

IMPLEMENTATION OF THE PLAN-DO-REVIEW-SHARE-HAPPY (PLANDORESH) PROJECT-BASED LEARNING MODEL IN TECHNICAL DRAWING SUBJECTS

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ABSTRACT

Since 2021, the Ministry of Education, Culture, Research and Technology (Kemdikbudristek) of the Republic of Indonesia has implemented an independent curriculum for all levels of education in stages. The policy for implementing this curriculum, actually not much has changed from the previous curriculum (2013 curriculum). However, specifically Vocational High Schools (SMK) through the Directorate General of Vocational Education are directed at implementing the project-based learning model (PjBL) or teaching factory (tefa) in implementing the accelerated curriculum after Covid-19. Implementing this project-based learning model requires the right strategy in its implementation, plandaresh is one of them. The aim of this study is to find out the comparison of learning outcomes for Technical Drawing subjects that apply the plandaresh strategy with other strategies. The research subjects were two groups of class XII students with machining engineering skills competency, each numbering 36 students. The research results show a significant comparison between the implementation of the plandaresh strategy and the non-plandaresh strategy with a significance figure of $\alpha < 0.05$ ($0.000 < 0.005$) and $t \text{ count} > t \text{ table}$ ($5.839 > 2.021$).

Keywords; Plandaresh; Project-Based Learning; Implementation.

INTRODUCTION

Since 2021, the Ministry of Education, Culture, Research and Technology (Kemdikbudristek) of the Republic of Indonesia has implemented an independent curriculum for all levels of education in stages. The policy for implementing this curriculum, actually not much has changed from the previous curriculum (2013 curriculum). However, specifically Vocational High Schools (SMK) through the Directorate General of Vocational Studies are directed at implementing the project-

based learning model (PjBL) or teaching factory (tefa) in implementing the accelerated curriculum after Covid-19.

The massive growth of information technology and artificial intelligence (AI) has a huge impact on all areas of social life as well as challenges. Apart from collaborating with work colleagues to solve problems and make decisions, workers also analyze, change and create information and carry out various complex tasks using this sophisticated technology.

Currently, the challenge for teachers in schools is to provide skills regarding responsibility in acting by prioritizing the greater interests of society, demonstrating ethical behavior personally, in the workplace and in relationships between communities (soft skills).

Teachers can build relationships with students by believing in the uniqueness of each individual, teaching differentially. Conveying respect and trust to students, as well as valuing effort over achievement can encourage students' enthusiasm for learning. Students are better prepared to acquire and improve new information, strategies or skills after they have spent a lot of time exploring a challenge or problem for themselves without receiving explicit prompts or answers at the start of a lesson.

Students are accustomed to each learning activity actively working both individually and in groups, then sharing. Van den Brink in his book *Critical Thinking for Students* (2000) says "being able to see more clearly what is happening in an argument is a very useful skill".

To get used to and cultivate this kind of activity requires higher thinking skills or in other terms higher order thinking skills (HOTS), such as analysis, synthesis, problem solving and creativity. When the learning process accommodates differences, it can help teachers be more effective in developing higher thinking skills. So, the paradigm of teachers as learning centers (teacher centers) must be changed to a more democratic direction, namely students as learning centers (student centers).

Various appropriate learning models are needed to obtain optimal learning outcomes for vocational school students. Learning models that suit the characteristics of vocational schools, such as Project Based Learning (PjBL), Contextual Based Learning (CBL), Problem Based Learning (PBL), and others. The approach of these learning models is student-centered, where students are more dominant in their learning process and are of course very relevant to the process of developing high-level thinking (HOTS).

Strategy in the world of education is defined as a plan, method, or series of activities designed to achieve a particular educational goal (J. R. David, 1976). Learning strategies can be interpreted as plans that contain a series of activities designed to achieve certain educational goals. Learning strategies are a series of activities and the use of various resources or strengths in learning which are arranged to achieve learning objectives.

The term strategy in the learning process is a teacher's effort so that students get optimal results in their learning. Kemp (1995) said that a learning strategy is a learning activity that teachers and students must carry out so that learning objectives can be achieved effectively and efficiently. Dick & Carey (1985) stated that a learning strategy is a set of learning materials and procedures that are used together to produce learning outcomes for students.

Esteban and Zapata (2016) state that strategy means a deliberate plan that results in learning. In addition, the proposed cognitive activities will determine the type of strategy; either associative, elaborative or organizational. A learning strategy is a decision-making process (responsibility) in which the knowledge necessary for the fulfillment of objectives is selected and recovered in a coordinated manner, according to the situation the educational activity takes place.

Cerezo, Casanova, Manuel and De la Villa (2015) said that there are self-regulation learning strategies which are divided into cognitive and cognitive. First, according to the activities carried out by students to achieve learning objectives. Next consists of the mastery and knowledge that students have about the process.

According to Affoni et al. (2021), plandoresh strategies include; 1) Plan which consists of setting goals, determining final tasks, scheduling, challenges and solutions, learning resources. 2) Do includes working on plans, finding new information, keeping work well. 3) Review, discussion, group work, student interaction, listening to others. 4) Share, present, ask questions, test work results, receive feedback. 5) Happy, continue to improve yourself, look for new, better ways, strive for improvement.

Today's vocational education and training systems are challenged to prepare future workers not only to excel in routine jobs but also to be able to adapt to complex and changing work environments (Dall'Alba, 2009). The ability to adapt to changing demands in the workplace, students must be more independent and learn throughout life in order to maintain and expand their competencies. Lifelong learning requires the capacity to regulate one's own learning through metacognitive self-reflective processes. (Van den Boom et al. 2007).

Little (1994) identified the learning process as important in enabling individual autonomy by highlighting the ability of learners to transfer their learning to other contexts. If learners can transfer their individual autonomy to new contexts, then autonomy is not limited to a particular environment, or something that has already been learned. According to Williamson (1995) the variables involved in one learning environment with one individual are very broad. The only common element is student responsibility.

Project-based learning refers to an inquiry-based learning method that involves students in knowledge construction by having them complete meaningful projects and develop real-world products (Brundiers & Wiek, 2013). Krajcik and Shin (2014) point out six advantages of PjBL, including managing questions ,focus on learning objectives,

participation in educational activities, collaboration among students, use of scaffolding technology, and creation of tangible artifacts. Among all these features, the creation of artifacts that solve authentic problems is the most important.

What differentiates PjBL from other student-centered pedagogies, for example, problem-based learning (Blumenfeld et al., 1991; Helle, Tynjälä, & Olkinuora, 2006). This creation process requires students to work together to find authentic problem solutions in the process of integrating knowledge, application and construction. Instructors and community members, usually as facilitators, provide feedback and support to students to aid their learning process. Several reviewed studies focused mostly on PjBL in postsecondary education.

Helle et al. (2006) discussed PjBL practices and the impact of PjBL on student learning. Regarding practice, the authors found that most of the studies reviewed were limited to course descriptions in terms of course scope, instructor requirements, and team size. As for impact, the review found that only a few studies have investigated the influence of PjBL on student learning related to cognitive outcomes (e.g. knowledge) or affective outcomes (e.g. motivation). Efforts to achieve learning goals can be achieved in three ways: 1) competitively, 2) individually, 3) collaboratively. Whether by competing, individually or collaboratively, they have a role to play in achieving goals. The idea is that all students should learn to compete, working alone and with others. Research says that working together provides students with opportunities for increased academic success because they have to ask questions, discuss thoughts, find solutions, clarify their own thinking, and develop deeper understanding. Apart from that, social skills such as taking turns, sharing, providing help to others, and receiving help from others will be obtained through cooperation.

Collaboration does not happen automatically for students and requires motivation, direct instruction, and practice time. When students are working together, the teacher should ensure that all group members participate and are accepted by the group, agree on their goals and plans for making a product, work in designated areas to complete the product, and talk about their work and help each other.

In implementing learning models, appropriate strategies are needed to obtain optimal learning outcomes. Strategy is one of the keys to the success of teachers as facilitators in implementing learning models in teaching and learning activities.

Learning practices in vocational schools, the strategy or method that is often used is assignments/recitations. This assignment/recitation method is a way of presenting learning material where the teacher gives certain tasks so that students carry out learning activities. Apart from its various advantages, the assignment/recitation method has weaknesses, including; (1) students are difficult to control, whether they are actually doing the assignment or someone else's, (2) it is not easy to give assignments that suit individual student differences, (3) they often give assignments that are monotonous, so they are boring.

The learning strategy developed in this research is the Plan-Do-Review-Share-Happy (Plandoresh) project-based learning model. It is hoped that the implementation of the plandoresh strategy can improve student learning outcomes so that they are able to answer the challenges of the world of work in the future.

METHODS AND MATERIALS

This study is classroom action research, which compares two groups or samples that are not related to each other (independent). Testing was carried out using the independent sample t-test, which is a statistical method used to compare two groups or independent samples. The purpose of this test is to determine whether there is a significant difference between the two groups in terms of the mean or means of the observed variables.

The independent sample t-test was used to compare two different classes. One class is the treatment group (plandoresh), the other class is the control group.

The steps carried out in the independent sample t-test are as follows:

1. Data from two independent groups or classes are compared.
2. The sample size for each class is 36 students (according to Ministry of Education and Culture standards) so that it can meet the t-test assumptions.
3. Calculate the t-statistic value using the appropriate formula based on the sample size and the average difference between the two groups.
4. Determine the significance level (α) < 0.05 which is the threshold for determining whether the difference between two groups is considered significant.
5. Interpret the results If the null hypothesis is rejected, it means that there is a significant difference between the two groups in terms of the means of the observed variables.

RESULTS AND DISCUSSIONS

Results

After carrying out treatment in one of the classes, the learning results for that class were obtained, namely class XII TPm 2 with an average learning result of 90.08. Meanwhile, in the control group or class XII TPm 3, the average score was 84.47. These results show that the group or class that received learning treatment by applying the plandoresh strategy was better than the group that did not apply the plandoresh strategy. It can be seen in the following statistical table.

Table 1. Average Learning Results of Two Independent Groups

Class	N	Mea	Std.	Std. Error
		n	Deviation	Mean
Learnin g Class XII TPm 2	36	90.08	3.782	.630

outcom XII TPm 3	36	84.47	4.352	.725
e GTM Class				

Based on the results of the independent sample t-test, where $t_{count} > t_{table}$ ($5.839 > 2.021$) while the significance value $\alpha < 0.05$ ($0.000 < 0.005$). These results indicate that there is a significant difference between learning in technical drawing subjects that uses the plandoresh strategy and learning that does not apply the plandoresh strategy. The following table shows the results of the independent sample t-test.

Table 2. Independent Sample t-test results

		Levene's test for equality of variances			t-test for equality of means			
		F	sig.	t	df	Sig. (2-tailed)	Mean difference	Std. Error difference
L	Equal	3.045	.088	5.73	36	.000	5.611	.961
	variances							
e	Equal	3.045	.088	5.73	36	.000	5.611	.961
	variances							
a	Equal	3.045	.088	5.73	36	.000	5.611	.961
	variances							
r	Equal	3.045	.088	5.73	36	.000	5.611	.961
	variances							
n	Equal	3.045	.088	5.73	36	.000	5.611	.961
	variances							
i	Equal	3.045	.088	5.73	36	.000	5.611	.961
	variances							
n	Equal	3.045	.088	5.73	36	.000	5.611	.961
	variances							
g	Equal	3.045	.088	5.73	36	.000	5.611	.961
	variances							
o	Equal	3.045	.088	5.73	36	.000	5.611	.961
	variances							
u	Equal	3.045	.088	5.73	36	.000	5.611	.961
	variances							
t	Equal	3.045	.088	5.73	36	.000	5.611	.961
	variances							
c	Equal	3.045	.088	5.73	36	.000	5.611	.961
	variances							
o	Equal	3.045	.088	5.73	36	.000	5.611	.961
	variances							
m	Equal	3.045	.088	5.73	36	.000	5.611	.961
	variances							
e	Equal	3.045	.088	5.73	36	.000	5.611	.961
	variances							
G	Equal	3.045	.088	5.73	36	.000	5.611	.961
	variances							
T	Equal	3.045	.088	5.73	36	.000	5.611	.961
	variances							
M	Equal	3.045	.088	5.73	36	.000	5.611	.961
	variances							

DISCUSSIONS

The project-based learning model is a learning approach that involves students in working on real projects or assignments that are challenging and meaningful. Under

this model, students are actively involved in identifying problems, planning solutions, conducting research, collaborating with teammates, and producing a final product that reflects their understanding.

According to Hamalik (2004) "learning is a process, an activity and not a result or goal. Learning is not just remembering, but broader than that, namely experiencing."

The project-based learning model places students as active participants in the learning process. They learn by actively participating in real-life relevant projects, which helps them develop practical skills and a deep understanding of the subject matter.

This model allows students to develop a variety of skills, including problem-solving skills, critical thinking, communication, working in teams, and time management. This process helps prepare students to face real-world challenges and the job market.

Although the project-based learning model has many benefits, its implementation also requires good planning and organization from educators. Proper guidance is required to ensure the project meets learning objectives and provides a meaningful learning experience for students.

At this point, appropriate strategies are needed in learning activities. The plandoresh strategy can present a sequence of planning processes (Plan), doing (Do), reviewing work results (Review), and sharing with other friends (Share). These plandoresh strategy steps are in line with a student-centered learning approach.

Students tend to be more motivated and engaged in learning when they have responsibility for their own projects and are in control of the results. This can increase students' interest and enthusiasm for learning.

CONCLUSIONS

The steps in applying the plandoresh strategy in learning technical drawing include 1) plan; students plan their learning goals before starting a lesson or project, 2) do; students work on relevant assignments or projects to enable students to engage in active and meaningful learning experiences, 3) review; students reflect on the process of their learning outcomes. This is done through discussion with friends in class, 4) share; sharing sessions where students can share their experiences and learning with presentations.

Achieving good learning outcomes shows that the individual has successfully achieved the learning objectives and mastered the expected material or skills. Learning outcomes in technical drawing subjects achieved by students after following the learning process in the classroom. This includes understanding, knowledge, and skills.

Learning outcomes are measured by tests, performance assessments, or projects that require the application of knowledge and skills. Regarding this, it can be concluded that the application of the Plandoresh strategy in technical drawing subjects is very relevant to use in learning activities. Apart from vocational subjects, the plandoresh strategy allows it to be applied to other subjects that use a project-based learning model at secondary education level.

Author's Contribution

All authors discussed the result and contributed to from the start to final manuscript.

Conflict of Interest

The authors declare that they have no competing interests.

REFERENCES

- Aftoni et al. Plan-Do-Review-Share-Happy (Plandoresh) strategy as an effort of developing vocational high school students' independent learning. **Jurnal Pendidikan Vokasi**, [S.l.], v. 11, n. 1, apr. 2021. ISSN 2476-9401. Available at: <<https://journal.uny.ac.id/index.php/jpv/article/view/37165>>. Date accessed: 03 may 2021. doi:<https://doi.org/10.21831/jpv.v11i1.37165>.
- Broad, J. (2006). Interpretations of independent learning in further education, *Journal of Further and Higher Education*, 30:2, 119-143, DOI: 10.1080/03098770600617521
- Costa, A.L. & Kallick, B. (2000). *Describing 16 Habits of mind*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Freire, P. (1993). *The Pedagogy of the Oppressed*. London: Herder and Herder.
- Gardner, H. (1993). *Multiple Intelligences: The theory in practice*. New York: Harper Collins.
- Intel education, (2007). *Program Pengajaran Intel. Getting Started*. California: Institute of Computer Technology.
- Maldonado-Sánchez, M., Aguinaga-Villegas, D., NietoGamboa, J., Fonseca-Arellano, F., Shardin-Flores, L., & Cadenillas-Albornoz, V. (2019). Learning Strategies for the Development of the Autonomy of Secondary School Students. *Propósitos y Representaciones*, 7(2), 415-439. doi: <http://dx.doi.org/10.20511/pyr2019.v7n2.290>
- Marzano. (2011). Higher Order Thinking Skills Among Technical Education Students. *International Journal of Social and Humanity*, Vol. 1, No. 2, July 2011, 121-125.
- Miller, M. D. (1994). *Philosophy: A foundation for envisioning the future and workplace education*. Lincoln, NE: University Council for Vocational Education.
- Nurlaela, L. (2019). *Strategi Belajar Berpikir Kreatif*. Jakarta: Pustaka Media Guru
- Prosser, C.A. & Quigley, T.H. (1950). *Vocational education in a democracy*. Revised Edition. Chicago: American Technical Society.
- Strom, B. T. (1996). The role of philosophy in education-for-work. *Journal of Industrial Teacher Education*, 33(2), 77-82.

- Sudira, P. (2017). TVET ABAD 21 Filosofi, Teori, Konsep, dan Strategi Pembelajaran Vokasional. Yogyakarta: UNY Press.
- Sudira, P. (2018). Metodologi Pembelajaran Vokasional Abad XXI, Inovasi, Teori, dan Praksis. Yogyakarta: UNY Press.
- Sugiono. (2016). Metode penelitian dan pengembangan (research and development R&D).Bandung: Alfabeta.
- Wibowo, A., Irmawaty. (2019). Future Skills: Persiapan Menghadapi Masa Depan Tahun 2035. Bandung: IPB Press.
- World Bank Group. (2019). The changing nature of work.Washington: World Bank Publication. DOI: 10.1596/978-1-4648-1328-3
- Yamada, M., Shimada, A., Okubo, F. et al. (2017). Learning analytics of the relationships among self-regulated learning, learning behaviors, and learning performance. RPTTEL 12, 13. <https://doi.org/10.1186/s41039-017-0053-9>