

The Influence of a Project-Based Learning Model to Life Skill Ability

Hendrik Pratama¹, Andista Candra Yusro¹ and Muhammad Nur Hudha²

¹Universitas PGRI Madiun, Jl. Setiabudi No. 85 Madiun 63118, Indonesia

²Universitas Kanjuruhan Malang, Jl. S. Supriadi Malang 65148, Indonesia

andista@unipma.ac.id

Keywords: Project-Based Learning, Thinking Skills, Social Skills, Academic Skills, Vocational Skills.

Abstract: This study aims to determine the effect of the model of Project Based Learning on student life skills. This research is experimental research with posttest-only control group design. Data collection method was done by observation method and questionnaire. Aspects of life skills that include thinking skills, social skills, academic skills and vocational skills. Learning model by following the steps of Project Based Learning starts with the essential question, design a plan for the project, create a schedule, monitor the students and the progress of the project, assess the outcome, and evaluate the experience. The results of the analysis in the experimental class and control class on the personal skill aspect showed an average score of 80.50 and 79.94, social skill aspects 85.15 and 83.00, an aspect of academic skills 83.00 and 80.94, and vocational aspects skill 80.95 and 76.82. Because during the learning process other than equipped with the academic ability of students are also equipped with practical skills closely related to the utilization of electrical circuits in the life of the everyday. The results showed that the model of Project Based Learning gave a significant influence on student life skill.

1 INTRODUCTION

The concept of life skills-based learning should be integrated into learning. Ministry of National Education in Anwar (2006: 28) divides life skills into four types, namely (1) personal skill, (2) social skill, (3) academic skill, and vocational skill. Personal skills include self-awareness skills and thinking skills. Social skills include communication skills and collaboration skills. Academic skills include the ability to identify variables, explain variable relationships, formulate hypotheses, and experiment. Vocational skills include skills that can be associated with a particular field of work or vocational. Vocational skills play a role in training students in processing things into more useful products (Kusuma and Siadi, 2010). These four aspects of life skills need to be possessed by learners to be able to survive and develop in the face of global challenges.

The appropriate learning model of life skill development of learners is model of Project Based Learning. This learning model is project-oriented and uses a constructivist approach that enables learners to be active in learning activities. This model emphasizes the activities of learners and focuses on the core concepts and principles of a lesson involving

students in problem solving, investigation and cooperation in producing a product. PBL promoted an increase in students' life skills, specifically problem solving, creativity, responsibility, communication, and self-direction; and the study adds to the data and literature about PBL. However, there may have been other contributing factors for these increases in life skills such as other college courses, extracurricular activities, or life experiences. Perhaps college course assessments in general should focus more on learning these types of skills because these are the skills that individuals need and use on an ongoing basis throughout life (Wurdinger and Qureshi, 2015). In accordance with Lict's (2014) study that project-based learning can serve as a teacher's strategy in enhancing the thinking, communication, collaborative and creativity skills that are capable of supporting the development of life skills. Supported also by research Devkota, et al. (2017) that with the model of Project Based Learning can provide opportunities for learners to learn real experiences outside the classroom to make learning more meaningful. The steps of learning in Project Based Learning as developed by The George Lucas Educational Foundation (2005) consist of: (1) start with the essential question, (2) design a plan for the

project, (3) create a schedule, (4) monitor the students and the progress of the project, (5) assess the outcome, (6) and evaluate the experience.

Life skills and project-based learning models have relevance because the variables that PBL goals can be represented by some values in the life skill aspect. The life skill aspect relates to the experience that learners must have a provision in life and prepare themselves for entering the workforce. While the project-based learning model emphasizes the learning process on skills aspect, integrated with practice, cooperation, investigation, problem-solving related to real-world issues, and product-oriented. Following the opinions of Wurdinger and Rudolph (2009) that the project-based approach allows students to learn essential life skills, instill confidence and desire to become lifelong learners. Education is not limited to the theory in the concept in the classroom, but more important is to apply knowledge owned. Students must begin to learn about future success and the challenges they face in entering the workforce.

One of the interesting subjects to discuss is about electric circuit concept. This course is very applicable because many examples of electrical circuits that can be applied in everyday life such as making a household electrical circuit. However, this material is also considered difficult by learners. The results of the assessment of the concept of electrical circuits, only 43% of students graduated. When viewed from the approaches, methods, and models of learning applied to this course is a teacher-centered approach, through lecture, discussion, and practicum methods. This model is less appropriate if it refers to the concept of developing the life skills of learners. The results of interviews with some students obtained information that the learning activities have not linked electrical matter direct current with the concept of electricity in real life. The direct current electric material is accompanied by learning by practicum method. However, when the lecturer asked the students to analyze the electrical circuit concept in each student's house, there are still many who cannot yet. In fact, many are wrong concepts between serial and parallel electrical circuits. Therefore, educators need to apply learning models related to real life experienced by students, able to link learning materials with everyday life and make the experience as a provision to run his life. Based on the above background, then this study aims to determine the

effect of learning model of Project Based Learning on the ability of student life skills in Electric Circuit courses.

2 RESEARCH METHODS

This research is a type of experimental research conducted on the students of SMT 1 Electrical Engineering Education Study Program PGRI Madiun University in 2017. The sample consists of two (2) classes, namely experimental class and control class with the number of samples each 34 people. In the experimental class (A) conducted learning by applying the model of Project Based Learning. While in the control class (B) apply the lecture model with demonstration. Sampling was done by using Cluster Random Sampling technique that was taken randomly from population having same homogeneity. The independent variables in this study are project-based learning in class A and lecture learning in class B. The dependent variable in this study is life skill. The research design used was posttest-only control group design. Data collection method was done by observation method and questionnaire. Observation method is used to assess the 4 aspects of life skill that includes personal skills, social skills, academic skills and vocational skills, while the questionnaire is used to determine students' self-perception of life skill. Life skill research data were analyzed using qualitative descriptive analysis.

3 RESULT AND DISCUSION

Basic competency studied is analyzing the direct current circuit. The materials used are Electric Circuits with sub-subjects covering the concept of Ohm's Law, Electricity conduction, Kirchoff Law, Series Electric Circuit, Parallel Electric Circuit, and Joint Circuit. In the experimental class, the learning process flow is by the syntax of Project Based Learning as in Table 1. While in the control class, the learning process is done by lecture method accompanied by demonstration assisted by practicum tool of the direct current electric circuit.

Table 1: Syntax Project Based Learning On Electric Circuit Courses (Wena, 2010).

No	Syntax	Activity	
		Lecturer	Student
1	Start With the Essential Question	Stimulate students by requesting to analyze the concept of household electrical circuits, analyzing weaknesses and strengths.	Students formulate the problem with the subject matter: <ul style="list-style-type: none"> • The type of electrical circuit available at home. • The advantages and disadvantages of the electrical circuit.
2	Design a Plan for the Project	Ask students to design projects to make household electrical circuits.	Students create a complete design that includes goals, tools and materials, and how to work.
3	Create a Schedule	Ask students to schedule and divide work assignments	Students arrange schedules of activities and division of tasks
4	Monitor the Students and the Progress of the Project	Monitor and observe student activities	Implement projects that have been designed and made documentation
5	Assess the Outcome	Assessing the product	Presenting the product
6	Evaluate the Experience	Provide evaluation and input for outcomes and learning process.	Fixed flaws and refined the next product

Based on the results of research on experimental class and control class in terms of 4 aspects of life skills obtained results as shown in Figure 1.

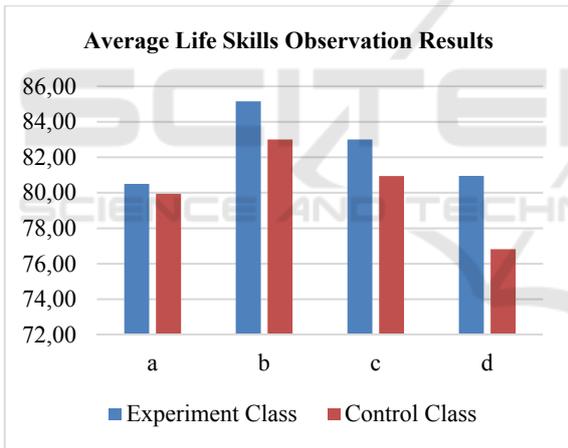


Figure 1: Personal Skill (a), Social Skill (b), Academic Skill (c), and Vocational Skill (d)

Figure 1 shows that there is a difference between the experimental class and the control class on the four aspects of life skill. Average grade of experiments for 4 aspects of life skill that includes personal skills, social skills, academic skills, and vocational skills of 80.50, 85.15, 83.00 and 80.95 respectively. While the average value in the control class for 4 aspects of life skill that is 79.94, 83.00, 80.94 and 76.82. In every aspect of life skill there are indicators in it.

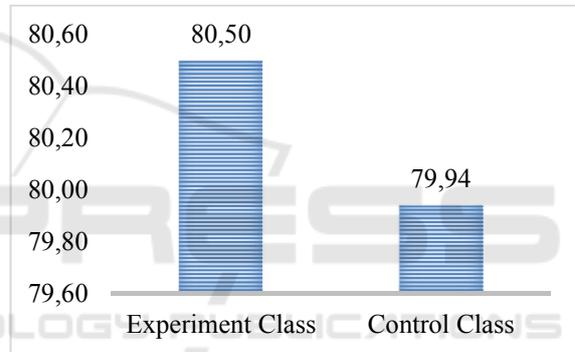


Figure 2: Results of personal skill observation.

Figure 2 shows the observation result on the personal skill aspect between the experimental class and the control class with the average values of 80.50 and 79.94, respectively. Personal skills aspect in terms of self-awareness (self-awareness skills) and thinking skills (thinking skills). Self-knowing skills include consciousness as God's creatures, awareness of self-existence, and awareness of self-potential. At the time of the learning process, self-awareness skill can be known from the observation. Such as not falsify the data of experimental results, discipline and timely in the task. At this stage, students are given an explanation of the concept of learning that will be given, objectives, and learning steps. In the experimental class, learning steps were taken with the learning model of Project Based Learning and control class using lecture model accompanied by demonstration. Lecturers provide the same problems in each group that is (1) How the concept of direct current electric circuits, (2) How the application in everyday life.

The next personal skill aspect is thinking skill. Thinking skill includes 4 indicators (1) information searching skill, (2) information processing skill, (3) decision making skill, and (4) creative problem-solving skill. In the experimental class, students are required to work quickly to discuss assigned projects. As a first step, the students conducted a study on the concept of direct current electric circuit and field observation. The next step in a group to process information and make decisions related to the idea of the project to be made. The idea of a project is to create a miniature electrical circuit that is commonly applied in the household. As the final step, the project made an analysis to answer the problems given by the lecturer. Through project tasks can also make students more independent, disciplined, and responsible. In contrast to the control class, the students studied the concept of direct current electricity through demonstration activities assisted by practicum tools. The visible weakness is that students do experiments on ready-made tool kits. So personal skill less well honed. When asked about the type of circuit, weaknesses and advantages of electrical circuits at home installations, many students cannot answer. Project-based learning encourages students to participate more actively in planning activities, making students more independent, disciplined, responsible, and group discussions to solve problems (Shih and Tsai, 2017). This is what causes the aspect of thinking skill class experiment better than control class. Thus, indicating that project-based learning has a positive effect on the personal skills aspect.

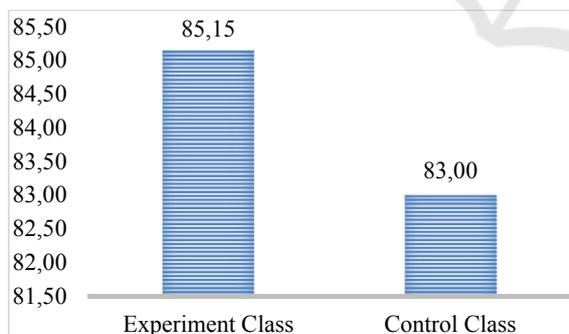


Figure 3: Social skill observation results.

In Figure 3 shows the observation result, the average value of social skill aspect which includes 2 indicators of proficiency that is cooperate and communicate with the mean value in experimental class 85,15 better than control class with value equal to 83,00. Collaboration skill with the implementation of Project Based Learning model is more honed because in groups of students are required to make presentation of the results of the discussion and

project steps which include presentation of title, materials and work tools, project development, until project presentation at the end of learning. In the process, the group can exchange ideas, pour ideas, and ideas. So, communication skills will be formed and developed. Through communication empathy, understanding attitudes, and the art of two-way communication can be developed. According to Bell's opinion (2010), through good communication then can train students to pour out their ideas. Unlike the case with the control class. Students conduct demonstration activities, analysis, and presentation of the results of the discussion. This causes social skill in experiment class better than control class. Learning in class with Project Based Learning can be connection with problems of real world (Efstratia, 2014; Musa et al., 2012; Tasci, 2015).

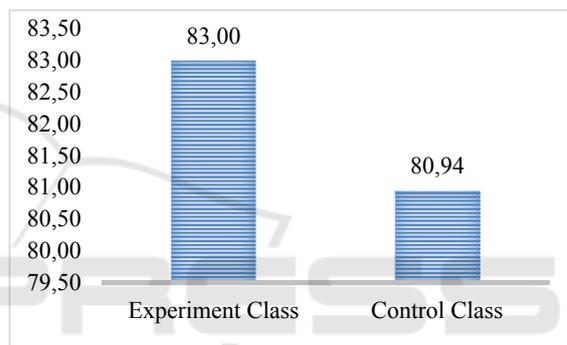
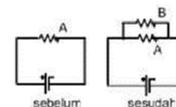


Figure 4: Academic skill observation results.

In Figure 4 shows the observation result, the mean value of academic skill aspect of the experimental class and the controls are 83.00 and 80.94, respectively. Academic skills are the ability to think scientifically and are the development of thinking skills. Academic skills have already led to academic or scholarly activities. These academic skills are closely related to the learning achievement of the knowledge and skills aspect. Although there is a difference in mean values, each group still has difficulty in concept of direct current circuit.

First, students have difficulty analyzing the effect of voltage and current on a barrier installed in parallel. For example, on the question:

1. A closed circuit consists of a resistor A and a voltage source. If the circuit is coupled with a resistor B that is paralleled with resistor A.



What is the current condition and the voltage across the resistor A after the addition of resistor B?

- a. The current and voltage are fixed
- b. Current and voltage increase

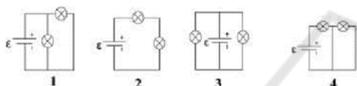
- c. Current and voltage decreases
- d. The current increases and the voltage decreases
- e. The current decreases and the voltage increases

From the analysis of answers, there is still a concept error that is (1) the student does not consider the current change as a result of the addition of resistors. Conceptually, the magnitude of the current in resistor A will decrease as it is divided in the branching point (according to Kirchoff's law). (2) The voltage value will decrease because it is divided on each resistor.

Second, students still have difficulty in explaining the character of electrical circuit. For example, on the question:

2. Side electrical circuits represent a circuit consisting of two lamps connected to a voltage source. Show which circuits are arranged in parallel...

- a. 1
- b. 2
- c. 3
- d. 1 and 3
- e. 1, 3, and 4



Some students still think that in parallel circuits should be lined up, branched, and less attention to alternative possibilities of other circuits. Many have answered that the D circuit is parallel. And if in life, then the series will be connected briefly.

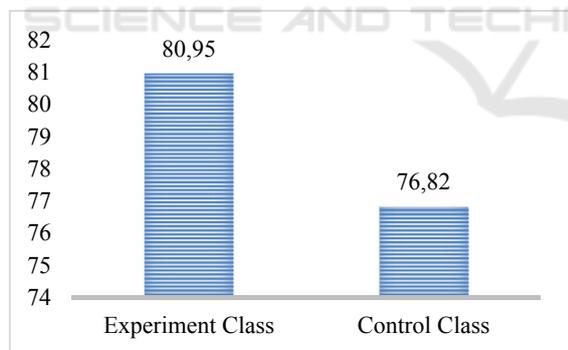


Figure 5: Observation results.

Figure 5 shows the observation result, the average value of the vocational skill aspect which includes aspects of linking the material with the product and creating the experimental and control class products respectively of 80.95 and 76.82. The vocational skills assessment indicator of the experimental class based on the project being undertaken and referring to Clark (2007) as in Table 2. While the vocational skills of the control class are taken from the skill aspect.

Table 2. Vocational skill assessment indicators.

No.	Aspek	Indicators
1	Project Idea	Utilization of raw materials are easily available Creating products that have value for use Products are able to represent with everyday life
2	Design Fittings	Contains guidance on the design method of the activity Contains costs and schedule of activities Contains a clear division of tasks
3	Performance Practices	Tols preparation Use of tools as directed and K3 Stages of work according to design
4	Product Presentation	Appearance of an attractive product Presentation of safe and neat products Present a simple and easy-to-learn product scheme
5	Product quality	The shape and appearance is interesting Proportional size Product works pro
6	Preparation of reports	Implementation Method Results and descriptions Documentation of activities Completeness of log book
7	Communicating Products	Submission of results of activities Presenting it well and correctly Answer questions correctly and clearly Communicating opinions politely and accordingly EYD

In the vocational aspect of skill, the experimental class students in groups produce projects related to direct current electricity. Ideas that appear like series of parallel electric circuit which is a series of miniature household. Students at this stage really need to understand the concept, active and involved in every activity that is designed, must have creativity in determining the project idea. The results of the observation indicate that the application of the project model makes students the spirit of learning because it feels learning to be more fun, useful, meaningful, and applicative. In the control class students do not make the product but do the demonstration activities and analyze it. Students cannot actualize themselves because the existing tools are provided with finished

circuit and less creativity. So, the learning process becomes less challenging and interesting. From both of these learning process, it can be seen that learning using Project Based Learning model can contribute to vocational skills aspect. In accordance with research Fatmawati, et.al. (2014) that the Learning-Based Learning model can improve students' vocational skills.

Completeness of learning and student skills become more honed. Besides, students can apply their knowledge in life. For example, when the electrical circuit at home damaged, students already have provisions to fix it. The Organization for Economic Co-operation and Development (OECD) in 2012 suggests that vocational education and training have advantages in improving life skills of the 21st century, namely: (1) balancing knowledge between concepts and practices in learners during learning, (2) High Order Thinking Skills (HOTS) especially on 4C aspects (Creativity, Critical thinking, Communication and Collaboration); (3) character development of learners; (4) developing meta-layered skills such as: mastering concepts, building skills, fostering creativity, connecting from different fields, which is essential to cope with the development of an increasingly complex world. This is in line with that proposed by Bell (2010) that Project-Based Learning is an innovative learning approach that teaches many strategies for successfully dealing with life in the 21st century.

The main reason of Project Based Learning is applied to the direct current flow circuit because it has the potential to make the learning process interesting, applicable, demands the students to be active in every learning, and of course can improve life skill. In accordance with the results of research (Wurdinger and Qureshi, 2014; Meyer and Wurdinger, 2015) states that Project-Based Learning can improve student's life skills especially on aspects of responsibility, problem solving, self-regulation, communication and creativity. Students become more actively encouraged in learning, while lecturer as a facilitator for students more creative and more active. In addition, teachers are also tasked with evaluating the work of students to be more effective application for their daily lives. During the learning process the students deliver results that can be authentically measured by the teacher. Project work contains complex tasks based on very challenging questions and problems, and requires students to design, solve problems, make decisions, conduct investigative activities, and provide opportunities for learners to work independently (Wena, 2010). Project Based Learning model is also able to train students' thinking ability, more critical on every problem, and analyze according to their experience. In accordance with research (Pratama and Prastyaningrum, 2016; Savery,

2006) that the model of Project Based Learning able to improve the ability of critical thinking. The Learning Based Learning Model provides new experiences and knowledge for learners because it indirectly learns to be a scientist, performs a scientific action in carrying out a project, starting from formulating the problem, determining the procedure, determining the required tools and materials, conducting the investigation, designing and create products, present or communicate products as a result of the investigation process, and conduct group discussions.

Student response to the application of project-based learning model to life skill showed the positive result. The projects can train responsibilities, work in groups, collect information, and design projects independently to the end. According to Movahedzadeh, et al., 2012, project-based learning can provide many opportunities for students to work together. Wurdinger and Rudolph (2009) that a project-based approach allows students to learn essential life skills, instill confidence and desire to become lifelong learners. Education is not limited to the theory in the concept in the classroom, but more important is to apply knowledge owned. Students must begin to learn about future success and the challenges they face in entering the workforce. Teachers play the role of facilitator, mentor, fellow learner, co-manager who creates a conducive learning environment. The impact is seen that the students become more understanding of the concept of electricity, the proper installation of an electrical grid, to the use of standard materials. For example, if all this time the students only know that household electrical circuits are still using a cable that has not been standardized, then start applying the use of standard cable based on PUIL 2000 like HIS or NYM type. Students understand that with the use of non-standard cables, the cables will be hot for long. This heat will cause waste of electric energy and even fire.

4 CONCLUSIONS

Based on the results of research and discussion can be concluded that the implementation of the model of Project-Based Learning in Electric Circuits Directional effect on student life skill. However, it is recommended that the assigned project still consider the learners' abilities. If in the case of product creation is not matched by the ability of learners it can lead to less optimal learning outcomes.

REFERENCES

- Anwar, A., 2006. *Pendidikan Kecakapan Hidup*, CV Alfabeta. Bandung.
- Bell, S., 2010. Project-Based Learning for the 21st Century: Skills for The Future, *The Clearing House*, Vol 83, Hal. 39-43.
- Clark, G. M., 2007. *Assessment for transitions planning*, Pro-ed. Austin, TX, 2nd ed.
- Devkota, S. P., Giri, D. R., Bagale, S., 2017. Developing 21st Century Skills Through Project-Based Learning In Efl Context: Challenges And Opportunities, *The Online Journal of New Horizons in Education*, 7(1), 47.
- Efstratia, D., 2014. Experiential Education through Project Based Learning, *Procedia - Social and Behavioral Sciences*, 152, 1256–1260.
- Fatmawati, U., 2017. Penerapan Model Project-Based Learning Pada Mata Kuliah Teknologi Pangan untuk Meningkatkan Vocational Skills Calon Guru Pendidikan Biologi, *Jurnal Pendidikan Biologi*, 6 (1).
- Kusuma, E., Siadi, K., 2010. Pengembangan Bahan Ajar Kimia Berorientasi Chemoentrepreneurship Untuk Meningkatkan Hasil Belajar dan Life Skill Mahasiswa, *Jurnal Inovasi Pendidikan Kimia*, Vol 4, No 1, Hal. 544-51.
- Licht, M., 2014. Controlled Chaos, *Project Based Learning*, 31 March, pp. 49-51.
- Meyer, K., Wurdinger, S., 2016. Students' Perceptions of Life Skill Development in Project-Based Learning Schools, *Journal of Educational Issues*, 2(1), 91.
- Musa, F., Mufti, N., Latiff, R. A., Amin, M. M., 2012. Project-based Learning (PjBL): Inculcating Soft Skills in 21st Century Workplace, *Procedia - Social and Behavioral Sciences*, 59(2006), 565–573.
- Movahedzadeh, F., Patwell, R., Rieker, J. E., Gonzalez, T., 2012. Project-Based Learning to Promote Effective Learning in Biotechnology Courses, *Education Research International*, 2012, 1–8.
- Pratama, H., Prastyaningrum, I., 2016. Pengaruh Model Pembelajaran Project Based Learning Berbantuan Media Pembelajaran Pembangkit Listrik Tenaga Mikrohidro terhadap Kemampuan Berpikir Kritis, *Jurnal Penelitian Fisika dan Aplikasinya*, 6(2), 44-50.
- Shih, W. L., Tsai, C. Y., 2017. Students' perception of a flipped classroom approach to facilitating online project-based learning in marketing research courses, *Australasian Journal of Educational Technology*, 33(5).
- Tasci, B. G., 2015. Project Based Learning from Elementary School to College, Tool: Architecture, *Procedia - Social and Behavioral Sciences*, 186, 770–775.
- Wurdinger, S., Rudolph, J., 2009. A different type of success: Teaching important life skills through project based learning, *Improving Schools*, 12(2), 115-129.
- Wurdinger, S., Qureshi, M., 2015. Enhancing College Students' Life Skills through Project Based Learning, *Innovative Higher Education*, 40(3), 279–286.
- Wena, M., 2010. *Strategi Pembelajaran Inovatif Kontemporer (Suatu Tinjauan Konseptual Operasional)*, Bumi Aksara. Jakarta.