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The Effect of Project-Based Learning through YouTube Presentations on English Learning Outcomes in Physics

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Abstract

This study aims to analyze the effect of project-based learning with YouTube presentations as a final project on the cognitive domain online learning outcomes in English for Physics subjects. This study used a quantitative approach with a quasi-experimental method. The design of the study was post-test with a non-equivalent design. The populations of this study were the fourth-semester students of Physics Tadris, which amounted to 32 people. The samples were taken by using the saturated sampling technique. The instrument used in this study was 20 multiple-choice questions. in analyzing the data, the researcher used the t-test and correlation test (phi (Φ) test) with a significance level of α = 0,05. The results of the t-test show that there is a difference in learning achievement where the experimental class is better than the control class. Then from the results of the correlation test (phi test (Φ)) shows that project-based learning with YouTube achievement as a final project has a significant effect on the cognitive domain.

Kata kunci:
Pembelajaran Virtual;
Pembelajaran Berbasis Proyek;
YouTube;
Prestasi Belajar

Abstrak

Penelitian ini bertujuan menganalisis pengaruh pembelajaran berbasis proyek dengan presentasi YouTube sebagai tugas akhir terhadap hasil belajar online ranah kognitif untuk mata kuliah Bahasa Inggris untuk Fisika. Penelitian ini menggunakan pendekatan kuantitatif dengan metode kuasi eksperimen. Desain penelitian ini adalah post-test dengan non-equivalent design. Populasi dalam penelitian ini adalah mahasiswa Tadris Fisika semester IV yang berjumlah 32 Oarang. Penarikan Sampel menggunakan teknik sampling jenuh. Instrumen yang digunakan dalam penelitian ini adalah 20 soal pilihan ganda. Dalam menganalisis data peneliti menggunakan uji t dan uji korelasi (uji phi (Φ)) dengan taraf signifikansi = 0,05. Hasil uji t menunjukkan bahwa terdapat perbedaan prestasi belajar dimana kelas eksperimen lebih baik dari kelas kontrol. Kemudian dari hasil uji korelasi (uji phi (Φ)) menunjukkan bahwa pembelajaran berbasis proyek dengan prestasi kerja YouTube sebagai tugas akhir berpengaruh signifikan terhadap prestasi belajar pada ranah kognitif.

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INTRODUCTION

The Covid-19 pandemic alters learning patterns significantly different from previous ones (Dong et al., 2020; Jabbar et al., 2021; Saha et al., 2021). Because learning is conducted online, lecturers must provide appropriate learning strategies such as project-based lectures (Guo et al., 2020; Trowsdale et al., 2021); educators must manage the learning process effectively. Because so much information can be collected, the growth of information technology can be used to aid in the instructional process during a pandemic. With a bit of innovation, changing the way we learn can be accomplished in the midst of technological advancements. Lecturers can motivate students by engaging in a variety of knowledge-sharing activities that help to improve the teaching and learning process (Blau et al., 2020; Sulman, 2019). There are a variety of ways lecturers can increase students' motivation to learn during a pandemic, one of which is through the use of technology, such as virtual media such as zoom, google meet, and learning management systems, which can help students better understand learning during the covid-19 pandemic (Sastradika et al., 2021; Sulman, 2019; Sulman et al., 2021). The virtual learning experience must be convenient and engaging for students. For instance, lecturers can assign a presentation project to help students develop their creativity.

Modern educators lead to an academic competence that provides a good learning atmosphere. Selecting a good learning strategy is the role of an educator in increasing enthusiasm and interest in learning (Liaw & Huang, 2013; Ozkazanc & Yuksel, 2015; Sulman et al., 2020). Project-based learning is expected to be a solution that students can enjoy and support the process of interest and creativity in the learning process (Choi et al., 2019; Guo et al., 2020), especially in the pandemic situation that requires students to do distance learning. The project-based learning process can be a medium to maximize the learning process in general and especially amid pandemics. It is a solution to students enjoy the learning process from home (Carte et al., 2011). It will also make the students independent to get additional information and new knowledge (Mascarenhas et al., 2017; Zb et al., 2020). The process of delivering information or learning resources via the internet can be easily enjoyed (Kuzmickaja et al., 2015; Zb et al., 2020).

The fact that is happening now is that students can easily search for the most important and valuable information through YouTube. For instance, YouTube is the most extensive video application globally (Abdillah, 2017; Satta et al., 2021). As one online media for sharing information, Youtube will increase student interest in learning, especially in the learning process. YouTube can support the online project recovery process in transmitting and receiving information. Youtube can also build creativity and is suitable for project-based learning (Guo et al., 2020; Kokotsaki et al., 2014), which are carried out during the pandemic. It can also provide a space for creativity in building the students' character (Sulman et al., 2021) by combining YouTube as the additional final project presentation that can generate interest and motivation of the students. The virtual learning process using project-based learning is expected to expand knowledge without being limited by distance.

The virtual learning process is carried out by giving a final project in the form of a YouTube presentation project that is highly effective, making students more creative (Shute & Rahimi, 2021). The project-based learning process, of course, really needs and requires a lot of understanding and references(Carte et al., 2011; Couló, 2020; Martin et al., 2018; Satta et al., 2021) so that it can be carried out properly and be maximized (Johnston, 2014; Lehavi & Eylon, 2018). The project-based online learning process with a youtube presentation final project makes students more creative and motivated to become better individuals, indirectly maximising their learning outcomes (Karpudewan et al., 2016; Putra et al., 2021; Zb et al., 2020). The virtual learning process above shows that Project-based learning by using YouTube as the media for presentation can improve students' learning achievement and creativity. Moreover, students' motivation and interest in learning will be better (Craig & Allen, 2015; Robinson, 2020; Satta et al., 2021). the researchers only found a few studies related to Project-based learning by using youtube as the media for final project presentations in a virtual class. Moreover, the researchers did not find related studies teaching

English for physics subjects. Considering the importance of project-based learning became the reason for researchers to carry out this research. The research focused on investigating the effect of project-based learning by using YouTube as the final project in learning English for physics subjects in a virtual class.

METHODS

The study was a quantitative approach. The study was quasi-experimental with a post-test-only group design with a non-equivalent group design (Creswell, 2012). The design of the study can be seen in Figure 1.

Figure 1. Research Design is the Posttest Only Design with None-equivalent Group

The treatment process (X) The treatment process (X) was only carried out in the experimental class (O1), namely project-based virtual learning with a final project presentation via youtube. In contrast, the control class (O2) was a virtual class without a final project presentation via youtube. The population of this study was the fourth-semester students of UIN Sulthan Thaha Saifuddin Jambi in the 2020/2021 academic year. The total population was 32 students. The sampling technique used was the saturated sampling technique. There were 18 students assigned as the experimental class, namely class B. Class A was used as the control class with a total number of 14 students. The population of this study where from 32 students consisted of about 24 female students and six male students, most of whom are in Jambi province.

The instruments used to gather the data were analysis of the lesson plan and final assessment test instrument (posttest). The test consisted of 25 multiple-choice items. The instrument was validated with logic validity by three experts, concluding that the instrument was accepted. Besides, an empirical analysis was also carried out to conclude that the logical validity of 25 items was accepted and could be used in English for physics subjects for the cognitive domain. Based on the result of empirical analysis, it was found that from 25 items, only 20 items were categorized as good, and five items were rejected. The item facility and discrimination of the items were categorized as good. The result of reliability was very high, with a coefficient was 0.824. The results of the analysis that the researchers did classically or manually show that the questions can and are well used in research.

Before analyzing the difference and correlation, the researcher carried out a prerequisite test to see the accuracy of the decision whether a test can be used or not (Creswell, 2012). In this research, the researchers used normality and homogeneity tests which were analyzed classically. From the analysis of the prerequisite test, it was found that the data was normal and homogeneous. Therefore, t-test and phi correlation were carried out to see the differences and the significant effects of project-based learning with youtube presentations as a final project in virtual class on students' achievement. To strengthen the research data, the researcher conducted interviews with 18 students in the experimental class and nine people in the control class after all lectures were completed, which were selected based on purposive sampling.

FINDINGS AND DISCUSSION

Research findings were obtained from the final test results (posttest). The questions used were in the form of multiple-choice, with a total number of 20 items. From a cognitive aspect, the student's learning achievement score can be seen in Table 1.

Table 1. The Result of Posttest Score

No	Parameter	Experimental Group	Control Group
		Posttest	***Posttest***
1	Total Number of Students	18	14
2	Lowest Score	72,70	66,73
3	Highest Score	97,83	96,85
4	Average	82,46	79,82

Based on the data in table 1, it can be concluded that the average score in the experimental group is better than the control group, both in terms of the highest and lowest scores. A prerequisite test followed the observation process to answer the research hypothesis whether there was a difference between virtual learning by using youtube presentations as the final project and significantly affected students' learning achievement in the English for physics subject.

The prerequisite test, both normality and homogeneity, were carried out by taking the final test data (Final Examination) of the students after presenting their final project via YouTube in English for Physics subject. The results obtained from the normality test in the experimental group were α = 0,05 or 5%, the results obtained are X^2 Value ≤ X^2table, 12,762 ≤ 28,869 it means that the experimental class data is normally distributed. In contrast, the control class X^2 Value ≤ X^2table, 13,623 ≤ 23,685 shows that the data is also normally distributed. Homogeneity test using a significant level α = 5% then obtained the score of X^2table = 2,10 and X^2value = 1,45. As a result, it can be concluded that X^2 Value ≤ X^2table . It can be concluded that the data variants are homogeneous.

After the prerequisite test, the research process was continued by carrying out the t-test to analyze how the facts of the virtual learning process based on the difference of students' learning achievement obtained from the final test. The qualitative data can be seen as follows Table 2:

Table 2. The test of learning achievement (t-test)

No	The Score of t-test		Comparison of t-test Score $-t_{table} \leq t_{value} \leq +t_{table}$	Conclusion
	t_{value}	t_{table}		
1.	3,28	1,69	-1,69 ≤ 3,28 ≥ +1,69	**H_o Rejected and H_a Accepted**

Based on the analysis results with df was 32, the t_{table} score is obtained at a significant level of α = 5% = 1,69, whereas the score of t_{value} = 3,28. By comparing the value of t_{value} with t_{table} which is done classically so that Ha is accepted and Ho is rejected, H_a is accepted and H_o is rejected. It can be seen that there are differences between the two variables. The conclusion from the analysis results above is that there are differences between online learning and final project presentations by using youtube on students' learning achievement. The research results described above have shown that the project-based virtual learning process using YouTube as a presentation medium has a better effect on learning English achievement in physics virtually than students without a YouTube presentation as a final project. The research process then continued with an analysis of the significant influence of virtual learning by using YouTube to present the final project on students' English achievement in English for physics subjects. Researchers have continued the analysis by testing the phi correlation with the score obtained in Table 3.

Table 3. Correlation Test (Phi test (Φ))

No	Score of Φ tes		Comparison of $r_{table} \leq r_{value}$	Conclusion
	r_{value}	r_{table}		
1.	0,566	0,287	0,287 ≤ 0,566	**H_o rejected dan H_a accepted**

Based on the analysis of phi correlation score where r_{value} = 0,566 is higher than r_{table}, which is obtained at a significance level of α = 0,05 or 5%, which is 0,287. Then $r_{table} \leq r_{value}$ or 0,287 ≤ 0,566. The result above shows that project-based virtual learning by using YouTube to present final projects has a significant impact on students' learning achievement. The data analysis process that has been carried out above shows information or facts where the value is proven that project-based lectures, namely YouTube, can significantly impact learning outcomes, especially in the cognitive domain of students.

This study aimed to determine the difference in students' learning achievement using project-based virtual learning in English for physics subjects. Moreover, this research object to seeing the significance of project-based virtual learning by presenting the final project via students' youtube channels student's learning achievement in virtual learning during a pandemic. The implementation of virtual learning presents an explorative learning process (Audunson & Shuva, 2016; Sremcev et al., 2018), in other words, learning must be able to provide information and knowledge to students in a more dynamic way so that students can be more motivated in the learning process (Sastradika et al., 2021; Sulman, 2019). Educators are required to master and always innovate, especially the creativity of the digital world, including YouTube, to increase students' interest and motivation in learning to get maximum results.

Maximum learning achievement is not easy because not all students have a goal to gain knowledge and sometimes do not emerge from themselves in the learning process (Putra et al., 2021; Sulman et al., 2021). Some students think that learning is only an obligation for a bachelor's degree, not to gain knowledge. This mindset must be changed because students must have a paradigm that learning is a way to gain knowledge (Zb et al., 2020). A good virtual learning paradigm requires encouragement both from inside and outside of the students in the form of students' interest and creativity in learning (Mishra et al., 2020; Ozkazanc & Yuksel, 2015). Learning creativity can motivate and interest the students to achieve maximum learning achievement. Creativity will be the driver for the students in learning something new that is considered interesting and important to be applied in the modern learning process that is being carried out nowadays. Learning creativity can be a trigger process to achieve a better quality of learning because creativity can increase students' interest in the learning process. Students who have high creativity are willing to explore deeper information to strengthen their understanding of instructional material. Therefore, presenting the final project using YouTube is needed to trigger student learning creativity to be more interested and focused on English for physics.

The final assignment in the form of a presentation via youtube on the English for Physics subject in virtual learning is believed to be a solution to the student's boredom in the learning process that often occurs in students during the covid-19 pandemic. It will be a beneficial solution to increase students' interest and learning achievement (Thees et al., 2020; Vosniadou et al., 2020). The final project in the form of a presentation by using YouTube can trigger students to be motivated to understand more deeply the physics' technical terms of equations and symbols in English and vice versa. In addition, students will also become more creative with final project presentations, and the boredom which usually appears in virtual learning can be ignored. The creative process in the form of presentations by using YouTube will make students more motivated to become better and qualified (Hernández-Torrano & Ibrayeva, 2020; Zb et al., 2020).

The impact of lectures by presenting the final project through the YouTube channel on students' virtual learning achievement in the cognitive domain

Based on the results of the data analysis that has been done, the researcher has found one important fact. The findings show that the students' achievement in the experimental and control groups is higher. This difference is the result of a given treatment. If it is explored deeply, the treatment carried out by researchers only lies in the final project. The experimental class used

YouTube to present their final project, and the others did not. Students in the experimental group who present their final project using YouTube tend to be better in learning, more exciting learning process, and increase their creativity in developing information through digital media. It is due to a lot of information they prefer available on the internet. One of them is YouTube (Abdillah, 2017; Satta et al., 2021). Therefore, it raises students' interest to become a better person in understanding and providing the material being studied. The project-based learning process by using YouTube to present the final project requires them to deliver really good material because they realize that the material presented will be easily viewed by many people. Giving the final project via YouTube will be a solution to avoid boredom in the learning process (Sulman, 2019).

The project-based virtual learning process using YouTube to present has a very good effect on students. According to the research, they will be more interested in understanding English for physics material and increase their curiosity about the material presented in each meeting. The difference can be seen when the learning process is carried out without YouTube for presentation. Many students get bored in accessing the instructional materials because the materials of English for physics are very easy to find. The materials can easily be translated searched for the answers via the internet. It causes the students are lack enthusiasm in learning. Lack of enthusiasm will make the students reluctant to express their opinion. They see the learning process as only an obligation that must be completed (Putra et al., 2021; Sulman et al., 2021). Whereas in the classes where the final project is presented by using YouTube, most students are very active in expressing their understanding of the material being studied. They are brave to explore further information about the material being studied. The students are creative in expressing an understanding and information so that the learning process runs well and the level of students' satisfaction is very good (Guo et al., 2020; Ozkazanc & Yuksel, 2015).

The difference in learning achievement in the control class is believed to be due to the only dependence on virtual learning. Nowadays, information can easily be accessed on the internet by students. Therefore, interesting materials of English for physics subjects can be accessed on YouTube. Under certain conditions, students' learning creativity is not encouraged to move during the learning process, resulting in lacking motivation and interest in the importance of English for physics material. It will cause the students to become bored to understand the material more deeply (Sulman et al., 2020; Zb et al., 2020). The students feel uncomfortable in learning so that the advantages of online learning where the students can access many pieces of information are lost. It will impact the learning process is carried out in the midst of a pandemic (Blau et al., 2020; Saha et al., 2021). Therefore, the presentation of the final project via youtube is one of the perfect supplementary in English for physics subjects. It is a medium to facilitate the students to achieve learning objectives. Furthermore, the student's achievement can be optimally maintained in virtual learning amid a pandemic like today.

The findings obtained are in line with research that states that the project-based learning process can provide dynamic conditions in the learning can increase students' creativity and learning achievement. The research process, which mostly describes the role of project-based learning from a positive point of view (Barron et al., 1998; Guo et al., 2020), will be a strong reason to find the most appropriate project, namely a final project, by using youtube as a media for presentation. YouTube can increase student's creativity in learning and is very good for supplementary media in virtual class amid a pandemic and the new normal, especially in English for physics subjects. The process of project-based virtual learning using youtube as a medium for presentations is believed to be the most familiar solution in distance learning in the future. Presenting the final project via youtube intends to give students a role to explore additional information from various sources independently during online learning. The lecture process with projects can be a solution to produce students who are creative and have a good understanding of concepts (Craft, 2003; Hadar & Tirosh, 2019) because

they are aware of sharing through a project that is carried out with the final task of sharing information via YouTube, which will be viewed and shared. Commented by many people made students be more careful in seeking information or supporting knowledge (Abdillah, 2017; Fralinger & Owens, 2009; Satta et al., 2021). The lecture process carried out based on a final project with YouTube can increase motivation and interest in the learning process, and if students' motivation increases, it will indirectly improve student learning outcomes, especially in the cognitive domain (Sulman et al., 2020, 2021; Zb et al., 2020).

The Significance of PjBL in the Form of a Final Project Presentation via Youtube on Students' Learning Achievement

The data analysis provides several important findings. The project-based lecture process using youtube as a medium for presenting the final project has a significant influence on the cognitive domain of students. It can be the right and effective choice in the online lecture process in increasing and encouraging creativity and motivation. Student learning, especially in the cognitive domain (Gilroy, 2010; Satta et al., 2021; Sulman, 2019). This lecture process is suitable for distance lectures during the covid-19 pandemic. Most people stay at home and use the internet. For instance, YouTube releases boredom so that the learning process can run optimally, and the results are very satisfying (Lehavi & Eylon, 2018; Zb et al., 2020).

The research process was continued by conducting interviews with 18 students based on the final test scores after the learning process. The students were divided into two groups. Nine students are in the experimental group, and the rest are in the control group. The researcher then divided nine students proportionally. The interview was conducted after all the lectures and learning outcomes tests had been carried out, which were selected based on purposive sampling so that the same number of students could be taken, namely students who had low, medium and high abilities based on the results of the cognitive domain student learning tests that had been analyzed. The interview process focused on identifying the creativity that could encourage the student's motivation and interest in the learning process. The results of interviews from the experimental group show that project-based learning by using YouTube as a medium to present the final project encourages students to become creative, understand much information so that they are aware of themselves and their quality, and always try to improve learning material. The enthusiasm and creativity lead to a dynamic and effective learning process. In other words, the learning process is not monotone (Fralinger & Owens, 2009; Guo et al., 2020; Satta et al., 2021; Shute & Rahimi, 2021). Whereas in the control group, students perceived that online learning gives them freedom in searching information, but some of the material in some meetings is monotonous. It is just like a normal learning process. The difference is only in the process carried out via distance learning. The students cannot explore their creativity. They are not motivated, and the learning process is considered only an obligation that must be passed not because of the importance of learning the materials (Sulman et al., 2021; Zb et al., 2020)

This study is also in line with the results of research, which states that project-based learning in the teaching and learning process can improve learning outcomes in the cognitive domain and can also increase students' creativity and interest in learning (Abdillah, 2017; Gilroy, 2010; Guo et al., 2020; Sulman, 2019) Analysts from several previous research findings and coupled with data found in the field, make researchers believe that project-based learning through YouTube presentations can be an integrated solution in the learning process, especially online lectures. Based on the explanation above, it can be interpreted that project-based learning by using YouTube as a medium to present the final project can encourage the quality of the students and get better achievement in the learning process.

Researchers realize that the research process carried out still has weaknesses. For instance,

the researchers found that some students have problems designing a good presentation on youtube. Moreover, some of the students are not able to present physics teaching materials in English well, which can be enjoyed by many people. These problems happened because the students never experienced using youtube as a medium for presentation. In addition, another weakness of the research is that the internet connection of the students is not stable because they live in different areas. Therefore, they have a problem searching the information from the lecturer and the internet. The research process carried out a deeper analysis of the meaning of physics using. The researchers only used basic physics concepts, such as the meaning of symbols and understanding questions and materials in English. The researcher hopes that there will be similar research that can improve this research. Such as analyzing several international articles in the study of physics so that students are expected to become better students in facing future careers and have a more broad or global understanding.

CONCLUSION

Project-based learning using YouTube presentations as a final project has been found to improve student learning accomplishment in cognitive domains where the experimental class outperforms the control class, according to research findings. With a YouTube presentation as the culminating activity, pupils' cognitive performance improves significantly. Based on their findings, the researchers would like to make recommendations to other scientists who might be interested in pursuing a similar line of research. It was proposed that the researchers teach the students to develop a successful physics project utilizing youtube. This work is supposed to serve as a guide for the next researcher who wants to do a comparative study. Students should be aware that YouTube project-based learning may be used to learn about a wide range of topics in the sciences to be more informed and discriminating in their research. Using youtube presentations in English for physics subjects, another researcher could also apply project-based learning and apply other physics subjects and other educational subject.

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