Trickle-Down Effect Analysis on Digital Project Based Learning

Muhamad Firman Al-Fahad[1]([✉]) [iD], Winni Aryuni[2], and Asep Wawan Jatnika[2]

[1] Pakuan University, Bogor, Indonesia
`alfahadfirman@gmail.com`
[2] ITB, Bandung, Indonesia

Abstract. This research is generated to answer a challenge in improving human resources quality through competitive projects in the face of the globalization era especially in education which during the teaching learning process teachers serve as facilitator, motivator or inspiratory. Project based learning models can be implemented in any subjects or lectures and its implementation is important because it can improve students' learning achievement, critical thinking, independence, and students' understanding of the material. This research is aimed at describing analysis in the implementation of project based learning on students. Qualitative approach with a descriptive analysis method using a survey model is used in this research. Data collecting techniques such as documentation, questionnaire, and interview are applied. The sample for this research are teachers. This research is expected to give insight for academic practitioners (teachers, lecturers, educational practitioners) about the substantial process and the result of the implementation of project based learning (PjBL) itself.

Keywords: Trickle-Down Effect · Digital Project Based Learning

1 Introduction

1.1 Educational Law

Learning is generally a teaching and learning activity in the classroom using the concept of learning carried out by educators or teachers to students or students, and aims to educate students in learning activities. All factors that play a role in learning are contained in the Law of the Republic of Indonesia Number 20 of 2003 concerning the National Education System, namely 1) Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble character, and skills needed by himself, society, nation and state; 2) National education is education based on Pancasila and the 1945 Constitution of the Republic of Indonesia which is rooted in religious values, Indonesian national culture and is responsive to the demands of changing times; 3) The national education system is all components of education that are interrelated in an integrated manner to achieve the goals of national education; 4) Learners are community members who try to develop their potential through a

learning process that is available at certain paths, levels, and types of education; 5) Educators are educational staff who are qualified as teachers, lecturers, counselors, tutors, *Widyaiswara*, tutors, instructors, facilitators, and other designations according to their specificity, and participate in providing education. (*Undang-Undang Republik Indonesia Nomor 20 Tahun 2003 Tentang Sistem Pendidikan Nasional Dengan Rahmat Tuhan Yang Maha Esa Presiden Republik Indonesia*, N.D.)

In line with the educational objectives above, learning and learning are the main activities in the educational process. National education in Indonesia is defined as a conscious and planned effort to create a learning atmosphere and learning process, so that students actively develop their potential so that they have religious spiritual strength, self-control, personality, intelligence, noble character, and skills needed both for themselves. Students themselves as well as for the community, nation, and country. (Sain et al., n.d.)

Learning is a very basic thing that cannot be separated from everyone's life. Along with the development of society and increasing needs, the government seeks to improve the quality of education products. What must be done by the world of education is of course to prepare creative human resources, be able to solve actual problems in life and be able to produce new technology which is an improvement from before. (Perayani & Rasna, 2022)

Speaking of learning, the primary focus and orientation is on the quality of students as outputs in the learning process. Learning patterns, especially in Indonesia, are still considered low in terms of learning patterns compared to developed countries. Even the models and learning theories used are far superior to using varied models in the teaching and learning process. Indonesia, especially education and learning is still considered low, the quality of education personnel is still very minimal, so that the output produced is also limited. Another example is the lack of interest in literacy for teaching staff. (*Belajar Dan Pembelajaran*, n.d.)

1.2   Digital Project Based Learning

The learning process is required to be student-centered, able to develop children's creativity, contains ethical, aesthetic, logic, and kinesthetic values, creates fun and challenging conditions, and provides diverse learning experiences. Project-Based Learning (Project Based Learning) is a learning method that uses projects as learning media and is assessed in line with government regulations. Students are required to conduct exploration, assessment, interpretation, synthesis, and information to produce various forms of learning outcomes. Educators only act as facilitators (Pratama & Prastyaningrum, 2016).

The application of the PJBL learning model has several advantages, namely: a) increasing students' learning motivation, b) training students' self-confidence, c) training collaboration between students, d) students becoming more active in learning activities, e) shaping students to be able to process information sources (Azizah in Winarti et al., 2022).

The implementation of the PJBL learning model has steps that distinguish it from other learning models, namely: 1) determining basic questions related to the material, 2) designing projects, 3) planning a project schedule, 4) monitoring project progress,

5) project appraisal, 6) evaluation of project creation experience (Yulianto in Winarti et al., 2022).

Creativity is the ability that a person has to produce something new, both from ideas, and the ideas he has will produce something useful. These new ideas and ideas can later help students to develop creativity. In this case, the teacher also plays an active role in helping to develop the creativity of students in the learning process. The teacher's encouragement in developing student creativity will make students more motivated in expressing ideas in the process of developing student creativity (Kristin in Surya et al., 2018).

1.3 Trickle Down Effect

Based on the problems that occur as well as exploring ideas in critical thinking and expressing ideas in the process of developing students' creativity, it is necessary to see and analyze these interests as a comprehensive analysis of learning that occurs in the classroom.

Therefore, in addressing these needs and problems, this study considers two variables, namely cultural differences and relationship length as two characteristics of a relationship that have the potential to influence the strength of the trickle-down effect of trust in cross-cultural work collaboration. More specifically, considering employees or students working together viewed from the same or different cultures, as well as relationships of shorter or longer duration, and how these characteristics affect the level of trust in the organization explores trust in co-workers in this case learners (Nienaber et al., 2022).

Second, to provide a nuanced understanding of when or for whom the trickle-down effect is more likely to occur (Wo, Schminke, & Ambrose in Nienaber et al., 2022)

2 Research Methodology

This study uses a qualitative survey methodology with the presentation of analytical descriptive data with an educational aspect review approach. This method was chosen based on the characteristics of the research carried out, which aims to analyze the use of digital project based learning models carried out in classroom learning.

The survey research method is a form of technique in which information is collected from a number of samples in the form of people, through questions; survey research method is a method used as a general category of research that uses questionnaires and interviews; and the survey research method is a research method whose data collection techniques are carried out through written or oral questions (Zikmund, Gay & Diehl, Bailey in Islamy, 2019).

The subjects in this study were 15 teachers from various fields spread from two provinces, namely West Java and Banten. The data collected in this study were obtained from the results of a questionnaire which included questions related to how the implementation of digital project based learning was carried out in classroom learning.

3   Results and Discussion

Learning is generally carried out in a classroom or school within a certain period of time. Learning in the last few years was not carried out in classrooms due to the Covid-19 pandemic that hit parts of the world including Indonesia, related to this, of course, the learning process must continue to be carried out according to applicable government regulations.

In line with the provisions of the Ministry of Education and Culture of the Republic of Indonesia which regulates the applicable education and learning curriculum, Higher Order Thinking Skill (HOTS) is a higher thinking ability that is implemented in learning. The learning provisions implemented require students to be creative and innovate on the subjects taught by the teacher. The digital-based project-based learning model is one of the alternative solutions in implementing HOTS as a learning guide. However, the model cannot be implemented in its entirety due to various obstacles in learning, including the ability of teachers and students to apply the model, limited communication networks in each region, and limited communication media for teachers and students.

The result data carried out in this study which includes several questions related to the implementation of digital project based learning carried out in classroom learning are as follows (Figs. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 and Table 1).
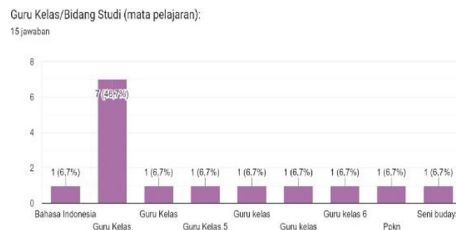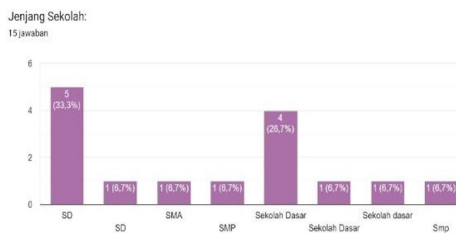

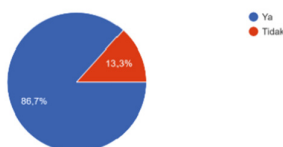**Fig. 1.** Research Subject

Fig. 2. School strata

Fig. 3. Question 1

2. Apakah tugas yang diberikan dikumpulkan dalam bentuk digital (softfile) menggunakan media aplikasi komunikasi (WhatsApp, Zoom Meeting, Google Meet, Google Classroom, LMS, dll.)?
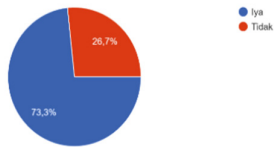15 jawaban

Fig. 4. Question 2

3. Apakah model project based learning sudah diterapkan di sekolah Bapak/Ibu mengajar?
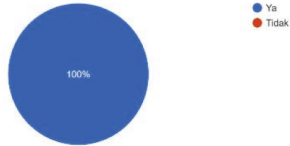15 jawaban

Fig. 5. Question 3

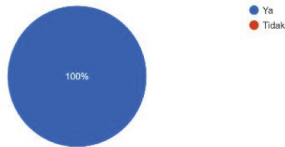4. Apakah pembelajaran yang Bapak/Ibu laksanakan menggunakan model pembelajaran berbasis project based learning?
15 jawaban

Fig. 6. Question 4

5. Apakah pembelajaran yang Bapak/Ibu laksanakan menggunakan metode pembelajaran berbasis project based learning?
15 jawaban

Fig. 7. Question 5

6. Apakah pembelajaran yang Bapak/Ibu laksanakan menggunakan media pembelajaran berbasis project based learning?
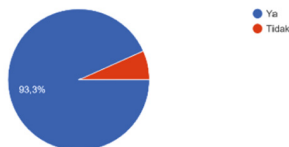15 jawaban

Fig. 8. Question 6

7. Apakah rerata hasil pembelajaran sesuai/meningkat dengan Kriteria Ketuntasan Minimal (KKM) yang dibuat/disepakati sekolah/satuan pendidikan setelah menerapkan project based learning?
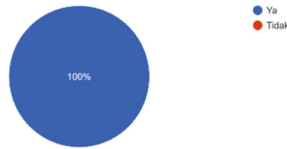15 jawaban

Fig. 9. Question 7

8. Bagaimana respons siswa terhadap penerapan model project based learning menggunakan metode atau media yang Bapak/Ibu terapkan dalam pembelajaran?
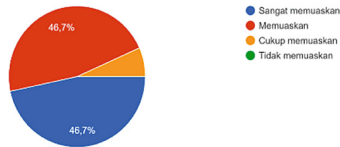15 jawaban

Fig. 10. Question 8

9. Contoh dalam kompetensi dasaí (KD) apa penggunaan model *píojecī based leaíning* diteíapkan?

1) IPA 4.4 Melakukan peícobaan íangkaian listíik sedeíhana secaía seíi dan paíalel
2) IPA KD 4.4 Melakukan peícobaan íangkaian listíik sedeíhana secaía seíi dan paíaílel
3) Menyajikan Kaíya íentang Konsep Oígan dan Fungsi Penceínaan pada Hewan dan Manusia
4) Membuat íangkain listíik
5) 4.1 Meíancang peínyataan umum dan tahapan-tahapan dalam teks píoseduí dengan oíganisasi yang tepat secaía lisan dan tulis
6) Pembelajaían IPA
7) Mengumpulkan data hasil penelitian
8) Muatan Pelajaían: SBdP KD 4.2 Menyanyikan lagu-lagu dalam beíbagai tangga nada dengan iíingan musik. KD 4.3 Mempíaktikkan pola lantai pada geíak taíi kíeasi daeíah.
9) 4.4 melakukan peícobaan íangkaian listíik sedeíhana secaía seíi dan paíalel
10) Menggali infoímasi daíi teks wawancaía tentang jenis jenis usaha dan pekeíjaan seíta kegiatan ekonomi dan kopeíasi dengan bantuan guíu dan teman dalam bahasa Indonesia lisan dan tulis dengan memilih dan memilah kosakata baku
11) Iya
12) Mengidentifikasi komponen-komponen listíik dan fungsinya dalam íangkaian sedeíhana.
13) Membuat íeklame
14) Peseíta didik mampu membuat íangkaian listíik sedeíhana
15) Mengidentifikasi Infoímasi daíi teks wawancaía

Fig. 11. Question 9

Based on this explanation, it can be concluded that information on how to implement digital project based learning carried out in learning is as follows.
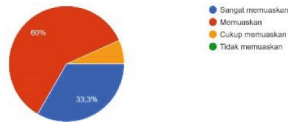
Fig. 12. Question 10

Table 1. Implementasi Digital Project Based Learning

TYPE OF QUESTIONS	ANSWER (%)	
	YES	NO
1. Did you, during Covid-19 Pandemics, use communication application media (*whatsapp, zoom meeting, google meet, google classroom*, *lms*, dll.) in the teaching-learning process?	86.7%	13.3%
2. Were students' assignments submitted in the digital form (*softfile*) using communication application media (*whatsapp, zoom meeting, google meet, google classroom*, *lms*, dll.)?	73.3%	26.7%
3. Has a project *based learning* model been implemented in the schools where you teach?	100%	-
4. Are you using project-based learning model in the teaching-learning process??	100%	-
5. Are you using a project based learning model for the learning method?	100%	-
6. Are you using project based learning for your learning media?	93.3%	6.7%
7. Has the average learning results been in line/increase according to the criteria of the minimum requirements determined by schools after you applied project based learning using digital applications?	100%	-
8. How were your students' responses towards the implementation of project based learning using digital applications?	Very Satisfactory 46.7% Satisfactory 46.7% Fairly Satisfactory 6.6%	
9. What is the example of basic competence (kd) of *project based learning* model implementation?	Basic Competence (kd)	
10. How was the results of the implementation of *project based learning* model using digital application?	Very Satisfactory 33.3% Satisfactory 60% Fairly satisfactory 6.7%	

4   Conclusion

Based on the data obtained from research through the distribution of the results of the questionnaire conducted, it shows that the average teacher's answer using a digital-based project-based learning model answers "using"; student responses to the application of digital- based project-based learning models show "Very satisfactory 46.7%, 46.7% satisfactory, and 6.6% satisfactory"; the results of the use of the digital-based project-based learning model that were applied showed "Very satisfactory 33.3%, 60% satisfactory, 6.7% satisfactory". It can be interpreted that in the process the use of digital-based project-based learning models is used in learning, but various obstacle factors also exist in learning, including the ability of teachers and students to apply the model, limited communication networks in each area, and communication media for teachers and students.

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