VOL 1 NO 10 TH, JANUARY 2021
E ISSN 2722-2985

INTERNATIONAL JOURNAL OF MULTI SCIENCE

EFFECTIVENESS OF PROBLEM-BASED MODEL LEARNING ON LEARNING OUTCOMES AND STUDENT LEARNING MOTIVATION IN BASIC ELECTRONIC SUBJECTS

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ABSTRACT

The purpose of this study is to find out: (1). The influence of the Problem-based learning model on student learning outcomes and motivation; (2). Students' response to learning with Problem based learning model to learning outcomes and learning motivation. This research is a pseudo-experiment. The research population is a student of Electromedical Poltekes Siteba Padang Semester IV who studied basic electronics. The study sampled 29 people, Test instruments to collect data on learning outcomes, and questionnaires for student motivation and response data. In this study, the authors conducted quantitative research using pre-experimental design method type one group pretest-posttest. The results showed that (1). There is a significant influence of the Problem-based learning model on student learning outcomes. The t-test analysis results obtained t-count of 6.9492 and t-table of 1.671 for DK of 28 with a significant level of 5%. Based on the test criteria obtained t-> t-table, this means H_0. The motivation of students who use the Problem-based learning model is said to be high, judging by the average student learning motivation of 131.83; and (2). Student response from applying the Problem-based learning model is positive, judging from the average student response questionnaire score of 78.07.

Keywords: problem-based learning model, learning outcomes, learning motivation.

INTRODUCTION

Success in teaching is one of every teacher's desires because it means that the teacher has succeeded in becoming an educator. A teaching and learning process is said to be good if the process can evoke learning activities (Sadirman, 2010). Many components must be combined to achieve success in learning, namely teachers, students, materials, methods, learning resources, learning media, etc.

Learning motivation is one of the factors of students' success in achieving maximum learning outcomes. Students who are highly motivated to learn will be better at receiving lessons, and the attitudes caused by students will become more positive in learning (Sardiman, 2014; Mardhiah M, 2020; Azmil Azman, 2020; Rina Novalinda et al, 2020). It is essential to shape students' motivation so that there is a change in learning in a more positive direction. (Ali, Habibah & Maulana, 2016; Melda Fajra et al, 2020) states that several factors influence

motivation in learning, namely: (a) Student goals or aspirations; (b) Learning ability; (c) Student conditions; (d) Environmental conditions; (e) Dynamic elements in learning; (f) Efforts of teachers in education.

According to Sardiman (2014), student learning motivation includes the following characteristics: (a) Diligently facing the task, (b) Tenaciously facing difficulties, (c) Showing an interest in various adult problems, (d) Prefer to work independently, (e) Be able to maintain his opinion, (f) Quickly get bored on routine tasks, (g) It is not easy to let go, (h) Happy to find and solve problems on the issues.

Learning outcomes are several abilities possessed by a student after he or she completes the learning process. The skills in question are cognitive, affective, and psychomotor. As Bloom (Suprijono, 2012; Ferbtriko et al, 2020, Mardiah et al, 2020) stated, learning outcomes include cognitive, affective, and psychomotor abilities. A student's abilities accumulate in a competency and student learning outcomes as an indicator of the success of a learning process, both at the field of study, education units and at the regional and national levels. Learning results are a measurement of the assessment of learning activities or learning processes expressed in symbols, letters, and sentences that tell the products that have been achieved by each child in a certain period.

According to (Susanto, 2013; Zagoto et al, 2018; Sarumaha et al, 2018), changes in students to cognitive, affective, and psychomotor aspects result from learning. The lack of interest in student learning in Basic Electronics lectures in the Siteba Padang Polytechnic Electrical Study Program led to students' inability to understand various basic concepts in the Electrical Circuit, which subsequently impacted student learning outcomes. Overcome the low interest in learning and student learning outcomes, and the Basic Electronics series needs to be breakthrough, such as applying the PBL model.

The PBL learning model is a model that uses real problems encountered in the environment as the basis for acquiring knowledge and concepts through the ability to think critically and problems solving (Fakhriyah, 2014; Paloloang, 2014; Ferdiansyah, 2020; Zagoto, 2019). Another model that also fosters critical thinking skills is the inquiry learning model. In (Anugraheni, 2018; Oskah Dakhi, 2020), students have little practice in designing their own problem solving; students are required to solve their problems by themselves (Sudewi & Tika, 2014; Shofiyah & Wulandari, 2018).

THEORETICAL FRAMEWORK

Problem Based Learning

PBL learning model focuses on learners as learners and on problem-solving authentically or relevant to all knowledge from existing or possessed sources (Fauzia, 2018; Zagoto et al, 2018; Wasonowati, Redjeki, & Ariani, 2014. Problem-based learning is an approach in education that helps students discover a real event's problems, gathering information through a self-defined strategy to make one problem-solving decision that will then in the form of a demonstration. Ramadhani (2016) shows the stages of the PBL model in Table 1.

Table 1. Stages of the PBL Model

Stage	Teacher's Behavior
Stage-1 Student orientation to the problem	The teacher explains the learning objectives, describes the logistics needed, motivates students to engage in problem-solving activities.
Stage-2 Organizing students to learn	Teachers help students define and organize learning tasks related to the problem.
Stage-3 Guiding individual and group investigations	Teachers encourage students to gather appropriate information, conduct experiments, to get explanations, and problem-solving
Stage-4 Develop and presenting the work	Teachers assist students in planning and preparing appropriate work such as reports, videos, models, and sharing tasks with their friends.
Stage-5 Analyze and evaluate the troubleshooting process	Teachers help students to reflect or evaluate their investigations and the processes they use

Learning Outcomes

According to Nurkancana and Sunartana, learning outcomes in learning activities over a certain period in numbers or values. According to Anni, "learning outcomes are behavioral changes that learners acquire after experiencing learning activities." Furthermore, Dimyati stated that "learning outcomes result from an interaction of learning actions and teaching actions." Various definitions above, we can formulate that students' understanding of learning outcomes by students from an act of learning and teaching (after students experience learning activities) over a certain period in numbers or grades. The factors that affect each student's learning outcomes are different, so the results achieved are different.

Learning Motivation

Motivation is a change in energy in a person characterized by the onset of feelings and reactions to achieve goals. Learning motivation related to achievement, namely the drive to master, manipulate, regulate the social and physical environment, overcome obstacles, and maintain a high quality of work, compete and strive to exceed the results achieved in the past and outperform the achievements obtained by others.

According to Rina Novalinda et al. (2020), the primary motivation in learning activities is two namely: a) Intrinsic Motivation, namely the drive to achieve goals that lie in the act of learning (the presence of stimuli from within the individual itself). b) Extrinsic Motivation, i.e., the urge to achieve goals beyond the front of education (the presence of stimuli from outside the

individual). This motivation is outside the learning situation, such as numbers, diplomas, tiers, prizes, oppositions, and competition. Sharp innuendo, scorn, and punishment are negative things that belong to extrinsic motivations.

METHODS

This research is pseudo experimental research where the research design used is one group pretest-posttest. The research population is a student of Electromedical Poltekes Siteba Padang semester IV who studied basic electronics. The study sampled 29 people. Test instruments to collect data on learning outcomes and questionnaires for student motivation and response data. The types of data collection in this study in Table 2.

Table 2. Types of Data Collection

Data Type	Method	Instruments	Time
Basic electronic learning outcomes	Test	Cognitive learning results test (Description Test)	After the learning process
Student motivation	Questionnaires	Motivational questionnaire Student learning	After the learning process
Student response	Questionnaires	Student response questionnaire	After the learning process

DISCUSSION

Based on the calculation of the t-test above by using the polled variance formula obtained t-count of 6.9492. Summary of test results t data posttest results of learning necessary programming students can result in Table 3.

Table 3. T-Test Analysis Results

Group	N	DK	X	S^2	T-Count	T-Table
Experiment	29	58	50.6	16.5	6.9492	1.671
Control	31		42.35	26.1		

Source: Processed data with Microsoft Excel 2010.

From Table 3 shows t-count = 6.9492 and t-table = 1.671 for DK = 58 with a significant level of 5%. Based on the test criteria because t-count > t-table (6.9492 >1.671), then H_0 is rejected, meaning H_1 is accepted. Based on this, there is a significant influence in applying the Problem-based learning Model to the Results and Motivation of Student Learning in Basic Electronics courses in Electromedical Poltekes Siteba Padang.

The analysis of student learning motivation in the experimental class with 29 people obtained that the average basis of learning students in Basic Electronics courses was 131.8387, in the histogram seen in Figure 1.

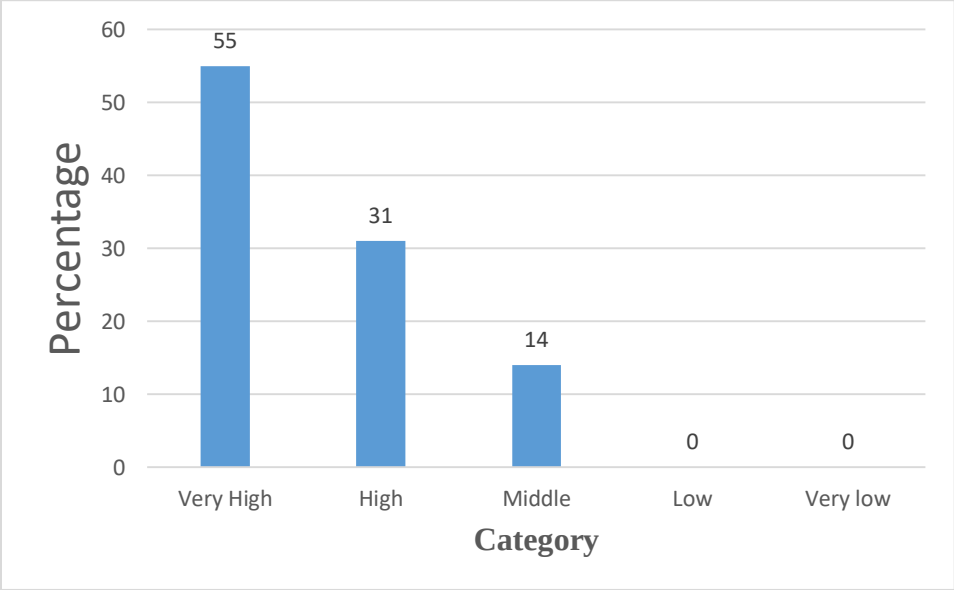

Figure 1. Motivational Histogram On Basic Electronics Courses

Figure 1 shows that students' motivation towards Basic Electronics courses as much as 55% categorized is very high, as many as 31% are high category, and 14% are moderate category. No students have the motivation to study in low and shallow classes. The results of the analysis of student responses to problem-based learning had an average of 78.07 and positive categories with details as much as 41% categorized as very positive, 52% classified positive, 7% classified as entirely positive, and 0% of students who had responses in less upbeat and very less positive categories, as shown in Figure 2 below.

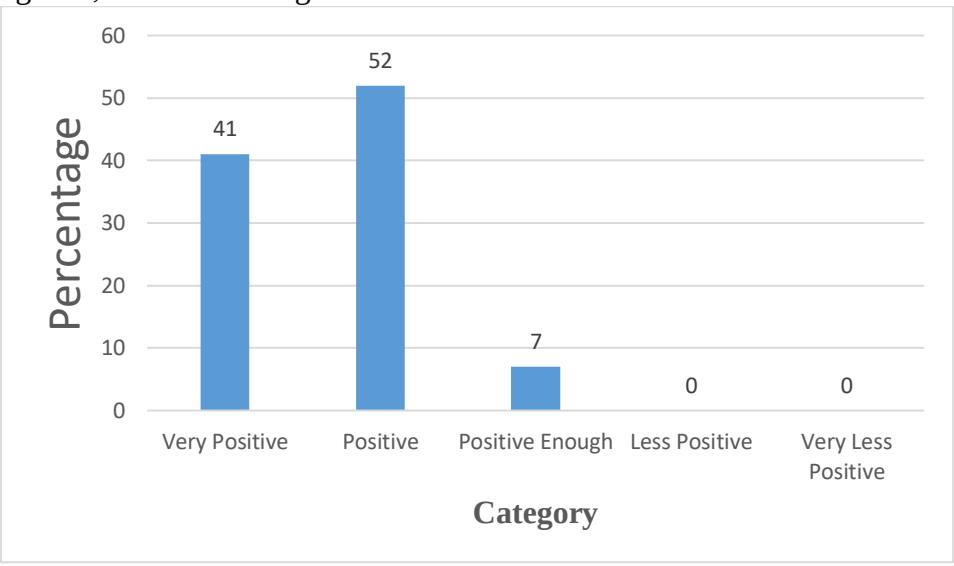

Figure 2. Histogram Student Response

In Figure 2 that the student's response to Basic Electronics courses after learning with PBL, as many as 41% categorized very positive, as many as 52% classified as positive, 7% classed as entirely positive, and no students who have a response in the category of less upbeat and significantly less favorable.

Based on the description above, using problem-based learning can improve learning outcomes to the material studied and increase the effectiveness of students in learning either at school or at home, which will affect the improvement of Basic Electronic learning outcomes. A questionnaire that showed an analysis of the data obtained from the study data found that the average learning motivation was 131.83.

A questionnaire showed that students' responses to the application of problem-based learning in Basic Electronic learning belonged to a positive category with an average of 78.07. This situation can be used as capital to create an effective learning atmosphere to improve student learning outcomes.

CONCLUSION

The results showed that (1) there was a significant influence of the PBL model on student learning outcomes with t-test analysis obtained by t-count of 6.9492 and 1.671 for DK of 28 with a significant level of 5%. Based on the test criteria obtained t-count > t-table, this means H_0 was rejected. The motivation of students who use the PBL model is said to be high, judging by the average student learning motivation of 131.83. (2) The student response from the PBL model application is positive, judging by the average student response questionnaire score of 78.07.

REFERENCES

Ali, Sudin., Habibah, Sukmini A & Maulana. (2016). Meningkatkan motivasi belajar melalui pendekatan problem based learning (PBL). Jurnal Pena Ilmiah. 1(1):141-150

Anugraheni, I. (2018). Meta Analisis Model Pembelajaran Problem Based Learning dalam Meningkatkan Keterampilan Berpikir Kritis di Sekolah Dasar. Polygot, 14(1), 9–18. Retrieved from http://dx.doi.org/10.19166/pji.v14i1.789

Azman, A., Ambiyar, Simatupang, W., Karudin, A., Dakhi, O. (2020). Link And Match Policy In Vocational Education To Address The Problem Of Unemployment. *International Journal Of Multi Science*, *1*(6), 76-85.

Dakhi, O., Jama, J., Irfan, D., Ambiyar, Ishak. (2020). Blended Learning: A 21st Century Learning Model At College. International Journal Of Multi Science, 1(8), 50-65.

Febtriko, A., Ambiyar, Jama, J., Irfan, D., Dakhi, O. (2020). Effectiveness Of Occupational Therapy Using Robot Manipulator For Elderly. International Journal Of Multi Science, 1(9), 1-9.

Fajra, M., Jalinus, N., Jama, J., & Dakhi, O. (2020). Model Pengembangan Kurikulum Sekolah Inklusi Berdasarkan Kebutuhan Perseorangan Anak Didik. *Jurnal Pendidikan* 21 (1), 51-63. https://doi.org/10.33830/jp.v21i1.746.2020

Fajra, M., Ambiyar, A., Rizal, F., & Dakhi, O. (2020). Pengembangan Model Evaluasi Kualitas Output Pembelajaran Teknik Komputer dan Jaringan di SMK Kota Padang. *Cakrawala: Jurnal Pendidikan*, 14(1), 1-9. https://doi.org/10.24905/cakrawala.v14i1.1480

Fajra, M., Suparno, Sukardi, Ambiyar, Novalinda, R. (2020). Project-Based Learning Innovation To Improve The Suitability Of Productive Competencies In Vocational School With The Needs Of The World Of Work. International Journal Of Multi Science, 1(8), 1-11.

Fakhriyah, F. (2014). Penerapan problem based learning dalam upaya mengembangkan kemampuan berpikir kritis mahasiswa. Jurnal Pendidikan IPA Indonesia, 3(1), 95–101. https://doi.org/10.15294/jpii.v3i1.2906

Ferdiansyah, Ambiyar, Zagoto, M. M., Putra, I E D., (2020). Pemanfaatan Media Pembelajaran berbasis E Learning dalam Meningkatkan Hasil Belajar pada Matakuliah Media Pembelajaran Musik. *Komposisi: Jurnal Pendidikan Bahasa, Sastra, dan Seni*, 21(1), 062-072. DOI: https://doi.org/10.24036/komposisi.v21i1.108082

Paloloang, M. F. B. (2014). Penerapan Model Problem Based Learning (PBL) untuk Meningkatkan Hasil Belajar Siswa pada Materi Panjang Garis Singgung Persekutuan Dua Lingkaran di Kelas VIII SMP Negeri 19 Palu. Jurnal Elektronik Pendidikan Matematika Tadulako, 2(1), 67–77.

Rina Novalinda, Oskah Dakhi, Melda Fajra, Azmil Azman, Mardhiah Masril, Ambiyar, Unung Verawadina (2020). Learning Model Team Assisted Individualization Assisted Module to Improve Social Interaction and Student Learning Achievement. Universal Journal of Educational Research, 8(12A), 7974-7980. DOI: 10.13189/ujer.2020.082585

Masril, M., Dakhi, O., Nasution, T., Ambiyar. (2020). Analisis Gender Dan Intellectual Intelligence Terhadap Kreativitas. *Edukasi: Jurnal Pendidikan*, 18 (2), 182-191. https://doi.org/10.31571/edukasi.v18i2.1847

Masril, M., Jalinus, N., Jama, J., & Dakhi, O. (2020). Implementasi Pembelajaran Berbasis Masalah Pada Kurikulum 2013 Di SMK Negeri 2 Padang. *Konstruktivisme: Jurnal Pendidikan Dan Pembelajaran* , 12 (1), 12-25.

Sardiman, A. (2014). Interaksi dan Motivasi Belajar Mengajar. Jakarta: Rajawali Pers.

Sarumaha, R., Harefa, D., & Zagoto, M.M. (2018). Upaya Meningkatkan Kemampuan Pemahaman Konsep geometri Transformasi Refleksi Siswa Kelas XII-IPA-B SMA Kampus Telukdalam Melalui Model Pembelajaran Discovery learning Berbantuan Media Kertas Milimeter. *Jurnal Education and development*, 6 (1); 90-96. Institut Pendidikan Tapanuli Selatan.

Shofiyah, N., & Wulandari, F. E. (2018). Model Problem Based Learning (Pbl) Dalam Melatih Scientific Reasoning Siswa. Jurnal Penelitian Pendidikan IPA, 3(1), 33. https://doi.org/10.26740/jppipa.v3n1.p33-38

Sudewi, N., & Tika, M. (2014). Studi Komparasi Penggunaan Model Pembelajaran Problem Based Learning (Pbl) Dan Kooperatif Tipe Group Investigation (Gi) Terhadap Hasil Belajar Berdasarkan Taksonomi Bloom. Jurnal Pendidikan Dan Pembelajaran IPA Indonesia, 4(1).

Suprijono, Agus. 2012. Cooperative Learning: Teori dan Aplikasi Paikem. Yogyakrta: Pustaka Pelajar.

Susanto, Ahmad. (2013). Teori Belajar dan Pembelajaran di Seklah Dasar. Jakarta: Kencana Prenada Media Group.

Zagoto, Maria M., Nevi Yarni & Dakhi, O (2019). Perbedaan Individu dari Gaya Belajarnya Serta Implikasinya Dalam Pembelajaran. *Jurnal Review Pendidikan dan Pengajaran*, 2(2), 259-265.

Zagoto, Maria M. & Dakhi, O (2018). Pengembangan Perangkat Pembelajaran Matematika Peminatan Berbasis Pendekatan Saintifik Untuk Siswa Kelas XI Sekolah Menengah Atas. *Jurnal Review Pendidikan dan Pengajaran*, 1(1), 157-170.

Zagoto, Maria M. (2018). Pengembangan Perangkat Pembelajaran Matematika Berbasis Realistic Mathematic Educations Untuk Siswa Kelas V Sekolah Dasar, *Jurnal Education And Development*, vol. 3, no. 1, p. 53, Feb. 2018.