

Analysis of project-based learning videos on biology subjects

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Article Information	Abstract
Keyword: Project-based learning; Video; Biology; Learning media; Innovation Kata Kunci: Pembelajaran berbasis proyek; Video; Biology; Media pembelajaran; Inovasi History: Received : 14/02/2022 Accepted : 18/06/2022	This study aims to analyze project-based learning videos on biology subjects on YouTube. This type of research is descriptive research with qualitative approach. The object of the research was a real teaching video about project-based learning in biology subjects on YouTube. The instrument in this research is an observation sheet that contains aspects of the activities carried out in project-based learning which have been validated by three learning experts. The data analysis technique used is descriptive analysis, by observing learning videos and evaluating through instrument, then the data is processed and classified into categories. The results of observations of four video real teaching project-based learning in biology subjects on YouTube are in the good and sufficient categories. Each video category is video 1 received a score of 85 which was classified as good category, the videos 2 and 3 scored 71 in the good category, and the video 4 scored 61 in the sufficient category. Abstrak Penelitian ini bertujuan untuk menganalisis video pembelajaran berbasis proyek pada mata pelajaran biologi di YouTube. Jenis penelitian ini adalah penelitian deskriptif dengan pendekatan kualitatif. Objek penelitian berupa video real teaching mengenai pembelajaran berbasis proyek pada mata pelajaran Biologi di YouTube. Instrumen dalam penelitian ini berupa lembar pengamatan yang berisi aspek-aspek kegiatan yang dilakukan dalam pembelajaran berbasis proyek yang telah divalidasi oleh tiga pakar pembelajaran. Teknik analisis data yang digunakan adalah analisis deskriptif, dengan mengamati video pembelajaran dan dilakukan penilaian melalui instrumen, kemudian data diolah dan diklasifikasikan dalam kategori. Hasil pengamatan terhadap empat video <i>real teaching</i> pembelajaran berbasis proyek pada mata pelajaran biologi di YouTube berada pada kategori baik dan cukup. Masing-masing kategori video yaitu video 1 memperoleh nilai sebesar 85 tergolong kategori baik, video 2 dan 3 memperoleh nilai sebesar 71 tergolong kategori baik, dan video 4 memperoleh nilai sebesar 61 tergolong kategori cukup.

A. Introduction

The 2013 curriculum requires schools to change their learning approach that is more student centered (student centered learning) and emphasizes a scientific approach (scientific approach). The 2013 curriculum is a curriculum that prioritizes understanding, skills and character education, students are led to understand more in terms of material, be active in discussion and achievement and have high disciplinary manners.

One of the main aspects in the 2013 curriculum is the application of the learning model used. The learning model can be interpreted as a graphical display, regular or systematic work steps, and contains concepts that are descriptive or explanatory (Marliani, 2015). The learning model is a form of learning that is illustrated from the beginning to the end of teaching and learning activities that are presented specifically by educators. In this case, the learning model is the main framework for implementing an approach, method, and learning technique. A teacher is expected to be able to apply an innovative learning model, so that in teaching and learning activities, interactions are formed between teachers, students and the surrounding environment (Banawi, 2019). The recommended learning models in the 2013 curriculum include problem-based learning models, project-based learning models, discovery learning models, and inquiry learning models (Sumiyarsih, 2016).

Based on Wahyu (2016), the project-based learning model or PjBL is a learning model that uses problems as a first step in collecting and integrating new knowledge based on experience in real activities, which can build knowledge and skills through direct experience. The project implemented can produce a product. The resulting product can be in the form of goods or services in the form of designs, schemes, written works, works of art, technological works and others (Aini, 2020).

Based on Nurannisa (2016), the steps for implementing the PjBL process as developed by The George Lucas Educational Foundation (2005) are six steps.

- 1) Start with the essential question: Learning begins with essential questions, namely questions that can assign students to carry out an activity. Taking topics that are in line with real-world realities and starting with an in-depth investigation. The teacher tries to make the topics raised relevant to the students.
- 2) Design a plan for the project: Planning is done collaboratively between teachers and students. Thus, students are expected to feel "own" for the project. Planning contains the rules of the game,

the selection of activities that can support answering essential questions, by integrating various possible subjects, and knowing the tools and materials that can be accessed to help complete the project.

- 3) Create a schedule: Teachers and students collaboratively arrange activity schedules in completing projects. Activities at this stage include: (1) making a timeline for completing the project, (2) making project completion deadlines, (3) bringing students to plan new ways, (4) guiding students when they make ways that are not related to the project. project, and (5) asking students to make an explanation (reason) about choosing a method.
- 4) Monitor the students and the progress of the project: The teacher is responsible for monitoring the activities of students while completing the project. Monitoring is done by facilitating students in each process. In other words, the teacher acts as a mentor for student activities. In order to simplify the monitoring process, a rubric is created that can record all important activities.
- 5) Assess the outcome: Assessment is carried out to assist teachers in measuring the achievement of standards, play a role in evaluating the progress of each student, provide feedback on the level of understanding that has been achieved by students, assist teachers in preparing the next learning strategy.
- 6) Evaluate the experience: At the end of the learning process, teachers and students reflect on the activities and project results that have been carried out. The reflection process is carried out individually or in groups. At this stage students are asked to express their feelings and experiences while completing the project.

Biology is the science of life that includes aspects of animal, plant, human life, and the relationship between living things (Umam, 2018). Biology has many concepts that need to be mastered by students. Biology subject not only emphasizes aspects of remembering knowledge and understanding, but also emphasizes aspects of application, analysis, evaluation, perception, and creativity. It is hoped that with this, students can hone their thinking and problem solving skills and apply concepts in everyday life. This can be realized by applying the PjBL model.

The development of Information and Communication Technology at this time allows the acquisition of information from various sources, one of which is YouTube. On YouTube, there are

many video uploads that also contain educational content, one of which is regarding the application of the PjBL model in Biology lessons. This can be used as a learning resource for anyone who wants to know about the implementation of the PjBL model (Setiadi, 2019). The application of the PjBL model must be carried out properly, so that the information obtained is correct in accordance with the nature of the PjBL model which uses a scientific approach in learning and is more student-centered (Maryati, 2018). This can be done by analyzing project-based learning videos on YouTube. The existence of this study can be used as an evaluation material for the achievement of the implementation of the PjBL model by teachers and with the results of the study, information will be obtained that can be used as a reference or reference by anyone regarding project-based learning on Biology material uploaded on YouTube. Based on the description above, a study entitled "Analysis of Project-Based Learning Videos on Biology Subjects".

B. Material and Method

This type of research is descriptive research with a qualitative approach. The object of the research is a video of real teaching on the implementation of PjBL in Biology, a total of four videos obtained from YouTube, with a total duration of the four videos, which is 63 minutes 29 seconds. The search for data accessed at the end of 2020 found more than 50 videos implementing PjBL. After sorting the videos, four videos were obtained which were selected based on criteria in the form of the application of the PjBL model, real teaching learning activities that brought teachers and students in the classroom, and the subjects taught were Science-Biology material in junior high school and biology material in high school.

The instrument used in this study was an observation sheet on the activities carried out by the teacher and student responses to the stimulus given by the teacher at the PjBL learning stage. The observation sheet contains eleven aspects that are observed and there are several indicators in each aspect. Data collection is done by giving a score for each aspect of the observed activity according to the available criteria in the form of giving a score of one if it does not meet the assessment indicators, a score of two if it only meets one assessment indicator, a score of three if it meets two or three assessment indicators, and a score of four if it meets all indicators so that a minimum score of eleven and a maximum of 44 is obtained. The instruments made were checked by three learning experts.

The researcher and three colleagues observed and analyzed the PjBL learning videos on Biology material. Furthermore, the results of the analysis were validated by three learning experts. Then do the data processing and present it descriptively. Data analysis in this study used descriptive analysis techniques. For the validity of the data in this study, the technique of persistence of observation and confirmability testing was used, also known as objectivity testing. The data obtained in this study were processed using the Formula 1 and classified into the following four categories of Table 1.

$$\text{Value} = \frac{\text{acquisition score}}{\text{maximum score}} \times 100 \dots \dots \text{Formula 1}$$

Table 1 Guideline for descriptive analysis

Value range	Category
86 - 100	Very Good
71 - 85	Good
56 - 70	Sufficient
≤ 55	Less

(Source: Anonym, 2019)

C. Results and Discussion

Based on the results of observations of the video implementation of the PjBL learning model using the observation sheet made, the data obtained can be seen in Table 2 and Table 3.

Based on the data from the observations above, the accumulation of the assessment rubric indicators for each aspect observed is obtained; video 1 gets an average score of 85, videos 2 and 3 get an average score of 71, and video 4 gets an average score of 61. Furthermore, based on the recapitulation of observational data, the categories of each video are obtained in Table 3.

Based on the data above, it can be seen in Table 2 and Table 3 showing that the implementation of the PjBL model on Biology subjects on YouTube is in the good and sufficient category. Each video category, namely video 1 scored 85 in the good category, video 2 and 3 received a score of 71 in the good category, and video 4 received a score of 61 in the sufficient category.

Based on the results of observations showed that the application of project-based learning models in Biology subjects on YouTube had good and sufficient categories. Videos 1, 2, and 3 received good categories. Meanwhile, the video 4 received a sufficient category. Obtaining this category is based on whether or not the indicators of each observed aspect are met.

Table 2 Observation data tabulation of the PjBL model implementation in biology subjects on YouTube

Observed aspects	Video 1			Video 2			Video 3			Video 4		
	Validator			Validator			Validator			Validator		
	1	2	3	1	2	3	1	2	3	1	2	3
Do apperception and motivation	4	4	4	3	3	3	3	3	4	1	1	4
Determination of basic questions	3	4	3	3	4	3	4	3	3	3	2	3
Design the project plan	4	4	3	3	3	3	3	3	3	3	2	3
Organize the schedule	4	4	3	2	2	3	1	2	3	1	2	3
Monitor students and project progress	4	4	3	4	4	3	4	4	3	3	3	3
Test results	3	3	3	1	1	3	3	2	3	2	2	3
Evaluating project results	1	4	3	1	2	3	1	1	3	2	2	3
Implement a scientific approach	4	4	3	4	3	3	3	3	3	3	2	3
Using learning aids/media	4	4	3	4	4	3	3	3	3	1	1	3
Using the correct and appropriate language in learning	4	4	3	4	4	3	4	4	3	4	4	3
Ending learning effectively	3	2	3	1	1	3	2	2	3	1	2	3
Score	38	41	34	30	31	33	31	30	34	24	23	34
Value	86	93	77	68	70	75	70	68	77	54	52	77
Average		85			71			71			61	

Table 3 Categories of observation data tabulation

Videos	Value	Category
1	85	Good
2	71	Good
3	71	Good
4	61	Sufficient

Video 1 gets a good category because many indicators are met. Starting from the preliminary activities, all indicators have been met. Then, in the steps of the PjBL model, the first is to determine the basic questions. In the video only three indicators are shown. Indicator four is not visible, namely students connect and convey the relevance of natural phenomena with the topics discussed, and this activity is an activity to associate questions. Yanti et al. (2018) explains that students do reasoning related to the questions given, the reasoning is of course based on how much insight and knowledge students have, as well as how smart students are by analogizing their insights into a conclusion to the questions given. Based on this, it indicates that students do not have insight into the questions given. In this video, the project being carried out is in the form of making a *tape*. The step of design a project plan has fulfilled all the indicators. The step of compiling a schedule has fulfilled all the indicators. The step of monitoring students and project progress has met all indicators. The step of testing the results has fulfilled all the indicators. The video only shows one group presenting, this is probably because part of the video has been cut. The sixth step, namely evaluating the project results, has met all indicators. In the closing activity, it only displays two indicators, namely reflecting or making summaries by involving students and providing psychological or social encouragement to students. In the video the educator does not carry out follow-

up. Based on Julaiha (2014), for closing activities, the activities carried out are in the form of educators with students making lesson summaries, educators reflecting on activities that have been carried out, then planning follow-up in the form of giving assignments, remedial or submitting the next lesson plan. This needs to be done to optimize student learning outcomes and students can study the material before it is discussed at school.

Video 2 received a good category because quite a lot of indicators were met. Preliminary activities were carried out and only met three indicators. Educators do not link the current learning material with the previous material. This is important to do to achieve learning success, as stated by Satria and Kusumah (2019), educators give apperception by linking the previous material, this activity is carried out to ensure student learning readiness, make the material that has been learned is stored and remembered and stimulates students' attention to focus on material to be studied. Furthermore, the steps of the PjBL model, determining the basic questions only meet three indicators. Indicator four is not visible. The project made in the form of making *tempeh*. The second step is to design a project plan, which only fulfills three indicators. There are no activities to explain the tasks and roles of group members. This needs to be implemented as stated by Oktari (2021) students must know the tasks in their groups and educators must help students to understand their duties. The third step is compiling a schedule, only showing the activities of agreeing on the project implementation time. Indicators two and three are not shown. Students should be directed to prepare a project completion schedule and educators monitor the making of the schedule so that activities do not deviate from the project objectives. As stated by Wajdi (2017), a work group needs a

good work schedule so that projects can be carried out according to plan, and students are not rushed for a short time, and can bring out their creativity. The fourth step, namely monitoring students and project progress, has met all indicators. The fifth step is to test the results, not meeting all indicators. This is probably because part of the video has been cropped. Based on Utami et al. (2015) in this fifth step, each group presents the final results of their project by presenting it in front of the class. This activity should be shown in a video so that the results of the projects being carried out can be known. The sixth step is evaluating project results, only meeting one indicator. It is not shown that educator activities measure understanding by looking at activities, attitudes, project results and understanding, this needs to be done to measure the success of learning carried out by educators in the classroom as well as measuring the success of students in mastering the competencies or materials specified (Nurhayati, 2018). The activities of educators to strengthen the concept of group results are also not visible. Irawati (2020) stated, strengthening aims to increase students' attention to the learning process, stimulate, and increase motivation and learning activities. In closing activities, all indicators did not meet. This is because part of the video has been cropped.

Video 3 obtained a good category because many indicators were complete. However, preliminary activities only meet three indicators. Furthermore, in the PjBL model steps, the first is determining the basic questions, which have fulfilled all the indicators. The project is in the form of vegetative propagation of plants. The second step is to design a project plan, which only fulfils three indicators. Indicator two is not visible. The third step is compiling a schedule, only fulfilling one indicator, and the educator agrees to the project implementation schedule. The fourth step, namely monitoring students and project progress, has met all indicators. The fifth step is to test the results, only meeting one indicator. The sixth step is evaluating project results, which does not complete all indicators. Based on Suranti et al. (2016), at the end of the learning process, teachers and students reflect on the activities and results of projects that have been carried out. Students are asked to express their feelings and experiences while completing the project. In the closing activity, only one indicator was met; the teacher only reflected. Follow-up needs to be done to optimize student learning outcomes. At the same time, psychological encouragement is done so that students are enthusiastic and motivated toward the positive things that have been given.

Video 4 received a sufficient category because only a few indicators were met. In the preliminary activities, all indicators did not meet. This is because the introductory activity is not shown in the video. Furthermore, in the steps of the PjBL model, the first to determine the basic questions only fulfills one indicator. Educators only provide topics in the form of projects for making water purification equipment. The second step is to design a project plan, which only fulfills one indicator. The students were divided into groups, but the video did not show the activity of designing the project plan because the previous meeting was not recorded. The third step is compiling a schedule, not meeting all indicators. The implementation of the project was carried out on the same day. The fourth step is to monitor students and project progress, only meeting two indicators. The fifth step is to test the results, only showing the presentation of the project results. The sixth step is to evaluate the project results, only to strengthen the concept. In closing activities only do reflection. One of the reasons for the lack of indicators met in this video is the previous meeting was not shown in the video, so some aspects were missed. In addition, the video may have also been cut in part. This can be seen from the short duration of the video.

The next aspect observed was carrying out a scientific approach in video 1. It met all indicators, videos 2 & 3 only met four indicators, and video 4 only met one indicator. Marjan et al. (2014) suggested that Biology as a product and process is very suitable for teaching using a scientific approach to learning. The scientific approach has a close relationship with learning Biology science because this approach emphasizes the activeness of students to build concepts in their knowledge independently and familiarize students in formulating, dealing with, and resolving any problems found. Therefore, it is necessary to present activities that encourage students to observe, ask questions, collect information, associate/process information, and communicate.

The aspect of using learning aids/media in videos 1 & 2 fulfills all indicators, video 3 only fulfills three indicators, and video 4 does not meet all indicators. Learning media is one of the methods or tools used in the learning process. Based on Mubin et al. (2018), the application of learning resources/media in learning consists of five aspects, namely demonstrating skills in the use of learning media, producing interesting messages, involving students in the use of learning resources and involving students in the use of learning media. With the fulfillment of these aspects, can optimize

and facilitate learning. The last aspect is the use of correct and appropriate language in learning, the video 4 have met all indicators, this shows that the use of language is good. The use of spoken and written language that is correct and appropriate will help the learning process, students can understand what is conveyed by the teacher.

D. Conclusion

Based on the results of the study, the application of the project-based learning model on Biology subjects on YouTube showed good and sufficient categories. Videos one, two, and three show the good category, while video four shows the adequate category based on the rubric assessment of the PjBL learning step indicators (syntax).

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