

THE PRAXIS OF PROJECT-BASED LEARNING AT PIKA VOCATIONAL SECONDARY SCHOOL SEMARANG

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Abstract


This study aims to find out the praxis of project-based learning at PIKA Vocational Secondary School Semarang and to identify the advantages and disadvantages. The design of this research is a qualitative case study. The data collection techniques were in-depth interviews, participant observation, and document analysis. The informants of this study were: principal, vice-principal, teachers, employees, and students. This study shows that: (1) there are two patterns of project-based learning at PIKA VSS Semarang. The first pattern is an internal internship program, and the second is learning a productive practice program. (2) The advantages of project-based learning are: (a) it trains the students' sense of entrepreneurship; (b) it develops learning motivation; (c) it gives a complete, real and contextual learning experience; and (d) it develops the students' hard skills and soft skills. The disadvantages of project-based learning are: (a) it requires the acquisition competencies to perform project assignments; (b) it takes times; (c) it requires high operational costs; (d) it requires adequate facilities.

Keywords: *project-based learning, PIKA vocational secondary school, learning praxis*

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INTRODUCTION

The impact of technological and information development in the 21st century dramatically affects changes in the way of life, learning, work, and even ways of thinking at work (Boutin et al., 2009). Unpredictable changes in the 21st-century workplace should become the attention of Vocational Secondary School (VSS) to equip students with 21st-century skills. It is necessary for VSS graduates to be absorbed in the labor market and to be adaptive rather than anticipatory to the changes in their workplace, both for the current and future contexts. The 21st-century skills include verbal and written communication skills, critical thinking in problem-solving, professionalism and ethics in the workplace, teamwork, technological skills, leadership skills, and project management (Trilling & Fadel, 2009).

This expectation has not been fully achieved. The facts show that VSS has not yet succeeded in overcoming the problem of unemployment in Indonesia. The empirical phenomenon shows that some Vocational Secondary School (VSS) graduates have not been able to be absorbed in the job market because their competence is not in accordance with the demands of the work field (Trianto, 2014). The data from the Central Bureau of Statistics quoted from Ulya (2019) in Kompas.com, November 5, 2019, the open unemployment rate is dominated by VSS Graduates grew 10.42% in 2019. The education sector becomes the thing that contributes the most to the amount of unemployment in Indonesia.

The issue of unemployed vocational graduates reported is contradictory to the phenomena that occurred in PIKA VSS Semarang. VSS PIKA Semarang is one of the vocational education institutions that is consistent in producing qualified, skilled, and competitive graduates in the field of furniture engineering. PIKA VSS is able to produce highly qualified human resources to make graduates able to be absorbed in the job market. Almost none of the PIKA VSS graduates are unemployed. The study from Setiawaty (2013) shows that the teaching and learning at PIKA VSS produce graduates with competence, ready to work, and fulfill the industrial needs in global competition. They are either absorbed in the work field and able to do the entrepreneurship (Adriyanto, 2012). Based on the empirical study in the field, it was found that: (a) PIKA VSS graduates were able to be absorbed in the job market due to their superior competences; (b) PIKA VSS graduates have the readiness to work in the wood industry; (c) every year many industries apply for the workforce and do direct recruitment from PIKA VSS (Sugestiyadi, 2012). Based on the PIKA VSS internship program report in 2017, 20 companies from various regions come to recruit apprentice students. The list of the companies can be seen in Table 1.

Table 1. List of Internship Partner Companies PIKA VSS Semarang

No.	Companies	Regional Address
1.	PT. Kudus Istana Furniture	Kudus, Central Java
2.	PT. Horrison & Gill	Semarang, Central Java
3.	PT. Deka Sari Perkasa	Bekasi, West Java
4.	PT. Agape Terang Mulia	Tebet, Jakarta
5.	PT. International Furniture Industries	Cakung, Jakarta
6.	PT. Cipta Kreasi Wood Industry	Karawang, West Java
7.	PT. Erka Interindo	Pulogadung, Jakarta
8.	PT. Integra Indocabinet	Sidoarjo, East Java
9.	Yayasan Mulia Bakti	Purwokerto, Central Java
10.	PT. Marrie Albert	Semarang, Central Java
11.	PT. Mamagreen Pacific	Semarang, Central Java
12.	PT. Jatiluhur Agung	Semarang, Central Java
13.	PT. Semeru Karya Buana	Semarang, Central Java
14.	PT. Kayu Lapis Indonesia	Semarang, Central Java
15.	CV. Mebel Internasional	Semarang, Central Java
16.	PT. Satya Mas	Kuningan, Jakarta
17.	PT. Antex Jaya Exim	Semarang, Central Java
18.	PT. Alegria Living	Semarang, Central Java
19.	PT. Danwood	Semarang, Central Java
20.	PT. Kajia Jawa Manufacturing	Klaten, Central Java

The data provide an overview of the quality owned by PIKA Vocational Secondary School Semarang. Wood industries across regions in Indonesia have known the PIKA VSS. The companies came to recruit students as workers. The internship program coordinator had said that three of these 20 companies belong to PIKA VSS Semarang. That fact proves that the success of PIKA Vocational Secondary School in educating its graduates to become entrepreneurs who master their work field expertise.

Another fact that can indicate that PIKA VSS is considered successful in forming its students skilled in the field of the wood industry can be seen through the students' achievement record in various competitions. PIKA VSS has achieved outstanding achievements in every skill competition from year to year, both at national and regional, even at the international level (Berita Jateng, 2015). The performance record ever achieved by PIKA VSS in various skill competitions is presented in Table 2.

Table 2. Achievement Record of PIKA VSS Semarang

No.	Competition	Year	Achievement
1.	Asean Skill Competition (ASC) in Malaysia	2016	Gold Medal Cabinet Making
2.	World Skill Competition (WSC) in Brazil	2015	Medallion for Excellence Joinery
3.	Asean Skill Competition (ASC) in Vietnam	2014	Gold Medal Joinery, Silver Medal Cabinet Making
4.	Nasional Competency Competition	2013	First rank on Joinery
5.	Asean Skill Competition (ASC) in Indonesia	2012	Gold Medal Joinery, Silver Medal Joinery, Silver Medal Cabinet Making

The PIKA VSS excellence in producing quality graduates cannot be separated from the process of organized learning. The learning at PIKA VSS is able to produce competent, accomplished, ready to work, and global competitiveness output (Setiawaty, 2013). The documentation of the PIKA VSS profile indicates that one of the patterns applied to learning at PIKA VSS is a project-based learning model. Project-based learning at PIKA VSS is done by providing project work to students to create a furniture product. The learning pattern provides an opportunity for students to complete project work autonomously. The implementation of project-based learning at PIKA VSS as the actualization of the teaching-based system of the education industry is done to present the real situation of the industry in the learning process. Learning through real working practices can improve student work competence (Pancawati & Sukardi, 2017).

Project-based learning is a learning model that provides an opportunity for students to produce valuable and realistic, and contextual work (Trianto, 2014). Project-based learning includes an interesting and innovative learning model in which students choose various aspects of the task and are motivated through real problems in many cases, thus contributing to the environment (Bender, 2012). Thus, project-based learning is a learning model consisting of complex tasks that are realistic-contextual by engaging students in project activities and producing valuable products.

The research evidence shows that the project learning model is successful in building deeper understanding and a higher level of motivation and at developing the 21st-century skill (Trilling & Fadel, 2009, p. 107). That is because of several things. First, the project learning model can help students deeper understand because they can apply the knowledge to real-world problems. Second, project learning will assist students in improving performance because project completion requires active and collaboration. Indirectly also form the skills to work together. Third, learning can be successful because students are taught how to learn as well as what to learn (Larmer et al., 2015; Mulyadi, 2016; Trilling & Fadel, 2009).

Project-based learning is a powerful teaching method that: (1) motivates student; (2) prepares the students for college, careers, and citizenship; (3) helps students meet standards and do well on tests that ask them to demonstrate in-depth knowledge and thinking skills; and (4) allows teachers to teach in a more satisfying way (Larmer et al., 2015). Based on these definitions, project-based learning, at a glance, has similarities with the concept of problem-based learning. Both have a conceptual similarity in which learning is authentic and based on real problems. However, the difference between the two can be seen from the focus of learning. Project-based learning focuses

on learning in the final process in the form of a product (artifact), while the end result of problem-based learning does not always lead to the product. At the same time, the problem in project-based learning is an obstacle experienced by students during the process of project work so that students need to find solutions to problem-solving, while in problem-based learning depart from the problem as the foundation of the inquiry process in collecting knowledge.

Based on the phenomenon that occurs at PIKA VSS, the aim of this study is to describe how the process of project-based learning at PIKA Vocational Secondary School can form competent graduates and in accordance with the demands of the work field. The researchers also identified the advantages and disadvantages of project-based learning at PIKA VSS Semarang. It can be a reflection and solution for unemployment problems that occur in VSS graduates in Indonesia.

RESEARCH METHOD

The research was conducted at PIKA Vocational Secondary School (VSS) Semarang to describe project-based learning praxis at VHS PIKA Semarang. Based on the research problems that are holistic and departs from the specific cases that occur at PIKA VSS, the research method used is qualitative research, particularly Case Study. A case study is used when researchers want to understand a real-life phenomenon in depth (Yin, 2009). The data collection techniques were in-depth interviews, participant observation, and document analysis. The informants of this study were: principal, vice-principal, head of the workshop, teachers, employees, and students. The informants were selected using a purposive technique based on the following considerations: (1) people who know the learning process correctly; (2) people involved in the planning and implementing project learning; (3) people who have time to provide information. Observations were conducted in productive practice learning in grade X, XI, XII, and grade XIII internship activities in the production unit. The validity of the data was obtained using the triangulation technique (sources).

The data were analyzed using the interactive framework of qualitative data analysis, proposed by Miles and Hubberman (1994). There are four stages of data analysis. The first stage is to collect data from various data sources with different collection techniques. The second stage is to make data reduction by selecting and sorting data and categorizing it with a coding system. The data are reduced by grouping relevant data to answer research questions and getting rid of irrelevant data with research questions. The third stage is to present data into the data transcript table and matrix of data analysis to make the data more easily understood so that the meaning behind the empirical phenomenon can be captured clearly. The last stage is to draw conclusions from the data that has been processed and analyzed carefully to answer the problem's formulation.

RESULTS AND DISCUSSION

The Concept of Project-Based Learning at PIKA Vocational Secondary School

Project-based learning at PIKA VSS is a learning process that involves the students' project work. The project in question is the assignment of work assignments to students oriented to manufacture furniture products (product-oriented). "At PIKA VSS, since the beginning of the learning period, the students are given the assignment to make finished products for sale (W.LKS.SQ1)", claimed a teacher. The application of the project-based learning model is based on the view that the learning model is suitable for teaching practice in VSS based teaching factory as it can present a real and contextual learning situation (not-simulation) in accordance with the characteristics of the work of manufacturing-based furniture industry. Head of The Workshop PIKA VSS said, "If the vocational school provides a simulation pattern of learning, competency cannot be achieved (W.A.SQ1)."

Conceptually, the project-based learning model is chosen as the embodiment of teaching factory teaching, in which there is a mix between the learning process and production process (Kuswanto, 2014). The production process is used as a learning media to form students' work competence. In the learning process, students are given the task to realize the project manufacture of products through the manufacturing process both in the workshop and in the production unit.

Project is designed by adjusting the substance of competence to be achieved. “Through the project learning model, students are expected to be able to achieve their competencies in accordance with industry expectations (W.MRS.SQ1)”, claimed the principal.

Looking at the project-based learning praxis that is applied at PIKA VSS, the learning theory that can be used as the foundation is work-based learning and constructivist theory. This work-based learning theory emphasizes learning mastery in accordance with industry standards (Sudira, 2016). The foundation of constructivist learning theory can be understood from the roles of the students and teachers in the learning process. Students are required to be active and independent in building their knowledge through interaction with learning resources. The teacher acts as a facilitator and supervisor.

The praxis project-based learning at PIKA VSS has two different types of patterns. The first pattern is an internal apprenticeship program in a production unit intended for class XIII. The learning pattern is made by assigning project tasks to students to create furniture products, from designing creative product designs to keeping abreast of market developments. Next, creating a drawing of production work, compile a list of equipment and materials needs, designing a work plan. Then realize the product design in the process of production, reporting, and marketing of product results to customers in the showroom.

The second pattern is applied as a method of delivering productive practice materials in class X, XI, and also XII. Project tasks or work are designed by the teacher by adjusting the competence and quality dimensions of learning at each grade level. The competence substance to be achieved translates into a production work image that is used as a project task of the student in making the product.

The First Pattern as Entrepreneurship-Based Project Learning

The first pattern is called entrepreneurship-based project learning. The Vice Principal said, “Grade XIII is based on entrepreneurship, independent project, they design the product by themselves, sell to the market, like that it is a project-based concept (W.DW.SQ1).” Praxis Project-Based Learning as an internal internship program is organized with the aim to strengthen students’ competencies which have been obtained in grade X, XI, and XII. Stabilization of work competence is done to prepare students in the program of external internship in the industry. It is done in the hope of minimizing the competency gap that has been gained with the demands of the industrial world.

Competencies already taught in grade X, XI and XII are strengthened by work-based learning experiences integrated with the manufacturing process. “Its importance, once again, is so that students have complete experience in a process from the beginning to the end for furniture manufacturing (W.LKS.SQ1)”, claimed a teacher. Basically, the concept is in accordance with the principle of vocational learning in the theory of Prosser and Quigley. Vocational education will be effective and efficient when students are trained in an environment that resembles industry, and the training jobs are carried on in the same way, with the same operations, the same tools, and the same machines as in the occupation itself to develop habits of thinking and working required in the occupation itself (Prosser & Quigley, 1950).

Table 3. Planning Aspects

No.	Aspect	Description
1.	Purpose	Refers to the standard of competence
2.	Target	The specific size of the objectives achievement
3.	Material	Knowledge needed in practice
4.	Type of project	The type of product that will be done by students
5.	Scheduling	Work time target
6.	Division of groups	Division of groups based on student potential analysis
7.	Working procedures	The steps of work to be undertaken in learning
8.	Reporting results	Signs in writing the work report
9.	Product Marketing	The method used to market the products of students' work
10.	Assessment	The design of the types and criteria used for the assessment

The focus of learning on an internal internship program is to provide students with a series of production work tasks similar to those in the industry's manufacturing process. Learning requires good planning to achieve learning goals effectively and efficiently. Teachers are drafting such a way of learning that can be used as a guide project implementation. Guides are used to help students understand clearly the procedures and steps to be taken in the learning process. Aspects to be considered in the lesson planning are presented in Table 3. The stages of activities in the implementation of project-based learning include pre-production, production, and post-production activities, as shown in Figure 1.

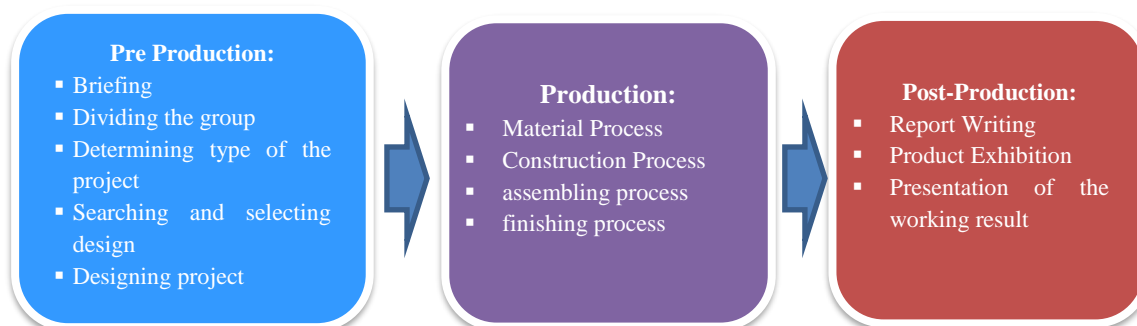


Figure 1. The Stages of Activities in the Implementation of Project-Based Learning

The pre-production stage is a learning activity conducted before realizing the project in the production process. Briefing activities are the first step in learning. At the briefing activity, the teacher explains the whole project tasks are done by the students. Teachers convey aspects of project work that have been prepared in the lesson planning. The teacher then divides the group. The student workgroup is determined by the teacher based on the characteristics and students' potential analysis. Students with a tendency in technical skills will collaborate with students who have a tendency in terms of drawing and design. "We have determined the groups based on competence. I consulted with the drawing teacher to determine the composition workgroup (W.A.SQ1)", claimed the head of the workshop VSS PIKA.

Once students get the group and the type of project that will be created, students then look for and choose product design from various learning sources, such as the internet, magazines, or books. The group activity in project-based learning provides an opportunity for students to choose where, when, and how students work (Amaral et al., 2015). In pre-production activities, students are given wide and open opportunities to explore ideas from various learning sources, where and how they explore, select, and design product designs. Extensive opportunities for exploration allow for differences in ideas between individuals (students) in workgroups. The student said, "There is a lot of debate too, we already have (design), presented in class, this, this, this. There are opinions from friends all in; this is not right, it is right, it should be like this, from the teacher too, so there is an open mindset too, oh it turns out how to determine the right design like this (W.MG.SQ1)." Efforts to integrate the differences between individual ideas are made by solving problems by collecting ideas from group members. This technique is called brainstorming. Brainstorming technique is a process that students undertake to organize project tasks by collecting ideas as the solution to the problem (Bender, 2012).

After the selected design, students submit verification and consultation to the teacher to assess the feasibility of the design. Design feasibility is seen from two aspects, namely, (1) product selling value and (2) the possibility to be in production. For the product to be of sale value, the design needs to follow the growing trend in the furniture market but still pay attention to the possibility of the design being produced. If the design has been verified and approved by the teacher, then the students create a working drawing (production). Production work drawings must also pass through the business unit's quality control process in order to ensure the quality of the type and construction detail of the product. After that, the students then create a Material Requirement List

(MRL) and a work plan (time schedule). Product design, working drawings, basics of building construction, and work plan are made into a useful project planning document to guide the production process. Prior to the production process, the project design document was reexamined by the production workshop instructor to ensure completeness.

The next stage is the production activities. Students perform production processes based on the project planning documents. The production process includes four stages, namely, the material, construction, assembly, and then finishing. At each stage of production, students collaboratively carry out parts of the work that have been organized by the group leader. One of the leaders' group explained, "After the design is finished, then we begin the selection and sorting of the materials, we have divided. Then we begin the process of dimensioning, construction, to the assembly stage (W.R.SQ2)." The leader of the group as leader has the duty to control its members' work to complete the project in accordance with the time targets and work plans listed in the project plan document. The field instructor conducts overall monitoring and guidance in the production process. "The Instructor carries out a monitoring and mentoring process when there are students who experience technical difficulties (W.LKS. SQ2)", claimed a teacher. The instructor ensures that the student performs the work in the right way and procedure, ensures the quality standards of work at each stage of production, and provides solutions when students experience problems or technical constraints in the field.

After the production process is complete, then the next stage is post-production. Post-production activities in project-based learning include report writing, product exhibitions, and results presentation. Report writing aims to train students' communication skills in conveying process and job results in writing, while the presentation of the work is intended to train students' verbal communication skills. Meanwhile, product exhibition activities from project-based learning aim to form the character of entrepreneurship (entrepreneurship) into the students themselves. The involvement of students in product exhibition activities is as marketing in charge of offering and explaining products to customers. This is done with the aim to train students' ability to build relationships with customers (customer) and understand the wishes and expectations of customers of the product.

After the learning is completed, then the teacher evaluates the lesson. Evaluation is done by looking at the overall assessment results, both process and output (output) of learning. The type of assessment undertaken is an authentic assessment consisting of project appraisal, product assessment, and student performance appraisal.

The Second Pattern as Guided Project Learning

Project-based learning on productive practice programs is different from apprenticeship programs. In learning productive practice, teachers make design and project design as a task that must be done and realized by students. The second pattern of Project-Based Learning is guided project learning. The project is designed as a training medium to develop productive competencies, so that project design adjusts competence demands and learning quality dimensions at each grade level. The head of the workshop said, "The training planned by the teacher refers to the competency units to be taught. One job represents one unit of competence (W.A.SQ2)." Differences in competence demands and the quality dimensions of learning in each grade make the learning-based have different characteristics (see Table 4).

Table 4. Characteristics Differences of Project Based Learning at PIKA VSS Semarang

Aspect	Grade X	Grade XI	Grade XII
Project Type	Fragment Shape	Simple Furniture	Furniture Set
Quality dimension	Sense of Quality	Sense of Efficiency	Sense of Teamwork
Work System	Individual	Individual	Collaborative
Tools	Manual	Basic Machine	Industrial Machine

Project-based learning in grade X focuses on developing basic individual competencies, such as the making of workpiece dimensions, various construction of wooden connections to small size furniture products so that the resulting product is still in the form of fragments. The units of competence to be achieved are translated into working drawings and used as students' project assign-

ments. Making the product is done individually using manual equipment. Learning emphasizes the dimension of the *sense of quality* so that students understand the quality of work, the results of work, and also the attitudes appropriate to industry standards. “Students complete each training if their work has met specified quality standards (W.LKS.SQ2)”, said a teacher. The cultivation of a sense of quality is done by minimizing tolerance to error, either from the working process or from the product produced. The teachers plan any training during one year of learning starting from the basic to the complex level, from how to use manual tools, training basic woodwork skills to make workpieces that are still in the form of fragments of wooden joints (W.DW.SQ4; WASQ4.13)

Project-based learning in productive practice in grade XI is the development of learning in grade X. Grade XI project learning becomes a vehicle for applying the competencies taught in grade X. Basic skills taught and accumulated learning experiences in creating fragmented products are used as stock to do more complex project work. The project is already made in the form of simple furniture products. Dimensions of the quality of learning to be achieved more emphasis on the *sense of efficiency*. The teacher said, “Learning in class XI emphasizes aspects of efficiency, efficiency in terms of work time, and material usage (W.IND.SQ4).” Therefore, in the learning in grade XI, students are required to be able to do the work using basic machines and a work plan flowchart while maintaining a sense of quality that has been learned in class X (W.DW.SQ4.33, W.MG.SQ4.36 & 46).

Project-based learning in grade XII is a learning development applied in grade XI. Project design is more complex both from specification and detail of construction. The process is already using industrial machines. The focus of competency development is on the ability to manage projects collaboratively. It is based on the dimensions of the quality of learning in grade XII that emphasizes the *sense of teamwork*. Thus, learning is done to apply the skills that have been obtained in grade XI and, at the same time, train students' leadership skills to manage and complete the project collaboratively.

The Advantages of Project-Based Learning

The first, project-based learning will train students' independence in their work. The teacher said, “The students will learn independently because they have ideas, hopes from students, passion from students so that they can be independent, they will work on their own looking for what is good, then self-designed, then work on their own (W.LKS.SQ4).” Students are required to be active in building the knowledge of the project completion process, and the teacher acts as a facilitator. Thus, the knowledge gained is more meaningful.

The second, project-based learning will improve students' learning motivation (Trianto, 2014). “The students are motivated in learning and working earnestly, because projects designed are based on ideas from students so that the desire about the product model made comes from students (W.DW.SQ6),” said the Vice Principal. Learning motivation arises from the challenges and demands to complete the project. Challenges and demands will stimulate the diligence and hard work of the students in completing projects. Diligence and hard work will also arise when the idea of the project comes from the students. Such project-based learning is applied to grade XIII.

The third, project-based learning can bring real and contextual learning nuances. Learning is real and contextual because the learning process is integrated with the production process, and learning materials are directly related to the work in the industry. The teacher said, “The students learn mindfully about the production process. This process starts from designing, the process of materials, the process of construction, the process of assembling, the process of finishing product (W.LKS.SQ6).” The learning experience gained will be memorable and kept in mind by the students. An industry-like learning climate will enable increased understanding, reminders, and re-implementation at work (Silberman, 2014).

The fourth, project-based learning can develop both soft and hard skills. The skills of the trained soft skills include creative thinking ability, oral and written communication skills, collaborative skills and teamwork, problem-solving skills, and leadership skills in managing projects. In addition, project-based learning can also develop hard skills, including the ability to use machinery, identify materials, use the software, and others.

The Disadvantages of Project-Based Learning

In addition to having advantages, project-based learning also has a lack of aspects that can be used as a consideration for schools to apply project-based learning. The first shortcoming, project-based learning will be effective when students have mastery of the concept of knowledge that is needed to perform the job task (project). The vice-principal further explained, “One of the skills needed in project work is the ability to understand the product's work image. If the ability to understand the working drawings has not been fully mastered, then in the production process, often mistakes occur (W.DW.SQ7).” “If there are many mistakes in the field and the cost is too high because many materials reject, the material must be replaced (W.A.SQ7)”, claimed the head of the workshop. Before using the project strategy in the learning activities, the students already have some knowledge and skills related to project tasks, so that students can apply the knowledge and skills to complete the project (Kosasih, 2014; Wena, 2014). Therefore, teachers should carefully consider whether students already have the necessary skills to perform the job tasks.

Second, project-based learning requires a considerable length of time in a single project. Project-based learning requires a broad time duration due to complex process activities (Kosasih, 2014; Sumarni, 2015). Each stage of work takes a long time to complete the work. Teachers are required to be able to estimate the time of project construction so as not to neglect other learning activities. “If they cannot manage their time, then the product is not finished (W.A.SQ7)”, claimed the head of workshop.

Third, project-based learning requires substantial operational costs. The head of the workshop stated, “Project-based learning requires a large amount of money, especially to provide practice material (W.A.SQ8.13).” High operational costs are identified from the type of projects that are made by students in the form of furniture products in terms of material needs costly. It starts from the direct costs for the main materials such as wood, glue, finishing layer, and also the indirect cost in the form of electricity usage, material delivery, and others. Fourth, project-based learning requires the availability and preparation of adequate facilities as well as infrastructure. Without the availability of adequate facilities and infrastructure, the learning process will not run effectively and efficiently.

CONCLUSION

The praxis of project-based learning at PIKA VSS Semarang has two different types of patterns. The first pattern is entrepreneurship-based project learning. The learning process in a production unit is performed within the context of an internal internship by assigning tasks to students for autonomous product manufacturing projects, from designing products to production processes to reporting results and selling/marketing. The second pattern is a guided project learning. Project-based learning is a method of delivering learning materials in the form of productive practice through project tasks provided by the teacher by adjusting the substance of competence in each grade level.

The advantages of project-based learning, among others, are (1) training students' sensitivity towards independence (sense of entrepreneurship); (2) improving learning motivation; (3) providing a real and contextual learning experience of the furniture manufacturing process; and (4) developing student employability skill. Meanwhile, the disadvantages of project-based learning, among others, are that project-based learning: (1) cannot be effective when students have not mastered the competencies required to carry out project tasks; (2) requires a long duration of time; (3) requires high operational costs for material procurement and equipment operationalization; and (4) requires adequate facilities with industry standards.

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