Project Based Learning in Pandemic Covid-19: The Implementation of ESD to Develop Students' Critical Thinking Skills

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Article Info

Abstract

Distance learning is an alternative for implementing learning during the covid-19 pandemic. However, this system cannot be separated from problems, including the number of student complaints because of the tasks that must be done from each subject. This problem motivated us to carry out a qualitative research into the implementation of project-based learning that we have designed, using one integrated student worksheet for all subjects. This study aims to find a learning design that can minimize the burden and be able to contribute in developing students' critical thinking by implementing education for sustainable development (ESD). The analysis was carried out using Transcript Based Lesson Analysis (TBLA). Based on the results of the analysis, it is proven that this learning is able to stimulate the active role of students in the learning process; building critical thinking skills of students in providing simple explanations by 17.39%, basic skills in observing and considering observations by 43.48%, stating hypotheses by 16.67% and deciding the action to be taken by 22.46%. From the results of the analysis of student conversation transcripts and questionnaires distributed to students, parents, and teachers, it can be concluded that this learning is able to reduce the accumulation of assignments, build students' conceptual understanding, touch social, economic, and environmental aspects, build critical thinking skills and good character for students.

How to Cite

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INTRODUCTION

The Covid-19 pandemic has forced changes in the implementation of learning, from face-to-face learning to distance learning. The use of internet access as a means that allows the implementation of distance learning processes flexibly and interactively (Moore et al., 2010) also raises many complaints. The availability of mobile devices such as android, laptop/netbook, iphone and other devices needed to access the internet anytime and anywhere (Gikas & Grant, 2013) is an obstacle for some students. In addition, the cost of filling the quota is also a challenge to carry out distance learning using internet access (Sadikin & Hamidah, 2020).

These various kinds of complaints gave birth to policies in determining lesson hours. During the distance learning period, learning hours are reduced. However, this raises a new problem, where the limited learning time causes the teacher to choose the assignment method so that the assignments for each subject are piling up, and become a burden for students.

The fact that occurs proves that the use of internet access in the implementation of distance learning experiences many obstacles, so it is not able to teach students optimally. Likewise, the reduction in lesson hours has an impact on the accumulation of tasks that become a burden for students. Therefore, a learning process is needed that is able to teach students optimally without having to be tied to the number of hours of lessons, and without burdening students with the accumulation of assignments from each subject. To deal with this problem, project-based learning is very suitable to be applied. Where in practice, the making of projects can be carried out outside of learning hours, so that although formal lesson hours are reduced, the student learning process continues outside of class hours. Student learning time that is 100% done from home is a great opportunity for project-based learning.

In addition, the prediction of limited curriculum achievements in learning during the pandemic raises demands for teachers to be able to increase other potentials of students that can be explored and developed. Especially the potential that is able to help the sustainability of students' lives with existing abilities. The many obstacles related to the availability of mobile devices and filling quotas are an illustration of the weak economic condition of students' families. Therefore, in this pandemic period, a learning process is needed that is not only able to reduce the burden on students but is also able to contribute in developing critical thinking skills and developing sustainable thinking by empowering self-potential and the environment. The application of ESD (Education for Sustainable Development) is very suitable as an effort to achieve this goal. The application of ESD is also expected to make learning meaningful, as stated by Ausubel (1963) that learning will be meaningful in the context of the time studied based on student learning that is relevant, useful and related to their lives.

To reduce the accumulation of tasks from each subject, efforts can be made by implementing integrated project-based learning for all subjects. This may be done with the cooperation of all teachers to analyze the related basic competitions, so as to determine a theme to study. As explained by Indrati & Hariadi (2016), it is necessary to analyze core competencies and basic competencies to determine materials that are able to integrate with ESD. Thus the teacher can create a student worksheet that contains assignments from all subjects in an integrated manner.

Many studies have been carried out related to the application of project-based learning which are stated to be able to develop students' critical thinking skills and are recommended to be carried out and developed in other learning (Aziz, 2014; Azizah & Widjajanti, 2019; Fitriani et al., 2019; Hikmah et al., 2016; Insyasiska et al., 2015; Jamaludin, 2017; Luthvitasari et al., 2012; Pratama & Prastyaningrum, 2016; Rachmawati et al., 2018; Widyantari et al., 2015). Besides being able to improve critical thinking skills, several studies have stated that project-based learning is also able to develop cognitive abilities (Azizah & Widjajanti, 2019; Insyasiska et al., 2015; Luthvitasari et al., 2012), creative thinking (Insyasiska et al., 2015; Luthvitasari et al., 2012), self-confidence (Azizah & Widjajanti, 2019), and motivation (Insyasiska et al., 2015).

Likewise, research on the application of ESD in learning has been carried out. Several studies have stated that the integration of ESD in learning is able to develop students' attitudes and character (Amran et al., 2018, 2019; Latifah, 2018; Muthmainnah et al., 2016), as well as creativity in thinking (Nurfadilah & Siswanto, 2020).

However, there has been no research on project-based learning as an integrated ESD implementation for all subjects as we do. This project is an implementation of ESD, to achieve sustainable development number 2, namely ending hunger, achieving food security and improving nutrition, and promoting agricultural sustainability. Target 2.2, on the loss of forms of malnutrition. And target 2.3 is to double ag-

ricultural productivity and income of small-scale food producers, value added opportunities and non-agricultural employment (Ministry of National Development Planning/Bappenas, n.d.). Through the implementation of a simple project, namely utilizing the land inside the house for vegetable and fish cultivation. It is hoped that the learning that has been designed can be a solution to the obstacles faced in learning during the pandemic, as has been stated previously. In addition, this learning is also expected to be able to build critical thinking skills, and students' concern for sustainable development. Where based on previous research related to the application of ESD in learning, aspects of students' caring attitudes towards sustainable development (Agusti et al., 2019; Latifah, 2018), and critical thinking skills (Agusti et al., 2019; Kusuma, 2019) still need to be improved. And can help the economy of students and their families.

METHOD

This research did in SMPN 1 Jatinangor in the early semester 1 of 2020-2021. The learning system is distance learning, because it is still in a state of the Covid-19 pandemic. The research subjects consisted of 32 7th grade students who were randomly selected from a sampling of 160 students who took part in the lesson.

This is a qualitative research. Analysis of students' critical thinking skills during the learning process was carried out using a transcript based lesson analysis (TBLA). Where all student conversations during learning will be transcribed and coded based on indicators of critical thinking skills (Ennis, 1985). The responses regarding the implementation of learning were captured through questionnaires distributed to students, parents, and teachers.

The stages in this research include planning, implementing, and processing research data. With details of activities as follows:

Planning

July 7, 2020. All subject teachers meet to determine the team project that will be carried out by considering the basic competencies of each possible subject to be integrated with the Sustainable Development Goals (SDGs), the level of difficulty and the possible costs that must be incurred by students. The result of the meeting decided that the project implemented was SDGs number 2, namely ending hunger, achieving food security and improving nutrition, and promoting sustainable agriculture. Target 2.2, in terms

of losing forms of malnutrition. And target 2.3, double agricultural productivity and income of small-scale food producers, value added opportunities and non-agricultural jobs (Ministry of National Development Planning/Bappenas, n.d.). Through the implementation of a simple project, namely utilizing the land inside the house for vegetable and fish cultivation.

Vegetable cultivation is determined by the school, namely kale, with consideration that cultivation is easy and can be harvested in a relatively short time (± 25 days). The seeds are supplied by the school, given to all students. As for the fish, it depends on the student's selection as well as the seeds.

July 8th to July 18th. Preparation of student worksheets according to the specified basic competencies. then 13-15 July 2020. Meeting with parents of students to explain the learning system that will be carried out. And distribution of vegetable seeds from the school.

And on 20 July – 14 August 2020. Online learning uses WhatsApp as the main media. In this lesson, students learn the concepts needed to carry out the project, based on the determined basic competencies.

Implementation

On August 1st distributed student worksheets for project implementation through the whats app application. For students who do not have the means to access the internet, student worksheets can be taken directly to the school. And on August 10, students began to soak the kale seeds (3-4 days). Then do the planting (starting project-based learning).

On August 15 – September 12, the teacher guided the students (via WhatsApp) to carry out the project. There are several investigative questions asked by teachers while guiding project-based learning, namely: • Are you having difficulty working on the project? • What do you think is the cause of the difficulties you are experiencing? • What have you done to overcome these difficulties? • How was the yield of kale and fish farming, after you tried to overcome these difficulties?

On September 14, 2020, a video conference was held to discuss directly the obstacles faced by students in working on the worksheets. And the worksheets are submitted at the end of September 2020. Because the worksheet contains assignments from all subjects, for integrated questions from several subjects are examined together (collaboration between subject teachers). For specific questions, such as the relevance of the concept to religious education subjects. then the section is

specifically examined by the teacher concerned.

Research data processing

Data processing was carried out from September 2020 to January 2021. Student conversations, both via chat and video conference, were transcribed, then analyzed using (Transcript Based Lesson Analysis). TBLA is one way to find out the character of learning (Arani, 2017). In practice, each student conversation was transcribed and coded according to the research objectives. In this case, students' critical thinking skills during the learning process are coded based on critical thinking indicators according to Ennis (1985). After coding the transcripts of students' conversations, the percentage of critical thinking indicators that appear during learning is calculated in the following way:

% Indicator of critical thinking = (Sum of conversation in the indicator "A"/Total conversation) x 100

 "A"= based category or indicator intended.

Other data regarding the benefits and drawbacks during the implementation of project-based learning were obtained from questionnaires distributed to students, teachers and parents, after the project was completed. The questionnaire contains open questions (providing opportunities for respondents to provide explanations) and closed questions (in the form of questions with yes/no answers). Questionnaires were distributed to 32 students who were the subject of the study, 50 parents were randomly selected from 160 students who took part in the lesson and 11 subject teachers were involved in the implementation of the lesson.

RESULT AND DISCUSSION

Based on the results of data processing using transcript based lesson analysis (TBLA), integrated project-based learning across all subjects succeeded in revealing 5 indicators of critical thinking skills (Ennis, 1985) as shown in Table 1.

The results of the analysis of students' conversations during the learning process showed that critical thinking skills in terms of observing and considering the results of observations were the most widely carried out activities (43.48%). This proves that project-based learning has a very good ability to facilitate students to build the ability to observe and consider the results of observations. This may happen because project-based learning encourages students to do something, from making plans, implementing projects, to making reports in the form of filling out worksheets. Students really become subjects in the learning process. they are conditioned to make good observations, and consider everything they see for the sustainability and success of the project. This is closely related to the ability of students in deciding the action to be taken, which was built by 22.46%. where deciding the action to be taken is the result of the process of observation and consideration of the results of these observations.

Table 1. Percentage of Students' Critical Thinking

Critical Thinking Indicators	Percentage
Focusing questions.	2,17
Asking or Answering a question or challenge.	15,22
Observing and considering observation result.	43,48
Induce and consider the results of induction.	16, 67
Deciding what action that will be done.	22,46

Other critical thinking skills that can be built through project-based learning integrated across these subjects are to induce and consider the results of induction, namely in terms of making hypotheses (16.67%), asking or answering a question or challenge (15.22%), and focused on the question (2.17%). When viewed from the learning process carried out, critical thinking skills that have been successfully built have interrelationships and are facilitated either directly from the teacher's instructions, or indirectly (because of the need to do so).

For example, making a hypothesis is part of the teacher's instructions in the worksheet that must be carried out by students, however, setting strategies and tactics in determining what actions will be taken is 22.46%, higher than the skill in making hypotheses 16.67%. This is because the actions that will be taken by students in anticipating more than one obstacle, even though it starts from one hypothesis. For example, when students deal with dead fish, they hypothesize that the water is dirty. Based on the same hypothesis, the students' decisions to anticipate this turned out to be different, some decided not to give much food, some chose to change the water regularly. As for

Table 2. Strengths and Weaknesses in "Team" Project Based Learning In Pandemic Time of Covid-19

Strengths	Weaknesses
Developing students' critical thinking skills. Developing Students' creativity. Developing communication between students and teacher, students with parents/family/environment, and students parents with teacher. Adding knowledge and experiences of students and parents/family, related to vegetable and fish cultivation. Helping students in understanding learning material/concept with real context. Growing responsibility, discipline, honest, carefull, patient and empathy to students and parents. Emerging the character of entrepreneur/business to students. Students able to integrate knowledge and skills and applied it into real context of daily life. Students and parents/family can use limited land in house environment to cultivate vegetables and fish. Fullfilled family nutrient (minimum from the nutrient content in cultivated vegetables and fish) Encouraging understanding to students for the importance of fullfilled nutrient for health. Using time during in the house with positive activity. Improving digital literation (to search information) related to vegetables and fish cultivation.	Development/Guidance is not optimum, because of only by chat. Assessment is not optimum, because only rely on observation by photo and video It cannot directly see students activities. The students /parents have not understand the way to cultivate vegetables and fish. The Students did not implement the project based on the time allocated, thus the process of counseling/guiding were not at the same time. The students did not able to buy baby fish, thus there were some students did not cultivate fish. The level of students' understanding were different, thus sometimes there are misunderstanding with teacher explanation. The need of good cooperation with all subject lesson teacher that sometime facing with obstacles.

asking or answering a question or challenge and focusing the question is what students need so that they can understand what they have to do and successfully work on the project and be part of the activity in conducting observations, considering the results of observations and deciding on the actions to be taken so that the percentage is lower.

The strengths and weaknesses in team project based learning in pandemic time of covid-19 based on data gained from questionnaires spreaded to students, teachers and parents can be seen in Table 2.

Generally, integrated project based learning as the implementation of ESD which has been implemented get positive respond from students, parents and teachers, such as shown in Table 3.

This is the first time we implemented integrated learning all subject lesson, thus the obstacle to implement cooperation with other subject lesson teachers still facing difficulties. Started from the analysis step and determining appropriate basic competency, the implementation of students' guidance, to the assessment. Added with the condition at that time was no possible to teachers to make home visit to observe the development of students' project, because the school area and student residences are included in the Covid-19 red zone. However, this learning able to run well used Whatsapp facility to communicate between students, students with teacher and parents and parents with teacher.

The challenges faced by students when implementing project-based learning are not only being able to build their critical thinking skills, but also being able to foster collaboration between students and parents to carry out projects. The obstacles faced by students have proven to be able to foster student curiosity, and encourage them to ask questions not only to teachers but also to parents, and also to seek explanations from various sources. Because basically curiosity and explanation arise when someone feels confused/problematic (King et al., 2019).

However, students' personalities are not the same and this affects the learning process and sharing ideas in learning (Pearce et al., 2020; Wade-Jaimes et al., 2018). Therefore, it needs help from the teacher to express ideas and explanations from students. One of them is by asking investigative questions. This is important to encourage students to express explanations (Cisterna et al., 2019; Tobin et al., 2018; Zangori et al., 2017), discuss productively (Wade-Jaimes et al., 2018), and improve contextual understanding (Tobin et al., 2018; Wade-Jaimes et al., 2018;

Zangori et al., 2017). Although communication is limited only through the WhatsApp application, the investigative questions given by the teacher while accompanying the learning process are proven to be able to build students' ability to share ideas and collaborate.

On the other hand, the involvement of parents or family in the implementation of this project is an added value. With the involvement of parents, students feel they have a good relationship and get more attention from their parents. Likewise with parents, they feel happy to be involved in learning, so they are more able to observe and help their children. This will certainly greatly affect student learning motivation, especially during the pandemic. where the majority of learning is carried out at home.

From the responses obtained, it can be seen that this learning is able to develop students' competence from the cognitive side, namely understanding the teaching material; affective, able to develop the character of students who are responsible, disciplined, honest, careful, patient and have a sense of empathy; also on the psychomotor aspect, by developing skills in vegetable and fish cultivation.

Furthermore, this learning does not only affect students, but also involves their parents/families. And the three basics of ESD namely environmental, social and economic were successfully developed in the implementation of this learning.

Likewise with the ESD that has been determined, namely goal number 2, ending hunger, achieving food security and improving nutrition, and encouraging sustainable farmers. Target 2.2, in terms of minimizing malnutrition. And target 2.3 to double agricultural productivity and income of small-scale food producers, value added opportunities and non-agricultural jobs (Ministry of National Development Planning/Bappenas, n.d.) can be applied. Thus, it is hoped that this learning will be able to produce human outcomes in the future who aware and are able to carry out sustainable development.

CONCLUSION

Based on the results of the research, project-based learning as an implementation of ESD during the COVID-19 pandemic is able to build critical skills in terms of focusing questions, asking or answering a question or challenge, observing and considering the results of observations, inducing and considering the results of induction, and deciding what actions to take. done.

In addition, this learning is also able to build students' cognitive, affective, and psychomotor abilities. and able to develop the three basics of sustainable development (environmental, social, and economic).

In general, integrated project-based learning as an ESD implementation is worth trying, either with the same or different sustainable development goals. Because the characteristics and potential of students are different and have the opportunity to develop better. In addition, integrated project-based learning for all subjects teaches students that in real life, knowledge cannot be separated. All knowledge is important, connected and complementary.

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