

Project-Based Learning: Innovation To Improve The Suitability Of Productive Competencies In Vocational High Schools With The Needs Of The World Of Work

Melda Fajra¹, Suparno², Sukardi³, Ambiyar⁴, Rina Novalinda⁵

¹²³⁴⁵) Faculty of Engineering, Universitas Negeri Padang, 25132, Sumatera Barat, Indonesia

*Corresponding Author: melda_fajra@yahoo.com

ABSTRACT

This paper aims to present studies on (1) project-based learning concepts; (2) the theory of learning underlying project-based learning; (3) the implementation of project-based learning; and (4) project-based productive competency learning at Vocational High School. Based on these findings, it can be concluded: (1) Project-based collaborative learning is carried out by creating work or projects related to the competencies that students expect. Project-based learning can help equip students for preparation to enter the world of work; this is because students learn not only in theory but also practice in the field; (2) Project-based learning is a learning model supported or based on constructivist learning theory; (3) the implementation of project-based learning consists of: (a) determination of basic questions; (b) design project planning; (c) draw up a schedule; (d) monitor students and progress; (e) test results; and (f) evaluate the experience, and (4) Project-based learning can be said to be the operationalization of competency-based education and production concepts in vocational high schools. Through project-based learning, students at Vocational High School are introduced to the real atmosphere and meaning of work in the world of work. Thus, the right learning model for vocational high school productive competency is project-based learning.

Keywords: *kolaboratif berbasis proyek, kompetensi produktif, SMK*

INTRODUCTION

Vocational High School is one of the educational institutions responsible for producing human resources that have competence, skills, and expertise to develop their performance when diving into the world of work. The description of Law No. 20 on the National Education System (2003: 23) mentioned that Vocational Education is a secondary education that prepares students to work in specific fields.

The current century of knowledge wants a paradigm of project-oriented learning, problems, induction, discovery, and creation (Trianto, 2014). This means allowing students to explore the entire understanding (cognitive, affective, and psychomotor) and develop all their intelligence (emotional, spiritual, social, etc.) (Novalinda, 2020; Zagoto, 2019; Fajra, 2019; Mallisza, 2019).

Interactive learning activities are expected to provide opportunities to develop the entire realm of learning and all intelligence to achieve students' hard skills and

soft skills of every desired competency. One learning strategy that can help students have creativity, problem-solving, and interaction and assist in research leading to real problem solving is project-based learning or project-based learning (Chiang & Lee, 2016; Afifi, Hindriana, and Soetisna, 2016). Project-based learning prioritizes student-centered learning and uses environmental issues in instructing student knowledge and understanding (Hayati, Utaya, & Astina, 2016; Dakhi, 2019; Novalinda, 2019; Sarumaha, 2018).

Project-based learning has enough potential to meet the demands of education. Project-based learning models help students learn: (1) meaningful knowledge and skills built through authentic tasks and work; (2) expand knowledge through the authenticity of curricular activities supported by the learning process of planning activities (designing) or open investigation with results or answers not previously determined by a particular perspective; and (3) in the process of building knowledge through real-world experience and interpersonal cognitive negotiations that take place in a collaborative work environment (Sunardi & Hasanuddin, 2019; Zagoto, 2019; Azman, 2019).

Project-based learning is done to deepen the knowledge and skills gained by creating a work or project related to students' competencies. According to Sani (2014), some of the priorities achieved by implementing project-based learning are:

1. Engaging students in complex real-world problems and making students understand the issues that will be solved.
2. Engage students in learning to apply knowledge and skills in a variety of contexts.
3. Provide opportunities for students to learn and practice the skills needed to live and work.
4. Provide opportunities for students to learn and practice interpersonal skills in groups.
5. Include reflection activities that direct students to think critically about the experience.

Project-based learning aims to help learners develop knowledge and technology-based environments, prepare students for the challenges of today's world, and solve complex problems that allow students to have the necessary skills (Afifi, Hindriana, & Soetisna, 2016). Project-based learning is one of the models or approaches to education that focuses on improving analytical and critical thinking skills, exploration, teamwork, and communication as the foundation for developing both skills. Skills are also the cornerstone of students throughout the student's lifespan (Widodo, 2015; Fajra 2019; Novalinda 2019).

Project-based learning is exciting and essential to implement; several research results evidence this. Sunardi & Hasanuddin (2019) states that the advantages of project-based learning are:

1. Developing a variety of work skills.
2. Improving the enthusiasm, creativity, and innovation of learners.
3. Improving the skills needed for a career in the workplace.
4. Improving the effectiveness of learning.
5. Assisting students in solving real-life problems.
6. Honing cognitive, manipulative skills, designing skills, utilizing technology, and combining cognitive and psychomotor knowledge.
7. Evoke curiosity and trigger creative imagination as well as critical thinking.

Mayasari et al.'s research (2016) that project-based learning is a learning model with a constructivist approach that can train the skills of the 21st century, namely the era of digital iteration, inventive thinking, effective communication, and high productivity.

Domblesky (2009) revealed that students learn better and act more actively in learning in Project-based learning. Instructors work behind students working on projects. This makes students actively solve problems in their projects, not passive recipients of science. Mayasari et al.'s research (2016). states that the positive impact of project-based learning for students in developing positive attitudes towards learning processes, work routines, problem-solving skills, and self-esteem. Similarly, Widodo & Joko (2015) noted that students complete projects and reflect methods based on their learning experience.

Based on the background description, this paper aims to present a study of (1) project-based learning concepts; (2) the theory of learning underlying project-based learning; (3) the implementation of project-based learning; and (4) project-based productive competency learning at Vocational High School.

DISCUSSION

Project-Based Learning Concepts

Project-based learning is a learning model that uses projects/activities as a medium. Students conduct exploration, assessment, interpretation, synthesis, and information to produce various learning outcomes. Project-based learning is an approach that uses problems as a first step in gathering and integrating new knowledge based on experience in real-world activities. Project-based learning is designed to solve complex problems needed by students in conducting investigations and understanding them (Ministry of Education, 2013). Project-based learning characteristics according to Wena (2012) are: (1) students create frameworks and decisions; (2) there are unspecified problems and solutions; (3) students plan a process to determine the results; (4) students are responsible for managing the information obtained; (5) continuous evaluation; (6) students regularly review their work; and (7) the final result in the form of quality-tested products.

Project-based learning has five traits that can distinguish it from other learning models: (1) centrality, the project as central or central; (2) driving questions, project-based learning focused on questions or problems that trigger students to solve problems with appropriate concepts, principles, and knowledge; (3) Careful investigation, the project must be adapted to the ability of the learner, and the task carried out must provide new skills and knowledge to the learner; 4) autonomy, the activities of students are essential, students as decision-makers and solution seekers (problem solvers); and (5) realism, students' activities are focused on work similar to real or real-world situations.

Project-based learning has the following characteristics: (1) students make decisions about a framework; (2) any problems or challenges posed to students; (3) students design processes to determine solutions to proposed problems or difficulties; (4) students are collaboratively responsible for accessing and managing information to solve problems; (5) the evaluation process is carried out continuously; (6) students

periodically reflect on the activities that have been carried out; (7) the final product of the learning activity will be evaluated qualitatively; and (8) a learning situation that is very tolerant of mistakes and changes (Ministry of Education, 2013).

Differences between project-based learning models and traditional learning approaches are seen in several aspects, including (1) the role of teachers and learners, in project-based learning of learners and teachers working together, teachers acting as partners or facilitators for learners; (2) Project-based learning process, the emphasis is not on students' activities to complete tests or exams but to prepare students in the real world and provide students with opportunities to develop themselves and their knowledge (Trianto, 2014; Ferdiansyah, 2020; Masril, 2019; Dakhi, 2013).

The use of project-based learning models can provide benefits, including (1) preparing students to face the real world; (2) increase the motivation of students and encourage the ability to do meaningful work; (3) connect school learning with the natural world; (4) form the attitude of the students; (5) improve communication and social skills; (6) improve troubleshooting capabilities; (7) improve students' skills to use information with their disciplines; (8) increase students' confidence; and (9) improve the ability of students to use technology in learning (Chiang & Lee, 2016; Fajra, 2019; Novalinda, 2019).

Project-based learning implementation has several advantages, including: (1) increasing students' motivation to learn, encouraging the ability to do meaningful work, and needing to be appreciated; (2) improve problem-solving capabilities; (3) make students more active and successfully solve complex problems; (4) enhance collaboration; (5) encourage students to develop and practice communication skills; (6) improve students' skills in managing resources; (7) provide experience to students learning and practicing in organizing projects, and making allocations of time and other resources such as equipment to complete tasks; (8) provide a learning experience that engages students complexly and is designed to thrive in the real world; (9) engage students to learn to retrieve information and demonstrate their knowledge, then implement it in the real world; and (10) make the learning environment enjoyable so that students and educators enjoy the learning process (Kemendikbud, 2013).

Project-Based Learning Theory

The project-based learning model is a constructivism-based method that supports student involvement in problem-solving situations (Trianto, 2014). Students are directly involved in real life in solving problems so that the science gained is more permanent. This is also the answer to concerns about graduates' abilities, especially vocational students because superior engineering education is mechanical skills. However, it is also worth noting that globalization and technological development pose new demands for the types of work skills needed.

Project-based learning is a model of education that is supported or based on constructivist learning theory. Outstanding learning strategies in constructivist learning include collaborative learning strategies, prioritizing student activities over teacher activities, laboratory/workshop activities, field experience, case studies, problem-solving, discussions, panel discussions, brainstorming, and simulation (Sudjimat, 2014). Some of these strategies are also found in project-based learning, namely (a) collaborative learning strategies, (b) prioritizing student activities over teacher activities, (c) laboratory/workshop activities, (d) field experience, (e) and problem-

solving. Project-based learning principles are also based on constructive learning theory. Productive learning must be done by fostering students' efforts to build complex, memory-rich representations, which demonstrate a healthy level of connection between semantic, episodic, and action knowledge (Mayasari et al., 2016; Azman, 2016). As a learning model, according to Widodo & Joko (2015), project-based learning has various principles, namely (a) centrality(centrality), (b) driving questions, (c) constructive investigation, (d) autonomy (autonomy), (e) realism (realism).

Project-based learning is also supported by experimental learning theory. As William James says, the best education is through self-activity, sensory experience is the basis for understanding, and effective learning is holistic and interdisciplinary (Chiang & Lee, 2016). The theme of the selected project is also interdisciplinary, as it contains elements of various disciplines needed to solve problems in the project being worked on. Project work can be seen as a learning process to consolidate unstable experiences, expand incomplete knowledge and entirely satisfactory knowledge, learn through real experience.

Based on the above constructivist learning theory, it can be concluded that:

1. Authentic-contextual (purpose-directed activities) will strengthen the relationship between the training and its conceptual knowledge.
2. Promote students' autonomy (self-regulatory) and teachers/instructors as mentors and learning partners, who will develop productive thinking skills.
3. Holistic and interdisciplinary.
4. Realistic and learning-oriented active problem solving, which contributes to the development of problem-solving skills.
5. Provide intrinsic reinforcement (internal feedback) that can hone productive thinking skills.

Starting in 2000, in Indonesia, four educational approaches were implemented, namely: (1) life skill-oriented education; (2) competency-based curriculum and learning; (3) production-based learning; and (4) broad-based education. The new orientation of education seeks to make educational institutions like life-proficiency educational institutions. The knowledge aims to achieve competency (thus called competency-based learning), with an authentic and contextual learning process that can produce valuable and meaningful products and provide comprehensive educational services: Multi-entry-multi exit, flexible education pathways, and education (Sudjimat, 2014). Based on theoretical and empirical studies, project-based learning can accommodate all four approaches to education.

Project-Based Learning Implementation Stages

According to Wena (2012), the project-based learning phase consists of seven stages, namely: (1) a good description, a step in presenting the problem to be solved and setting goals; (2) determine the criteria, the stages in determining the requirements for problem-solving, and select the focus that you want to achieve, as well as what capabilities will be achieved; (3) the background of knowledge, the stage of determining the necessary knowledge or concepts, and seeking information to its members; (4) generate ideas, generalize concepts and formulate hypotheses; (5) implement solutions, phase in finding and implementing solutions and comparing them with other solutions; (6) reflect, evaluate the entire learning process ranging from

processes, answers, and products; and (7) generalizations, stages of formulating concepts, generalizing facts and knowledge into theory.

The stages or steps of implementing project-based learning can be explained in Figure 1 below (Ministry of Education, 2013).

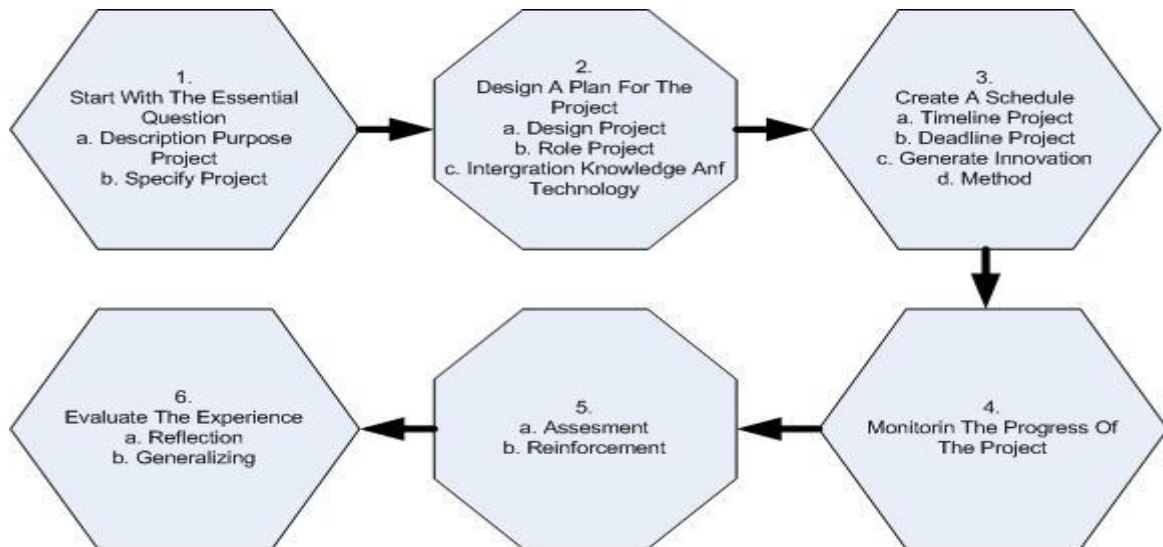


Figure 1. Project-Based Learning Implementation Stage Diagram

The steps in project-based learning are as follows:

1. Determine the fundamental question. Learning begins with an important question, which is a question that can assign students to do an activity. Take a topic that fits into real-world reality and start with an in-depth investigation. Instructors strive to make issues raised relevant to students.
2. Design project planning. Planning is done collaboratively between teachers and learners. Thus, students are expected to feel they have a project. Planning contains the rules of the game, the selection of activities that can support answering essential questions by integrating as many subjects as possible and knowing the tools and materials that can be accessed to help complete the project.
3. Schedule. Instructors and learners collaboratively schedule activities to complete projects. Activities at this level include: (a) creating a project completion timeline, (b) creating project deadlines, (c) inviting students to plan new ways, (d) guiding students when creating roads unrelated to the project, and (e) asking students to make an explanation (reason) about method choices.
4. Monitor project progress (monitor students and project progress). Educators are responsible for monitoring students' activities during project completion. Monitoring is done by facilitating students in each process. In other words, educators act as mentors for student activities. Educators teach students how to work in groups. Each student can choose their respective roles by not ignoring the group's interests, including in terms of the selection of learning resources/media. To facilitate the monitoring process, a section has been created that can record all important activities.

5. Evaluation of Results. Assessments are conducted to assist instructors in measuring standard achievement, play a role in evaluating each student's progress, provide feedback on the level of understanding that learners have achieved, assist instructors in formulating future learning strategies.
6. Evaluation of Experience. At the end of the learning process, teachers and students reflect on the activities and results of the project that has been implemented. The reflection process is carried out both individually and in groups. At the evaluation stage, students are asked to express their feelings and experiences during the project's completion. Teachers and learners develop discussions to improve performance during the learning process.

Project-Based Productive Learning at Vocational High School

Productive Subjects are a set of vocational competencies (both Vocational Base and Vocational Competency) in the vocational curriculum structure that equip students with competency standards or productive skills in a particular job or expertise relevant to the demands and demands of the job market. Areas of expertise and product development skills designed and implemented based on standard procedures and real jobs to produce goods or services by the market's demands and needs (industry). The implementation of productive subject learning in specific contexts refers to education and productive subjects' characteristics—functional elements 70% and the theoretical load 30%. Besides emphasizing the mastery of productive competencies, in the implementation of learning, it is necessary to implement strategies in organizing, delivery, and management for learning to run optimally.

The maintenance of the learning of productive subjects of Vocational High School in practice will be associated with two specific strategies, namely: (1) competency-based learning; and (2) production-based production held in schools and/or businesses/industries. In practice, the two strategies are combined into productive skills learning, conducted in school, and/or in the workplace/industry. This form of productive learning is a skill training that leads to the achievement of individual standard graduates' competencies by providing experience in production to students, both in industrial working practices and the development of school production units.

According to Sudjimat (2014), the education-based project is exact in vocational high schools that are not only source-based (competency-based training) but also based on production-based activity. Furthermore, Widodo & Joko (2015) Syer Agung located the project based on students' direction on the working procedures that the system and standards to make or which a product through production. It could be said that based on the project is very suitable in the program in vocational high school, especially those that are oriented towards the product. Siswanto (2011) is that experiential learning, context teaching and learning, work-based learning, and project-based learning theories are highly relevant in technology and vocational education.

Based on the above research, it can be concluded that project-based learning is the right learning model to be applied to productive competencies in Vocational High School so that the achievement of student competencies according to the needs of the world of work because project-based learning combines competency-based learning and production-based learning. Bring students closer to real-world conditions.

CONCLUSION

Based on the discussion description, it can be concluded that: Project-based learning is an approach that uses the problem as a first step to collecting and integrating new knowledge based on its experience in real activities. The implementation of project-based learning is:

1. Engaging students in complex real-world problems.
2. Engage students in learning to apply knowledge and skills in a variety of contexts.
3. Provide opportunities for students to learn and practice the skills needed to live and work.
4. Provide opportunities for students to learn and practice interpersonal skills.
5. Include reflective activities that direct students to think critically about the experience.

Project-based learning is a model of education that is supported or based on constructivist learning theory. Through project-based learning, students are introduced to a real work environment and meaning in the world of work. Thus the appropriate learning model for Vocational High School is project-based learning.

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