

The Effect of Video-Assisted Problem Based Instruction on Learning Motivation and Learning Outcomes in Lathe Machining Engineering

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Abstract

This study aimed to analyze the effect of the Video-Assisted Problem Based Instruction (PBI) learning model on students' learning outcomes in Lathe Machining Engineering by controlling learning motivation variables. The study employed a quasi-experimental method using a Post-test Only Control Group Design. The research sample consisted of 50 students divided into an experimental class (25 students) and a control class (25 students) at SMKS Semen Padang. Data collection instruments included learning outcome tests and learning motivation questionnaires. Data were analyzed using Analysis of Covariance (ANCOVA). The findings demonstrated that the implementation of the video-assisted Problem Based Instruction learning model exerted a statistically significant effect on students' learning outcomes, as indicated by the ANCOVA results of $F(1,47) = 63.145$ with a significance value of $p < 0.001$. The effect size was categorized as large with Partial Eta Squared = 0.573. However, learning motivation as a covariate did not significantly affect learning outcomes with $F(1,47) = 0.001$ and $p = 0.974$. Simultaneously, the model used in this research was significant with $F(2,47) = 32.851$ and $p < 0.001$ and contributed 58.3% to the variance of learning outcomes ($R^2 = 0.583$). Therefore, video-assisted Problem Based Instruction was proven effective in improving students' learning outcomes in Lathe Machining Engineering.

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1. INTRODUCTION

Education constitutes a fundamental component in the development of high-quality human resources, particularly within vocational education, which emphasizes the mastery of practical competencies, technical expertise, and workforce readiness in accordance with industrial demands. Vocational schools are expected to produce graduates who possess cognitive, psychomotor, and affective competencies that are relevant to industrial needs. One of the subjects that requires practical competence is Lathe Machining Engineering.

However, learning outcomes in Lathe Machining Engineering subjects remain relatively low due to the predominance of teacher-centered instructional approaches, which limit student participation and active engagement during the learning process. Students tend to become passive during the learning process, resulting in low motivation and poor understanding of practical concepts. According to Khoerunnisa and Aqwal (2020), innovative learning models that actively involve students can improve learning effectiveness and increase student engagement in the learning process.

Problem Based Instruction (PBI) is a student-centered instructional model that emphasizes contextual problem-solving activities and encourages students to develop critical thinking, analytical reasoning, and collaborative learning skills. Through authentic problems, students are trained to identify problems, analyze information, and find appropriate solutions collaboratively. Dwi Sumarsih, Forijati, and Sugiono (2023) explained that Problem Based Instruction can improve students' problem-solving abilities, creativity, and participation during the learning process.

The integration of instructional video media into the learning process is considered highly relevant in vocational education because audiovisual presentations are capable of enhancing students' understanding of practical procedures, machining operations, and technical demonstrations in a more systematic and concrete manner. Video-assisted learning enables students to observe machining steps repeatedly and understand concepts more clearly. Luh and Ekayani (2021) stated that instructional media, especially video-based media, can improve students' understanding and learning achievement through visual learning experiences.

Several previous studies have shown that PBI and video-based learning positively affect student achievement and motivation. Research conducted by Gapari and Gapari (2023) showed that the implementation of the Problem Based Instruction model significantly improved students' learning outcomes. In addition, Agus Dipa Prayatna, Sudiarta, and Gita (2019) found that video-assisted learning increased students' motivation and learning achievement.

Based on these conditions, this study aimed to analyze the effect of the video-assisted Problem Based Instruction model on learning outcomes in Lathe Machining Engineering by controlling learning motivation variables among Grade XI students of the Mechanical Machining Department at SMKS Semen Padang.

2. METHOD

This research used a quantitative approach with a quasi-experimental method. The research design applied was Post-test Only Control Group Design with Analysis of Covariance (ANCOVA).

The study was conducted at SMKS Semen Padang during the 2025/2026 academic year. The research subjects consisted of 50 students divided into two classes: 25 students in the experimental class (XI TPM 3) and 25 students in the control class (XI TPM 1).

The experimental class received treatment using the Video-Assisted Problem Based Instruction learning model, while the control class used conventional learning methods. The learning process in the experimental class was carried out in three meetings using instructional videos related to lathe machining practices.

The research instruments consisted of:

1. Learning outcome test instruments.
2. Learning motivation questionnaires using a Likert scale.

Data analysis techniques included:

- a. Normality test
- b. Homogeneity test
- c. Linearity test
- d. Homogeneity of regression slope test
- e. ANCOVA test using SPSS 27 s software.

3. RESULTS AND DISCUSSION

The results showed differences in learning outcomes between the experimental and control classes. The average post-test score in the experimental class was 87.12, while the control class obtained an average score of 69.12.

The ANCOVA test results showed that the Video-Assisted Problem Based Instruction learning model significantly affected student learning outcomes with the following statistical results:

- a. $F(1,47)=63.145$
- b. $p<0.001$
- c. Partial Eta Squared=0.573

These results indicate that the effect size of the learning model is categorized as large. Therefore, the PBI model assisted by video effectively improves student learning outcomes in Lathe Machining Techniques subjects.

Meanwhile, learning motivation as a covariate variable did not significantly influence learning outcomes with the following results:

- a. $F(1,47)=0.001$
- b. $p=0.974$
- c. Partial Eta Squared=0.000

This means that learning motivation contributed very little to the variance of student learning outcomes in this study.

The effectiveness of the PBI learning model assisted by video can be explained because students actively participated in the learning process through problem-solving activities and visual observation from video tutorials. Students became more engaged in discussions and could better understand machining procedures. Video media also helped students visualize abstract machining concepts more concretely.

These findings are consistent with previous research conducted by Askar (2020), which concluded that the PBI model assisted by movie media significantly improved student learning outcomes.

4. CONCLUSION

Based on the results of the study, it can be concluded that the Video-Assisted Problem Based Instruction learning model has a significant positive effect on student learning outcomes in Lathe Machining Techniques subjects at SMKS Semen Padang. Students taught using the PBI model assisted by video achieved significantly higher learning outcomes than students taught using conventional learning methods.

In addition, learning motivation did not significantly affect learning outcomes as a covariate variable. Therefore, the Video-Assisted Problem Based Instruction learning model can be recommended as an effective learning strategy in vocational education, particularly in machining subjects.

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6. BIBLIOGRAPHY

- Agus Dipa Prayatna, I. P., Sudiarta, I. G. P., & Gita, I. N. (2019). Penerapan Pembelajaran Matematika Berbantuan Video Tutorial Untuk Meningkatkan Minat Dan Prestasi Belajar Matematika Siswa Kelas Viiiid Smp Negeri 2 Sawan. *Jurnal Pendidikan Matematika Undiksha*, 9(2), 40. <https://doi.org/10.23887/jpm.v9i2.19894>
- Alkaromi, A. (2022). Penerapan Model Pembelajaran Kooperatif Tipe Jigsaw Untuk Meningkatkan Kerjasama Dan Prestasi Belajar Siswa. *Diadik: Jurnal Ilmiah Teknologi Pendidikan*, 12(1), 75–84. <https://doi.org/10.33369/diadik.v12i1.21351>
- Arikunto, S. (2010). *Metode Penelitian*. Rineka Cipta.
- Askar. (2020). Pengaruh Model Pembelajaran Problem Based Instruction (PBI) Berbantuan Media Movie terhadap Hasil Belajar. *Jurnal Pendidikan Teknik Mesin*, 8(2), 55–62.
- Gapari, M. Z., & Gapari, M. Z. (2023). *Efektivitas Penggunaan Model Pembelajaran Problem Based Instruction (Pbi) Dalam. 1*(November), 13–21.
- Hakim, A. R., A, Y., Jasman, J., & Abadi, Z. (2022). Kontribusi Hasil Belajar Teori Terhadap Kemampuan Praktik Mata Pelajaran Teknik Pemesinan Bubut di SMK 1 Sumatera Barat. *Jurnal Vokasi Mekanika (VOMEK)*, 4(1), 26–31. <https://doi.org/10.24036/vomek.v4i1.268>
- Khoerunnisa, P., & Aqwal, S. M. (2020). Analisis Model-Model Pembelajaran. *Fondatia*, 4(1), 1–27. <https://doi.org/10.36088/fondatia.v4i1.441>
- Luh, N., & Ekayani, P. (2021). Pentingnya Penggunaan Media Pembelajaran Untuk Meningkatkan Prestasi Belajar Siswa, 1–16.
- Mendari, A. S. (2013). Aplikasi Teori Hierarki Kebutuhan Maslow Dalam Meningkatkan Motivasi Belajar Mahasiswa. *Widya Warta*.
- Noveria, L., Pendidikan, J., Biasa, L., Pendidikan, F. I., & Padang, U. N. (2019). Meningkatkan Keterampilan Vokasional Menghias Sandal Melalui Media Video Tutorial Bagi Anak Tunagrahita Ringan Kelas VIII (Penelitian Tindakan Kelas Di SLB YPPLB Padang). *Repository UNP Padang*, 41–47.
- Prayekti, “*Problem Based Instruction* Sebagai Alternatif Model Pembelajaran Fisika Di SMA,” *Jurnal Pendidikan Dan Kebudayaan* 16, No. 1 (2007): 63, <https://doi.org/10.24832/jpnk.v16i1.431>
- Rusman, *Model-Model Pembelajaran Mengembangkan Profesionalisme Pendidik* (Jakarta: PT.Rajagrafindo Persada, 2011).
- Shilphy A. Octavia, *Model-Model Pembelajaran*, (Yogyakarta : CV. Budi Utama 2020)
- Sugiyono. (2016). *Metode Penelitian Kuantitatif, Kualitatif dan R&D*. Bandung: Alfabeta.
- Trianto Ibnu Badar Al-Tabany, *Mendesain Model Pembelajaran Inovatif, Progresif, Dan Kontekstual* (Jakarta: Prenamedia, 2014).
- Ulfah, & Arifudin, O. (2021). Pengaruh Aspek Kognitif, Afektif, dan Psikomotor Terhadap Hasil Belajar Siswa. *Jurnal Al-Amar (JAA)*, 2(1), 1–9.

- Wirasasmita, R. H., & Putra, Y. K. (2018). Pengembangan Media Pembelajaran Video Tutorial Interaktif Menggunakan Aplikasi Camtasia Studio dan Macromedia Flash. *EDUMATIC: Jurnal Pendidikan Informatika*, 1(2), 35. <https://doi.org/10.29408/edumatic.v1i2.944>
- Yoana Nurul Asri. (2022). *Model-Model Pembelajaran*. Sukabumi: CV. Haura Utama.