



# Effect of Problem-Based Learning Model on Learning Motivation in Quality Control Course

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## Abstract

*This study is to evaluate the effectiveness of problem-based learning in increasing student learning motivation in quality control course at college in Lubuk Pakam, North Sumatra Province. The method approach used is quantitative research involving 40 college students as respondents. This research was conducted by providing teaching using problem-based learning, learning model for one semester, and then evaluating student learning motivation. Hypothesis testing uses simple regression analysis. The result showed that the implementation of problem-based learning model significantly increased students' learning motivation in quality control course. Students showed improvement in active engagement in learning, deeper conceptual understanding, and development of problem-solving skills. The findings highlight the importance of interactive and student-centered learning approaches in improving learning effectiveness in higher education.*

**Kata Kunci:** *Problem-Based Learning, Learning Motivation, Quality Control Course*

## Abstrak

*Penelitian ini bertujuan untuk mengevaluasi efektivitas pembelajaran berbasis masalah dalam meningkatkan motivasi belajar mahasiswa pada mata kuliah pengendalian mutu di perguruan tinggi di Lubuk Pakam, Provinsi Sumatera Utara. Pendekatan metode yang digunakan adalah penelitian kuantitatif dengan melibatkan 40 mahasiswa sebagai responden. Penelitian ini dilakukan dengan memberikan pengajaran menggunakan pembelajaran berbasis masalah, model pembelajaran selama satu semester, dan kemudian mengevaluasi motivasi belajar mahasiswa. Pengujian hipotesis menggunakan analisis regresi sederhana. Hasil penelitian menunjukkan bahwa penerapan model pembelajaran berbasis masalah meningkatkan motivasi belajar mahasiswa pada mata kuliah pengendalian mutu secara signifikan. Mahasiswa menunjukkan peningkatan dalam keterlibatan aktif dalam pembelajaran, pemahaman konseptual yang lebih dalam, dan pengembangan keterampilan pemecahan masalah. Temuan ini menyoroti pentingnya pendekatan pembelajaran interaktif dan berpusat pada mahasiswa dalam meningkatkan efektivitas pembelajaran di pendidikan tinggi.*

**Keywords:** *Pembelajaran Berbasis Masalah, Motivasi Belajar, Mata Kuliah Pengendalian Mutu*

## **Introduction**

Education is one of the important aspects in the sustainable development of human resources. In the era of globalization and increasingly fierce competition, the quality of education, especially in higher education, is the main focus to produce graduates who not only have theoretical knowledge, but also strong applicative skills. One of the subjects that has an important role in engineering and business is quality control. This subject is not only important to ensure products or services meet set standards, but also to improve efficiency and customer satisfaction. However, a challenge that is often faced in the learning process is how to increase student motivation towards subjects that are considered complex and theoretical such as quality control. Traditional learning methods are often not effective enough in addressing this issue due to the lack of engagement and practical application which makes it difficult for students to understand the concepts deeply.

The benchmark of educational outcomes can be known by evaluation. Where educational evaluation is often interpreted as measuring or assessing teaching-learning results, even though the two have different meanings even though they are interconnected by measuring is comparing something with a measure or quantitative, while assessing means making a decision on something with a measure of good and bad or qualitative (Pandiangan et al., 2023).

In recent years, problem-based learning has emerged as an innovative solution to improve the quality of learning.

The increase in student motivation is due to students being very enthusiastic in participating in learning assisted. By assuming that problem-based learning model is able to increase student motivation and critical thinking skills in all fields, this learning model should also be effective in increasing student motivation and critical thinking skills in the course. Problem-based learning is a learning approach that challenges students to learn through hands-on experience in dealing with real problems. It not only improves conceptual understanding, but also analytical skills, teamwork, and communication.

Problem solving ability is assessed from problem-based learning with cognitive conflict strategy, in overcoming challenges in mathematical problem solving. The results of this study indicate that this approach is effective in developing mathematical problem solving skills (Amdani et al., 2023). By using the appropriate learning model, students will be more interested and can encourage creativity and motivation in learning activities, can change learning habits for the better, and the tasks given by the teaching staff when delivering material can be more easily understood. Gradually, this will help achieve learning objects and indicators evenly. Various kinds of strategies and approaches that can be applied by teaching staff in chemistry learning activities are expected to improve the quality of these learning activities (Awalin and Ismono, 2021). According to Laxmi (2017), the quality of education is currently still a fundamental problem in efforts to improve the quality of the

national education system. Learning conditions in higher education are still quite diverse, lecturers have a variety of methods in exporting students' abilities in lectures also highlighted that, although problem-based learning can increase learning motivation, a systematic and structured approach is needed to optimize its benefits. With these challenges and needs in mind, this study aims to investigate the effects of problem-based learning methods on enthusiasm motivation in learning for university students taking quality control subjects. Through this research, it is expected that strategies and best practices in the implementation of problem-based learning can be found that not only improve students' learning motivation, but also their learning outcomes and applicative skills. This is crucial to prepare students for real-world challenges and improve their competitiveness in the job market. Referring to the importance of problem-based learning in enhancing students' learning motivation, especially in the context of quality control subjects, this research will further explore how problem-based learning can be effectively integrated in the college curriculum. The integration of problem-based learning not only aims to increase students' learning motivation, but also ensures that they develop the critical skills needed to solve real problems in industry and society.

Problem-based learning approaches also provide opportunities for students to engage in learning based on solving real problems, which are directly relevant to industrial applications, competency-based approaches can increase the relevance of the curriculum to the needs of the world of work, while thematic approaches can

increase students' interest in learning and integrate various disciplines found that the use of various curriculum development strategies allows for more relevant, enjoyable, and effective education (Nirwana and Aly, 2023).

The purpose of this study was to determine how problem-based learning based on moodle lms influences in improving student learning outcomes and motivation and differences in student learning outcomes and motivation given blended problem-based learning model learning, problem-based learning model is a problem-based learning model designed to provide students with critical knowledge that will make them proficient in problem solving and have the skills to participate in teams.

### **Method**

In the research methodology for the study of problem-based learning, a suitable approach to problem based learning is to use a mixed approach that combines qualitative and quantitative elements, this research approach uses a quantitative approach, according to the objectives and research questions. The research designs that can be used include survey, observation, or case study, depending on the scope and purpose of the research, which indicates that the population of this research can consist of students in higher education, with the main variable observed in this research can be student learning motivation, which can be measured using valid and reliable scales or instruments. In addition, other factors such as satisfaction level with learning, participation in problem-based learning, or environmental factors may also be observed, this data analysis will also use statistical techniques to compare the results between the groups,

while qualitative analysis will be used to explore the views and experiences of the participants. By combining qualitative and quantitative approaches, this research is expected to provide a comprehensive understanding of the effectiveness of problem-based learning in improving students' mathematical problem solving skills (Pandiangan et al., 2023). The purpose of quantitative research is to design and apply mathematical models, theories, or hypotheses related to a phenomenon (Fransisco et al., 2024; Pandiangan, 2024; Pandiangan et al., 2024). The approach method is carried out with descriptive empirical methods by utilizing quantitative data, documents and also related literature stated by (Gultom et al., 2022; Yoppy et al., 2023). According to the scope of study, it is carried out through literature studies, conceptualizing, collecting related data, surveying data and information, analyzing data and reviewing discussions and drawing conclusions (Silitonga et al., 2021; Tambunan et al., 2024).

In this study, the focal population consisted of 40 students enrolled at college in Lubuk Pakam, North Sumatra Province. The selection of this population is based on consideration of the suitability of demographic characteristics and the educational environment relevant to the research context. In determining the sample, a simple random sampling technique can be used to ensure the representativeness of the sample to the population. By using a representative sample, it is expected that the research results can provide a broader picture of the impact of problem-based learning implementation on student learning motivation in quality control course. Thus, the population used in this study will be a

relevant reference to describe the impact of problem-based learning implementation on student learning motivation in quality control course in Lubuk Pakam, North Sumatra Province. As stated by Pandiangan et al. (2023) defines population as a general area consisting of objects or subjects that have certain qualities and characteristics that are chosen to be studied and then draw conclusions. As stated by Gultom et al. (2023) regarding data sufficiency, a data sufficiency test was carried out, from the population. Determination of the minimum amount of data is decisive in providing a true picture. The level of accuracy of the calculation will affect the accuracy of the research results.

Hypothesis testing uses simple regression analysis. Simple regression analysis can be used to determine the direction of the relationship between the independent variable and the dependent variable, whether it has a positive or negative relationship and to predict the value of the dependent variable if the value of the independent variable increases or decreases (Alimuddin et al., 2023).

### **Results and Discussion**

From the statement given by Junaedi and Wahab (2023), a hypothesis is basically a proposition or assumption that may be true, and is often used as the basis for making a decision or solving a problem or the basis for further research. Assumption as a hypothesis is also data, however, because it is likely to be wrong, if it is used as a basis for decision making it must first be tested using observational data. The null hypothesis is the hypothesis to be tested, expressed as  $H_0$ , and rejection of  $H_0$  is interpreted as acceptance of the other hypothesis expressed as  $H_1$ . Thus, based on this statement, hypothesis testing

will test the validity of an assumption or statement about the population, and rejection of the null hypothesis ( $H_0$ ) will imply acceptance of the alternative hypothesis ( $H_1$ ). This suggests that the hypothesis testing process allows us to test certain claims or assumptions and determine whether they can be accepted or rejected based on data obtained from a sample drawn from a larger population.

**Table 1. Hypothesis Test**

Variable	Prob.
Problem-Based Learning	0.000

*Dependent Variable: Learning Motivation  
Source: Research Result (2024)*

The results of this study indicate that by using the results of statistical analysis which shows a significant influence between the implementation of problem-based learning and student learning motivation in quality control course raises broad implications in the context of higher education. By strengthening students' interest and enthusiasm for learning, problem-based learning is not just a teaching method, but a powerful tool for creating meaningful and meaningful learning experiences.

Problem-based learning encourages students to face real challenges and solve problems critically and creatively. In the context of quality control course, where conceptual understanding and applicative skills are critical, problem-based learning offers a platform that enables students to integrate theory with practice, develop systematic thinking, and enhance their analytical abilities. Thus, students not only acquire knowledge, but also skills that they can apply in real-world situations.

In addition to providing direct benefits for student learning and achievement, these results also have

important implications for curriculum development and teaching strategies in higher education institutions. The integration of problem-based learning in the curriculum can increase the relevance of learning to the demands of the world of work, preparing students to face complex challenges in a rapidly changing industrial environment. By focusing on the development of analytical, creativity and problem-solving skills, problem-based learning helps create graduates who are not only technically skilled, but also have the ability to adapt and thrive in a variety of professional contexts.

By improving the ability to think logically, systematically, and critically in students, it is expected through an understanding of quality control as a science that enables an understanding of how to obtain quality and product quality. In the context of learning, a deep understanding of quality control concepts opens the door to the development of strong analytical thinking ability, which is an essential skill in solving complex problems in various industrial fields. Students who are skilled in quality control have the ability to identify, analyze, and correct quality problems with a systematic and structured approach.

In addition to being an important cornerstone in the learning process at the higher education level, an understanding of quality control is also key to success for students in their professional careers. In the era of globalization and increasingly fierce competition, companies need individuals who can ensure that the products and services produced meet high quality standards. Therefore, students who understand the concept of quality control

have a significant competitive advantage in a competitive job market.

Quality control also has far-reaching implications beyond the industrial context. In other disciplines such as social, health, and environmental sciences, quality control becomes an important instrument to ensure that the products or services provided meet the set standards and can provide maximum benefits to society. Therefore, an understanding of the concept of quality control is not only relevant in an industrial context, but also important in building a better and sustainable society. With these findings also encourages educators and educational managers to continue to develop and refine innovative and effective learning strategies problem-based learning, with its student-centered and problem-solving oriented approach, may be part of a bigger picture in designing learning experiences that motivate, build independence, and prepare students to become future leaders in various disciplines.

Thus, through an in-depth understanding of quality control, students are expected to develop the logical, systematic, and critical thinking skills necessary to become future leaders in various industries and disciplines. This understanding can also provide a solid foundation for their successful learning and professional careers, as well as a meaningful contribution to building a quality and sustainable society.

### **Conclusion**

Based on the results of this study, it can be concluded that the implementation of problem-based learning has a significant positive effect on student learning motivation in quality control course at college in Lubuk Pakam, North Sumatra Province.

It is expected that problem-based learning approach can be used as an effective learning strategy to improve the quality of higher education and prepare students to become future leaders in various industrial fields. Through problem-based learning approach, lecturers are expected to have an important role in choosing learning models and methods that are appropriate to their learning context. Lecturers also need to consider the suitability between the chosen learning model and the subject matter being taught, and can also provide students are encouraged to be actively involved in the learning process, critical thinking, analytical, and creativity. However, in applying the learning model, it is important to pay attention to various aspects including the subject matter, the learning objectives to be achieved, the time available, and the facilities and infrastructure available in the educational environment.

### **Reference**

- Alimuddin, Mariani, Sandra, Jana, Awom, Sarce Babra, Pandiangan, Saut Maruli Tua, Solehudin, Ahmad, Susanti, Evi, Fitriani, Itsna Rahma, Budiantoro, Risanda Alirastra, & Chasanah, Amalia Nur. (2023). *Pengantar Ekonomika*. ISBN: 978-623-8382-45-3. Batam: Penerbit Cendikia Mulia Mandiri.
- Amdani, Dadan, Heni Pujiastuti, & Fathurohman, Maman. (2023). *Kemampuan Pemecahan Masalah Matematis Ditinjau dari Pembelajaran Berbasis Masalah dengan Strategi Konflik Kognitif*. *JIIP - Jurnal Ilmiah Ilmu Pendidikan*.
- Awalin, Nabila Aurelia & Ismono. (2021). *The Implementation of Problem*

- Based Learning Model with STEM (Science, Technology, Engineering, Mathematics) Approach to Train Students' Science Process Skills of XI Graders on Chemical Equilibrium Topic. *Integrative Science Education and Teaching Activity Journal*, 1(2), 1-14.
- Fransisco, Prasetyo, Kelly, Surya, Hutahean, Thomas Firdaus, & Pandiangan, Saut Maruli Tua. (2024). Faktor-faktor Fundamental Terhadap Earning Per Share pada Perusahaan Perbankan BUMN. *Journal of Economic, Bussines and Accounting (COSTING)*, 7(3), 5837-5844.  
<https://journal.ipm2kpe.or.id/index.php/COSTING/article/view/9591>.
- Gultom, Josua Alexander, Napitupulu, Abidan, Silitonga, Manaor, & Sinurat, Windo. (2022). Studi Kelayakan Pengolahan Jagung Menjadi Gula-Jagung di Kabupaten Dairi. *ATDS Sainstech Journal of Engineering*, 3(1), 50-58.
- Gultom, Josua Alexander., Silitonga Manaor. (2023). Analisa Layanan Jasa Bengkel Sepeda Motor Terhadap Kepuasan Pelanggan (Studi Kasus Bengkel Motor Dolpine di Kec. Medan Johor). *ATDS Sainstech Journal of Engineering*, 4(1), 11-22.
- Junaedi & Wahab, Abdul. (2023). *Hipotesis Penelitian dalam Kesehatan*. *Jurnal Pendidikan dan Teknologi Kesehatan*.
- Laxmi, Zahara. (2017). *Implementasi Pembelajaran Berbasis Masalah Melalui Lesson Study untuk Meningkatkan Kemampuan Pemecahan Masalah dan Aktivitas Belajar Mahasiswa*.
- Nirwana, Rina & Hery Noer Aly. (2023). Tinjauan Terhadap Strategi Pengembangan Kurikulum dan Implikasinya dalam Meningkatkan Kualitas Pembelajaran. *Jurnal Pendidikan dan Konseling (JPDK)*.
- Pandiangan, Saut Maruli Tua. (2024). Effect of Income and Expenditure on Foreign Visitors at Indonesian Commercial Tourist Attractions. *Journal of Social Responsibility, Tourism, and Hospitality (JSRTH)*, 4(2), 1-7.  
<https://journal.hmjournals.com/index.php/JSRTH/article/view/3611>.
- Pandiangan, Saut Maruli Tua, Wau, Lindari, Ariawan, Napu, Fithriah, & Nuryanto, Uli Wildan. (2023). The Role of Business Education in the Implementation of Financial Check List in Financial Management Courses. *Edumaspul: Jurnal Pendidikan*, 7(1), 174-179.  
<https://ummaspul.e-journal.id/maspuljr/article/view/542>.
- Pandiangan, Saut Maruli Tua, Gultom, Josua Alexander, Ariani, Dian, Dharmawan, Donny, & Butar-Butar, Ribka Sari. (2023). Effect of Problem-Based Learning Model on Learning Outcomes in Microeconomic Course. *Edumaspul: Jurnal Pendidikan*, 7(2), 5572-5575.  
<https://ummaspul.e-journal.id/maspuljr/article/view/728>.
- Pandiangan, Saut Maruli Tua, Pattiasina, Victor, Mawadah, Badriatul, Dharmawan, Donny, & Suratminingsih. (2023). Effectiveness of Problem-Based Learning Model on Critical Thinking

- Ability in Financial Management Course. *Edumaspul: Jurnal Pendidikan*, 7(2), 5576-5580. <https://ummaspul.e-journal.id/maspuljr/article/view/728>.
- Pandiangan, Saut Maruli Tua, Tambunan, Hotbona Novandi, Gultom, Josua Alexander, & Hutahaeon, Thomas Firdaus. (2024). Analysis of Asset Management Ratio and Solvency Management Ratio. *Journal of Corporate Finance Management and Banking System (JCFMBS)*, 4(2), 25-36. <https://journal.hmjournals.com/index.php/JCFMBS/article/view/3622>.
- Pandiangan, Saut Maruli Tua, Sintesa, Nika, Abdulghani, Tarmin, Muhiban, Ayi, Pohan, Yuli Arnida, Suryathi, Wayan, Awa, Gultom, Josua Alexander, Prasetya, Prita, & Anjarwati, Sri. (2024). *Pengantar Bisnis Digital*. ISBN: 978-623-8576-18-0. Batam: Penerbit Cendikia Mulia Mandiri.
- Silitonga, Manaor, Gultom, Josua Alexander, Sitohang, Andar, Naibaho, Ronald, & Napitupulu, Abidan. (2021). Studi Kelayakan Pengolahan Ampas Gula dan Jagung Menjadi Pakan Ternak. *ATDS Saintech Journal of Engineering*, 2(2), 72-81.
- Tambunan, Hotbona Novandi, Pandiangan, Saut Maruli Tua, Candra, Siagian, Mei Veronika Sri Endang, & Hendarti, Ricca. (2024). Upaya Peningkatan Perekonomian dengan Memanfaatkan Potensi Ibu Rumah Tangga di Era Digital pada Kelurahan Durian, Kecamatan Medan Timur. *E-Amal: Jurnal Pengabdian kepada Masyarakat*, 4(1), 1-6. <https://stp-mataram.e-journal.id/Amal/article/view/3084>.
- Yopyy, Irene, Hartono, Ivany Artamevia, Hutahaeon, Thomas Firdaus, & Pandiangan, Saut Maruli Tua. (2023). Influence Profitability, Policy Debt, Policy Dividend, Investment Decision, and Firm Size to Company Value Manufacture Sub Sector Food and Drink Registered in the Indonesian Stock Exchange. *International Journal of Economics Social and Technology*, 2(3), 162-170. <https://jurnal.risetilmiah.ac.id/index.php/ijest/article/view/336>.