

The Effect of Motivation in Learning

by Luthfiyah Nurlaela

Submission date: 11-Oct-2020 08:15AM (UTC+0700)

Submission ID: 1411346607

File name: The_Effect_of_Motivation-Subuh_dkk-Prosiding_IOP_UNP.pdf (509.5K)

Word count: 3419

Character count: 19641

PAPER • OPEN ACCESS

7

The effect of motivation in learning used an electric installation automation trainer based on Project Based Learning

8

To cite this article: S I Haryudo *et al* 2019 *J. Phys.: Conf. Ser.* **1387** 012076

View the [article online](#) for updates and enhancements.



IOP | ebooks™

Bringing you innovative digital publishing with leading voices to create your essential collection of books in STEM research.

Start exploring the collection - download the first chapter of every title for free.

7 The effect of motivation in learning used an electric installation automation trainer based on Project Based Learning

S I Haryudo¹, L Nurlaela¹, M Sondang¹, Ekohariadi, Munoto¹

¹Postgraduate Program, Universitas Negeri Surabaya, Surabaya-East Java, Indonesia

Abstract. The purpose of this study is to determine the effect of using the Industrial Electric Automation Installation trainer kit using project based learning (PjBL) and motivation on learning outcomes. Project Based Learning is a learning model that involves students actively in designing learning goals to produce tangible products or projects. By using PLC-Zelio as a control device, students can design electrical systems automatically based on electric loads according to priority, so that the use of electric power can be efficient. This kit trainer is used to complete the information conveyed orally by the lecturer in accordance with the demands of the DU/DI oriented curriculum by considering the needs of the students. The study design is categorized as quasi-experimental designed with factorial experimental designs. This study uses research and development methods based on multi-disciplines with a quantitative approach. (1) student learning outcomes with a project-based learning model are better than students who get direct learning, and complete learning outcomes by getting KKM (Learning Completeness Criteria) ≥ 70 . (2) learning outcomes in a group of students with high motivation are better. (3) there is an influence between the application of learning models of interest and motivation to student learning outcomes.

1. Introduction

The more intense competition between the business world / industrial world (DU/DI) in the current era of globalization, of course requires a skilled and competent workforce in carrying out the industrial process well. So that institutions / institutions of education / training always try to improve the competency of prospective graduates according to the demands of the world of work. The purpose of 21st century education is to build students' intelligence abilities in learning so that they are able to solve the problems around them. Forming intelligence in the real world is not just simply knowing, but can solve problems faced around the environment in a meaningful, relevant and contextual manner [3]. According to the Ministry of National Education [15], the learning process of educational units is organized in an interactive, inspirational, fun, challenging, motivational for active participation, and provides sufficient space for initiative, creativity, and independence in accordance with the talents, interests and physical and psychological development of students. Learning is a change from behavior or appearance, with a series of activities such as reading, listening and imitating. Learning also has a purpose as an effort to master material from a science. Learning is a modification or strengthening behavior through experience [9]. According to this understanding, learning is a process, an activity and not a result or goal. Learning is not only remembering, but wider than that, which is experiencing. Factors that influence student learning according to Slameto [15] are divided into two types, namely: Internal factors and external factors. Internal factors are factors that originate in the individual, for



1
Content from this work may be used under the terms of the Creative Commons Attribution 3.0 licence. Any further distribution of this work must maintain attribution to the author(s) and the title of the work, journal citation and DOI.

Published under licence by IOP Publishing Ltd

example from intention, attitude, motivation to learn. While external factors are factors originating outside the individual for example the learning model.

According to the view of constructivism theory, student-oriented learning activities are described as learning where students must actively build their own knowledge. Project-based learning model is one method that is based on constructivism that supports student involvement in problem solving situations [1][6][9]. Students in project-based learning are directly involved with real life in solving problems, so that the knowledge gained is more permanent. To help develop students' soft skills, including students need to be given problem solving skills, technical skills, and cognitive skills, then student-centered learning methods such as project based learning (PjBL) are appropriate.

In addition to the use of the right learning model as an external factor, in the learning process motivation is needed as an internal factor to improve student learning outcomes. Motivation to learn is one form of activeness for someone to encourage a series of physical and mental activities to obtain behavioral changes as a result of individual experiences in interactions involving psychomotor, cognitive, and affective abilities. Motivation to learn has a very important role because its existence is very meaningful in the process of learning to achieve goals that are expected to be achieved [11]. Motivation for learning is a process that gives enthusiasm, direction and persistence of behavior that will affect the quality of learning and student learning outcomes [13].

Besides the above factors, in the learning process other factors that can support the quality of student learning outcomes are the availability of learning media. In the opinion of [2] the use of learning media in the teaching and learning process can generate new desires and interests, generate motivation and stimulation of learning activities, and even bring psychological influences to students. In this study learning media is suitable for learning the practice of electrical automation installations, namely learning media with elements of equipment or hardware. Where learning media equipment or hardware must also present a message / teaching material, presenting attraction as a motivator for learning and presenting skills and experience for students. Learning media for equipment or hardware is a trainer kit. The use of tools in the form of learning media has a significant influence on students in understanding in depth the material being taught.

2. Methods

This research is a Quasi Experimental Design, because not all variables (symptoms that appear) and experimental conditions can be tightly regulated and controlled. The study design used "Nonequivalent Control Group Design" by modifying it into the form of Factorial Design [13]. Factorial modification of the design by considering the possibility of moderator variables that influence treatment (independent variables). The factorial design paradigm is illustrated in Figure 1.

experiment group :	O ₁	X	Y ₁	O ₂
			Y ₂	
control group :	O ₃		Y ₁	O ₄
			Y ₂	

Figure 1. Research Design

With:

- O₁ : The pretest result of the experiment group
- O₂ : The posttest result in motivated students of the experiment group
- O₃ : The pretest result of the control group
- O₄ : The posttest result in motivated students of the control group
- X : Treatment using the project-based learning model
- Y₁ : High Motivation
- Y₂ : Low Motivation

The research variables consisted of (1) independent variables of the learning method; (2) learning motivation moderator variables; (3) control variables with the same material, the same learning source, the same time allocation and the same teacher; and (4) the dependent variable of student learning outcomes in electrical automation installation material in cognitive, affective, and psychomotor

aspects. In this design, there are two groups used as research subjects, the control group and the experimental group. The control group class uses the direct learning model while the experimental group is given a lesson using a project-based learning model. While the moderator variable that influences treatment is student learning motivation.

The subjects of this study consisted of Universitas Negeri Surabaya electrical engineering students from the TE-A class as a control group and TE-B as the experimental group. Sample interpretation of group group selection using random sampling techniques. According to Kothari [13] a random sampling technique is a sampling technique from members of the population that is done randomly regardless of the strata that exist in that population. This way is done if members of the population are considered homogeneous.

In this study using descriptive statistical analysis and multivariate analysis methods. To test the research hypothesis used two-way analysis of variat (ANAVA) with the help of SPSS 17.0 for Windows. Before analyzing the data, the data obtained were tested for assumptions first, namely the test for normality and homogeneity of variance.

3. Result and Discussion

Data collection in this study uses test and observation methods. Observation methods are used to observe student learning outcomes based on the psychomotor domain and affective domain. Meanwhile, the test method in this study was used to measure cognitive domain learning outcomes in the experimental group and the control group before and after treatment.

Before conducting testing and analysis, it is necessary to do a pre-requisite test (normality and homogeneity test) on student learning outcomes. The normality test uses the Kolmogorov-Smirnov test with a significance level of $\alpha = 0.05$, the data can be categorized as a normal distribution (normal test). The results of the normality test can be seen in table 1 for the experimental group and table 2 for the control group:

Table 1. The Normality Test of Learning Results in the Experiment Group

factor score		Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		statistic	df	sig.	statistic	df	sig.
score pre test in the experiment group	cognitive domain	.187	20	.067	.930	20	.264
	affective domain	.271	20	.198	.967	20	.567
	psychomotor domain	.229	20	.089	.952	20	.324

Table 2. The Normality Test of Learning Results in the Control Group

factor score		Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		statistic	df	Sig.	statistic	df	sig.
score pre test in the control group	cognitive domain	.206	20	.062	.895	20	.301
	affective domain	.267	20	.136	.906	20	.457
	psychomotor domain	.198	20	.097	.946	20	.367

Based on the results of the normality test of the learning outcomes of the two groups having a significance value > 0.05 . This means that data from both groups have a normal distribution. Statistics show that the smaller the value, the more normal the data distribution $df =$ the amount of data.

The next stage of the homogeneity test is used to find out whether some population variants are the same or not. To test the similarity of variance, the Levene test was used. The homogeneity test results can be seen in Table 3:

Table 3. The Homogeneity Test of Learning Outcomes

Source	Levene Statistic	df1	df2	Sig.
Cognitive Scores of the experiment and control classes	.791	2	37	.290
Affective Scores of the experimental and control classes	.389	2	37	.098
Psychomotor Scores of the experimental and control classes	.934	2	37	.127

From the results above it can be seen the significance > 0.05 . Because the significance is more than 0.05, it can be concluded that the three data groups understanding students based on motivation have the same variants. Levene Statistic shows that the smaller the value, the greater the homogeneity. $df1 = \text{number of data groups} - 1$ or $3 - 1 = 2$ while $df2 = \text{number of data} - \text{number of data groups}$ or $40 - 3 = 37$.

Prerequisite test analysis shows that the data meets the requirements to be tested further by testing the hypothesis. Testing the value of the statistical hypothesis is the last step used to decide whether the answer to the problem statement mentioned in the research hypothesis is true or false, in other words, the statistical hypothesis test also means whether the hypothesis can be accepted or rejected. In this study, the separation of statistical hypothesis testing was carried out between cognitive domain learning outcomes, effective learning outcomes, and psychomotor domain learning outcomes on student learning motivation. The statistical hypothesis test used in this study is two-way ANAVA. The results are shown in Table 4, Table 5, and Table 6. Then to answer the research hypothesis, basic decision making is If the significant value > 0.05 then H_0 is accepted and If the significant value < 0.05 then H_0 is rejected or accepted H_a means there is a difference .

Table 4. Statistical Hypothesis Test Results of the Cognitive Domain

Source	F	Sig.	Value
Learning Model	7.523	.006	< 0.05
Motivation	6.402	.000	< 0.05
Learning Model *Motivation	4.067	.013	< 0.05

Table 5. Statistical Hypothesis Test Results of the Psychomotor Domain

Source	F	Sig.	Value
Learning Model	5.352	.008	< 0.05
Motivation	7.862	.000	< 0.05
Learning Model *Motivation	4.067	.032	< 0.05

Table 6. Statistical Hypothesis Test Results of the Affective Domain

Source	F	Sig.	Value
Learning Model	7.523	.008	< 0.05
Motivation	6.402	.000	< 0.05
Learning Model *Motivation	8.467	.032	< 0.05

Table 7. describes the student learning outcomes with different learning models categorized as complete with $KKM \geq 70$, but treatment with project-based learning models shows better learning outcomes in the affective, psychomotor and cognitive realms than students with direct learning models.

Table 7. Summary of Mean of Students Learning Outcomes

Learning Models	Mean		
	Affective	Psychomotor	Cognitive
Project Based Learning	89.384	84.232	83.182
Direct Interaction	85.232	80.753	82.598

Based on descriptive statistical analysis and multivariate analysis, increasing student learning outcomes with project-based learning models in this study, one of which is inseparable from the seriousness of lecturers to implement the steps of the learning model strictly, in the sense that lecturers try to follow each stage of the project-based learning model referenced. In the experimental class through project-based models, students are more active in the learning process so that students' understanding of the subject is higher and the development of student skills is better. To be able to implement project-based learning well the teacher should prepare learning tools namely lesson plan (RPP), student worksheet (LKS), visualize the theme of the project in detail so that it is easy to implement, visualize the theme of the project through attractive packaging so that students are motivated to work on the project [1][3][4][10]. Besides that learning will be even better, if there is motivation to learn. Table 8 explains that student learning outcomes with high learning motivation show results that are significantly higher than the learning outcomes of students with low learning motivation. According to Grant [11] states learning motivation is the overall driving force in students to lead learning activities, which ensures continuity of learning activities and provides direction for learning activities. Motivation has three functions, namely (1) encouraging people to do, as a motor that releases energy, (2) determines the direction of action, toward the goals to be achieved, and (3) chooses work that must be completed harmoniously to achieve its objectives, setting aside actions not useful for purpose [9].

Table 8. Summary of Mean Interaction of Students' Learning Outcomes

Aspect	Motivation	Project Based Learning (PjBL)	Direct Interaction (DI)
affective	High	87.75	81.25
	Low	75.25	75.00
psychomotor	High	85.75	84.75
	Low	80.25	80.00
cognitive	High	85.25	80.00
	Low	81.75	75.50

In table 8, it still explains the interaction relationships that influence each other between learning models and learning motivation from learning outcomes. students who use learning models and have high motivation have better learning outcomes compared to students with low learning motivation.

The analysis that has just been described, has tried to illustrate how the Project Based Learning approach can facilitate the process of internalizing values and motivating the students. More explicitly, the pattern of the relationship between Project Based Learning and the internalization of Motivation Methods is shown in Table 9.

Table 9. Pattern of Relationship between Project Based Learning and Motivation Method

Project Based Learning syntax	Motivation Method
Starts With the Essential Question	Create scientific questions
Design a Plan for the Project	Efforts to overcome difficulties
Creates a Schedule, Monitor the Students and the Progress of the Project,	Interest and sharpness of attention in learning
Assess the Outcome	Achieve in learning
Evaluate the Experiences	Independent in learning

Thus, the Project Based Learning approach and motivation can be used by lecturers in internalizing the value and spirit of learning to students (students). The constructivist approach with PjBL leads to an

increase in academic motivation to develop cognitive skills in a variety of class participation in social studies. Because the constructivist approach promises to improve student achievement and motivation. According to Bell [3] the tremendous advantage of PjBL is because it motivates students to become fully involved in the learning process and gives them a feeling of satisfaction. They also observed that PjBL encourages students to collaborate with each other in solving problems; it promotes independent learning when students become more responsible in their learning; and because PjBL involves a series of activities, it fulfills the various needs and interests of learning of students. PjBL is a brilliant teaching method where students can find challenges and problems in the world around them. The learning responsibilities are transferred from teacher to student [7].

The lecturer divides students into groups, and each group member has the responsibility to focus on learning material that must be solved. In this way, students can learn to develop knowledge, plan activities, skills in solving each problem, communication skills of the results of activities or products, and reflect on their experiences. Students gain a variety of learning experiences through the use and development of process skills and scientific attitudes.

On the other hand, project-based learning has been able to provide better results than direct learning. Project-based learning models that involve the active role of students are essentially aimed at (1) increasing motivation, (2) high-level thinking skills, (3) understanding the material as a whole, and (4) improving student process skills. If implemented correctly, the achievement of students in these four components is very likely to occur.

Unlike the case with the project-based learning model, the direct learning model is more dominated by lecturers as information centers (teacher centered). Lecturers transfer concepts directly to students, while students listen to lecturers' explanations. In addition, learning orientation that only prioritizes products rather than processes results in the limited ability of students to use concepts they learn in the real world. Instead students only memorize concepts without understanding the meaning of the concepts learned. This learning process causes students to only be able to master the material at the lowest cognitive level and is very dependent on the mastery of lecturers on teaching material.

4. Conclusion

Conclusions of the results of the analysis and discussion of this study show: (1) Student learning outcomes for electrical automation installation trainer with Project-based learning models have better results than students who received direct learning, even though both groups showed complete learning outcomes by obtaining $KKM \geq 70$. (2) There is an effect of student learning outcomes who have high learning motivation and students who have significantly lower learning motivation. (3) There is an interaction effect of the learning model and learning motivation of electrical engineering students on student learning outcomes in the Electrical Installation Automation trainer.

5. Recommendations

(1) The sample size taking part in this study is relatively small. Therefore, a more extensive trial (arranging the empirical try out) with a larger sample is recommended. (2) Further research is needed in teaching 21st century skills to explore the effectiveness of PjBL with motivation in learning.

References

- [1] Aldabbus, S. (2018). Project based learning: implementation & challenges. *International Journal of Education, Learning and Development*, 6 (3), 71-79. <https://www.eajournals.org>
- [2] Arsyad, A. (2007). *Media Pembelajaran*. Jakarta: PT. Raja. Grafindo
- [3] Bell, S. (2010). Project-Based Learning for the 21st Century: Skills for the Future. The Clearing House, 83(2), 39-43, <https://doi.org/10.1080/00098650903505415>
- [4] Bagheri, M. Wan Ali, W.Z. Chong Binti Abdullah, M. & Mohd Daud, S. (2013). Effects of Project-based Learning Strategy on Self-directed Learning Skills of Educational Technology Students. *CONTEMPORARY EDUCATIONAL TECHNOLOGY*, 4(1), 15-29
- [5] Daun, M. Salmon, A. Weyer (2016). Project-based Learning with Examples from Industry in University Courses. *29th Conference on Software Engineering Education and Training*, pp. 184-193 <https://doi.org/10.1109/CSEET.2016.15>

- [6] Doppelt, Y. (2003). Implementation and assessment of project based learning in a flexible environment. *International Journal of Technology and Design Education*, 13(1), 255-272.
- [7] Grant, M. (2011). Learning, beliefs, and products: Students' perspectives with project-based learning. *Interdisciplinary Journal of Problem-based Learning*, 5(2). 37-69
- [8] Hamalik, O. (2005). *Proses Belajar Mengajar*. Jakarta: Bumi Aksara
- [9] Ilter, I. (2014). A study on the efficacy of project-based learning approach on Social Studies Education: Conceptual achievement and academic motivation. *Academic Journals*, 9(15), 487-497, <https://doi.org/10.5897/ERR2014.1777>
- [10] Jagantara, I.M.W. & Adnyana, P.B. (2014). Pengaruh Model Pembelajaran Berbasis Proyek Terhadap Hasil Belajar Biologi Ditinjau Dari Gaya Belajar Siswa SMA. *e-Journal Program Pascasarjana Universitas Pendidikan Ganesha: Program Studi IPA*. 4(1) p- ISSN : 1858-4543 (Print) and e-ISSN : 2615-6091 (*online*)
- [11] Jamaris, M. (2015). *Orientasi Baru dalam Psikologi Pendidikan*. Cetakan Kedua. Bogor : Ghalia Indonesia.
- [12] Kokotsaki, D. Menzies, V. & Wiggins, A. (2017). Project-based learning: A review of the literature. *Improv. Sch.*, vol. 19, no. 3, pp. 267–277. <https://doi.org/10.1177/1365480216659733>
- [13] Kothari, C.R. (2004). *Research Methodology: Methods and Techniques*. New Age International (P) Ltd, Publishers.
- [14] Keller, J. M. (1987). Development and use of the ARCS model of motivational design. *Journal of Instructional Development*, 10(3), 2-10.
- [15] Ministry of National Education (2013). Government Regulation No. 32/2013 Republic of Indonesia: National Education Standards, article 9
- [16] Slameto. (2010). *Belajar dan Faktor-faktor yang Mempengaruhinya*. Jakarta: Rineka Cipta

The Effect of Motivation in Learning

ORIGINALITY REPORT

23%

SIMILARITY INDEX

21%

INTERNET SOURCES

16%

PUBLICATIONS

0%

STUDENT PAPERS

PRIMARY SOURCES

1

eprints.unm.ac.id

Internet Source

6%

2

pt.scribd.com

Internet Source

2%

3

journal.unpak.ac.id

Internet Source

2%

4

www.ijsrp.org

Internet Source

1%

5

Matsun, V S Andrini, T W Maduretno, A C Yusro. "Development of physics learning e-module based on local culture wisdom in Pontianak, West Kalimantan", Journal of Physics: Conference Series, 2019

Publication

1%

6

www.scribd.com

Internet Source

1%

7

www.semanticscholar.org

Internet Source

1%

repository.uhamka.ac.id

8

Internet Source

1 %

9

Sri Winarsih, Khresna Bayu Sangka, Dini Octoria. "The effect of direct instruction and problem based learning on millennial", AIP Publishing, 2019

Publication

1 %

10

article.sapub.org

Internet Source

1 %

11

D Susanti, V Fitriani, L Y Sari. "Validity of module based on project based learning in media biology subject", Journal of Physics: Conference Series, 2020

Publication

1 %

12

www.neliti.com

Internet Source

1 %

13

digilib.unimed.ac.id

Internet Source

1 %

14

conference.wisnuwardhana.ac.id

Internet Source

1 %

15

Linawati Kuswanda, Anna Fitri Hindriana, Awis Hamid Dani, M.Firman Ismana, Abas Hidayat. "Implementation of Self Assessment to Increase The Science Process Skills and The High-Level Cognitive Abilities on Plants Growth and

1 %

Development through Research-Based Learning", Journal of Physics: Conference Series, 2020

Publication

16

Gary Pan, Poh-Sun Seow, Venky Shankararaman, Kevin Koh. "An exploration into key roles in making project-based learning happen", Journal of International Education in Business, 2020

Publication

1%

17

M Karimah, Dafik, I M Tirta, Y Wangguway, Z L A Jabbar. "The analysis of the implementation of project based learning and its influence to the student deductive reasoning based on cognitive style on solving super edge local antimagic total labelling", Journal of Physics: Conference Series, 2020

Publication

1%

18

repository.phb.ac.id

Internet Source

1%

19

Inten Meutia, Mukhtaruddin Mukhtaruddin, Yulia Saftiana, Muhammad Faisal. "CEO's experience, foreign ownership and corporate social responsibility: A case of manufacturing companies", Corporate Ownership and Control, 2017

Publication

1%

Exclude quotes On

Exclude bibliography On

Exclude matches < 1%

The Effect of Motivation in Learning

GRADEMARK REPORT

FINAL GRADE

/0

GENERAL COMMENTS

Instructor

PAGE 1

PAGE 2

PAGE 3

PAGE 4

PAGE 5

PAGE 6

PAGE 7

PAGE 8