance of E lerning Chamilo media that is appropriate to increase students' understanding of physics concepts during a pandemic, (2) to find out how high the understanding of physics concepts is by using learning Project Based Learning (PjBL) Assisted by Media E Lerning Chamilo, (3) find out how high the understanding of students' concept understanding in learning physics is increased by using the Project Based Learning (PjBL) learning model assisted by E Lerning Chamilo's media. The subjects in this study were 108 students of SMA Negeri 1 Kejayan Class MIA 4, MIA 5 and MIA 6. This study uses the Project Based Learning (PjBL) method assisted by Media E Lerning Chamilo. Defining is the initial stage of developing learning based on task analysis and concept analysis. Design is the second stage of the development of this learning which aims to produce an initial design of thE-Learning to be developed. The next stage is development which consists of testing the first stage including validation from the validator. the second stage of testing, namely the trial phase includes student responses to learning, along with giving interest questionnaires and also pretest and posttest questions. The data analysis technique used to analyze each data is the conversion of quantitative to qualitative values for the validation of Project Based Learning (PjBL) learning assisted by the E Lerning Chamilo media and the conversion of quantitative to qualitative values and normalized gain for interest data and student tests. The results of the development of this media show that: 1) E Lerning Chamilo based physics learning media is suitable for use as a physics learning medium with the subject of momentum, impulse, and collision. 2) the use of Project Based Learning (PjBL) learning media assisted by E Lerning Chamilo media can increase students with a gain value of 4.10 (high category).

Keywords: Project Based Learning (PjBL), E-learning Chamilo, Interest in Learning, Understanding Concepts

1. Introduction

Education is an activity to help the development of students achieve educational goals. Educational activities center on interactions between students and educators and other educational resources, and take place in an educational environment. Educational activities function to help develop the potential, skills and characteristics of students so that they develop according to the expectations of society. Educational goals are goals that must be achieved or mastered by students for their lives as individuals, citizens, further learning and carrying out work tasks (Elvira, 2021).

Education has the task of preparing human resources for development. In development steps, efforts must always be made to be in tune with the demands of the times. The development of the era that continues to occur always raises new problems that sometimes have never been thought of before. But all is unavoidable. What needs to be done is what efforts we can make so that all problems that arise can find a solution (Traditional, 2021).

Low opportunities for educational equity, opportunities to obtain education are still limited, especially at the elementary school level. Even though education or coaching services at an early age will certainly hinder the development of human resources as a whole. Therefore, appropriate policies and strategies are needed to overcome this inequality problem (Correlation & Product, 2020).

During the Covid 19 pandemic, since the issuance of the Minister of Education and Culture Circular Number 3 of 2020 concerning the prevention of COVID-19 in educational units which called for the postponement of activities that gather many people, learning activities in high schools began to shift from face-to-facE-Learning to online distance learning. (online), and because of that the Kejayan High School teachers are still confused about the material they want to convey (Mustika et al., 2021).

E-Learning Chamilo is one of thE-Learning media that can assist teachers in carrying out the teaching and learning process. E-Learning Chamilo is a web-based e-learning learning media that helps teachers carry out online learning. E-Learning Chamilo is part of the LMS (Learning Management System) which is often used in

various fields, one of which is in the field of education. The researcher chose E-Learning Chamilo as a learning medium because Chamilo E-Learning is supported by SCROM (Shareable Content Object Reference Model), which is a standard for distributing various electronic learning packages. So that teaching materials can be displayed in various formats, including text, PDF, video, and other formats (Yulita et al., 2018).

Chamilo's E-Learning learning media modified with Project Based Learning, this Project Based Learning learning model is one of thE-Learning models in which there is competition. Project Based Learning, or PJBL is a learning model that uses problems as a first step in gathering and integrating new knowledge based on experience and real activities. Project-based learning is a learning model that uses projects or activities as learning tools to achieve attitude, knowledge and skill competencies. The choice of learning model is strongly influenced by the nature of the material to be taught, the goals to be achieved in the learning, and the ability level of students (Tiari et al., 2020).

Based on the results of observations, previous research and theories that support the above, the title of this research is the Application of the Project Based Learning (PjBL) Learning Model Assisted by Chamilo's E-Learning Media to Improve Students' Understanding of Physics Concepts.

2. Research Method

Project Based Learning (PjBL) is a learning model that organizes classes in a project, PjBL is a learning strategy in which students must build their own content knowledge and demonstrate new understanding through various forms of representation, while Chamilo's E-Learning Media is an E-Learning and content management system that aims to increase access to knowledge and education with a broad scope (globally). This is supported by the Chamilo Association which aims to promote software, maintain good communication channels, and build networks that provide and contribute software, and in Chamilo's E-Learning there are several menus that can be used for Project Based Learning (PjBL) learning and make it easier for students to study either at home or at school, and in one of these menus the group division already exists, you just have to see which group the student is in.

3. Result and Discussion

The data obtained by the researcher is a collection of data collected from the validation of learning tools, the implementation of learning, the results of pretest, posttest, and student response questionnaires. The results of the pretest and posttest describe students' understanding of physics concepts when applying the Project Based Learning (PjBL) learning model assisted by E Lerning Chamilo's Media. Meanwhile, the results of the questionnaire explained the students' responses to the Project Based Learning (PjBL) learning model assisted by E Lerning Chamilo's Media with material on momentum, impulses, and collisions.

Learning activities should have a "valid" status. Ideally, learning device developers conduct assessments of experts (validators). The purpose of holding this learning device validation is to get "valid" status from experts, as for the validator chosen in this study.

Implementation of Project Based Learning (PjBL) learning assisted by E Lerning Chamilo media in order to increase students' understanding of physics concepts.

displayed in the form of a graphic image in Figure 4.8 above states that each class has very high criteria. The results of the Pretest and Posttest scores are data from the use of Project Based Learning (PjBL) Assisted by Media E Lerning Chamilo to find out the feasibility of helping students improve their understanding of concepts. The pretest score is the student's score when doing the initial test before using Project Based Learning (PjBL) Assisted by Media E Lerning Chamilo, while the Posttest score is the student's score when doing the final test after using Project Based Learning (PjBL) Assisted by Media E Lerning Chamilo.

The results of the average pretest and posttest scores of 3 classes starting from class MIA 4, MIA 5, and MIA 6 with an average pretest MIA 4 score of 63.6 with the number of 36 students, MIA 5 is 62 with a total of 36 students, and MIA 6 is 64 with a total of 36 students, while the Posttest scores of 3 classes, MIA 4 is 82.8 with a total of 36 students, MIA 5 is 82 with a total of 36 students, and MIA 6 is 83 with a total of 36 students. Meanwhile, the average pretest and posttest values of the 3 classes were 63.2 pretest and 82.6 posttest. From the results of the average pretest and posttest scores, it can be concluded that there is an increase and to get maximum results.

	Pretest	Posttest	N Gain
MIA 6	2310	2990	0,44
MIA 5	2225	2950	0,46
MIA 4	2290	2980	0,45

per class are: MIA 4 with an N gain value of 0.45, MIA 5 with an N gain value of 0.46, and MIA 6 with an N gain value of 0.44, so it is classified as a high category. Based on the results of data processing that has been done by researchers. then the researcher will discuss the problems that have been studied, as follows:

a. Validation Project Based Learning (PjBL) Learning Tool Assisted by Media E Lerning Chamilo. At this stage thE-Learning tools are in the form of syllabus, lesson plans, textbooks, worksheets and pre-test post-test questions that have been completed in consultation with the supervising lecturer to obtain input and suggestions. Learning tools in the form of syllabus, lesson plans, textbooks, LKPD and pre-test post-test questions which have been corrected according to input and suggestions from the supervisor are then validated by the validator.

The results of the validation of learning tools show that the syllabus, lesson plans, textbooks, worksheets and pre-test post-test questions compiled are feasible to be implemented in schools with revisions according to the suggestions and comments given. The validation results are then followed up with revisions according to the suggestions and comments from the validator. The results of the validation of learning tools, namely the syllabus has an average of 4.58, lesson plans have an average of 4.70, textbooks have an average of 4.7, LKPD has an average of 4.67

b. Implementation of Project Based Learning model learning tools (PjBL) Assisted by Media E Lerning Chamilo. Based on the table 4.7 regarding the results of the implementation of learning, it can be seen the implementation of the Project Based Learning (PjBL) learning model assisted by Media E Lerning Chamilo. At MIA 04 the first observer rated 19, the second observer rated 20, and the third observer rated 19, while the first MIA 05 observer rated 19, the second observer rated 19, and the third observer rated 19, and MIA 06 the first observer rated 18, the second observer rated 20 , and a third observer judged 19. Thus it can be seen that the percentage of the implementation of the Project Based Learning (PjBL) model assisted by Media E Lerning Chamilo, MIA 04 percentage of 290% is classified as very high, MIA05 percentage is 285% classified as very high, and MIA 06 percentage is 285% classified as very high, So from the three classes the criteria are classified as very high.

c. Student response

Student responses were obtained from distributing or distributing questionnaires. Questionnaire is data collection that is done by giving questions or written statements to respondents to answer. (Sugiyono, 2017). Based on the response data that has been answered by students for positive statements, it shows that the average score of statements regarding students' attitudes towards physics lessons using the E Lerning Chamilo Media Assisted Project Based Learning (PjBL) learning model can be seen from table 4.12, the results show class MIA 04 on average 3.5 strongly agree, MIA 05 on average 3.4 strongly agree, and MIA 06 on average 3.5 strongly agree. This shows that students are happy and interested in learning physics by using the Project Based Learning (PjBL) learning model assisted by Media E Lerning Chamilo which is in accordance with learning Physics, especially the material Momentum, Impulse, and Collisions.

4. Conclusion

Based on this research, it can be concluded that:

a. The results of the validity of the E-Lerning Chamilo Media Assisted Project Based Learning (PjBL) learning model show that the syllabus, lesson plans, textbooks, LKPD and pre-test post-test questions compiled are feasible to apply in schools with revisions according to the suggestions and comments given. Validated learning tools show good results with a very valid level of validity.

b. The results of the implementation of E Lerning Chamilo's Media-Assisted Project Based Learning (PjBL) model on Momentum, Impulse, and Collision material in class MIA 04, MIA 05, and MIA 06 are classified as very high categories. This conclusion is based on the results of the analysis and discussion, which obtained the percentage of implementation of MIA 04 290%, MIA 05 285%, and MIA 06 285%.

c. The results of student responses to E Lerning Chamilo's Media-Assisted Project Based Learning (PjBL) learning based on response data that have been answered by students for positive statements indicate that the average score of statements regarding students' attitudes towards physics lessons using the Project Based Learning learning model (PjBL) Assisted Media E Lerning Chamilo can be seen from table 4.12 the results show that the MIA 04 class averaged 3.5 strongly agreed, the MIA 05 averaged 3.4 strongly agreed, and the MIA 06 averaged 3.5

d. This research is expected to be a lesson as well as a guide for students in completing their final lecture assignments with the same topic.

e. Learning problems that exist in schools with media research and development are expected to be alternativE-Learning as well as new knowledge about media that has been developed, especially during a pandemic like this, where face-to-face contact cannot be maximized.

f. For future researchers, the research and development of instructional media still have many shortcomings, so the researchers hope that future researchers will be able to develop research using more samples, validators and observers so that the data obtained is of higher quality.

References

Arikunto, S. (2012). *Prosedur Penelitian Suatu Pendekatan Praktik Edisi Revisi*. Rineka Cipta.

HASTUTI, I. T. (2021). Pembelajaran Pkn Dengan Memanfaatkan Aplikasi Quizizz Di Tengah Pandemi Covid 19. *EDUCATIONAL : Jurnal Inovasi Pendidikan & Pengajaran*, *1*(3), 99–106. https://doi.org/10.51878/educational.v1i3.370

Ricardo, R., & Meilani, R. I. (2017). Impak Minat dan Motivasi Belajar Terhadap Hasil Belajar Siswa. *Jurnal Pendidikan Manajemen Perkantoran*, *2*(2), 79. https://doi.org/10.17509/jpm.v2i2.8108

Sugiyono. (2019a). *Metode Penelitian pendidikan*. CV. ALFABETA.

Sugiyono. (2019b). *Metode Penelitian Pendidikan* (A. Nuryanto (Ed.)). CV. ALFABETA.

Suharyanto, A. (2014). Partisipasi Politik Masyarakat Tionghoa dalam Pemilihan Kepala Daerah. *JPPUMA: Jurnal Ilmu Pemerintahan Dan Sosial Politik Universitas Medan Area*, *2*(2), 151–160.

ZAM, E. M. (2021). Peran Literasi Teknologi Informasi Dan Komunikasi Pada Pembelajaran Jarak Jauh Di Masa Pandemi Covid-19. *EDUTECH : Jurnal Inovasi Pendidikan Berbantuan Teknologi*, *1*(1), 11–20. https://doi.org/10.51878/edutech.v1i1.176