JVCE 10 (1) (2025) : 56-63

Journal of Vocational Career Education

https://journal.unnes.ac.id/nju/index.php/jvce

The Influence of TKRO Workshop Practical Facilities and Infrastructure on Student Learning Outcomes

Maftuh Ikhsan Ramdani✉, Deddy Supriyatna, Ananda Yhuto Wibisono Putra

[1]Universitas Sultan Ageng Tirtayasa, Indonesia

Article Info

Article History :
Received
February 2025
Accepted
May 2025
Published
July 2025

Keywords:
Facilities and Infrastructure; Automotive Workshop; and Learning Outcomes

Abstract

Low student learning outcomes in certain competency elements of vocational education raise concerns about the adequacy of supporting factors, particularly facilities and infrastructure. This study aims to examine the influence of workshop facilities and infrastructure in the TKRO practicum on student learning outcomes at SMK Negeri 5 Kota Serang. Using a quantitative approach with a descriptive method, data were collected from classes XI TKR 1 and XI TKR 2, totaling 73 students selected through simple random sampling. The research data passed statistical assumption tests and were further analyzed using simple linear regression, yielding an R Square value of 0.119. This indicates that workshop facilities and infrastructure contribute 11.9% to the variation in student learning outcomes. It can be concluded that although the influence is not dominant, facilities and infrastructure still significantly affect student achievement. The findings of this study are expected to serve as a reference for schools and policymakers in evaluating and improving vocational workshop facilities to enhance educational quality. Furthermore, this research highlights the importance of integrating physical resources with pedagogical practices to maximize their impact. One of the study's novel contributions is the identification of a gap between perceived adequacy of facilities and actual student performance, which emphasizes the need for better alignment between infrastructure use and instructional design. Therefore, improving learning outcomes in vocational education requires not only complete facilities but also competent teaching, motivated learners, and a structured learning environment.

✉ Correspondence:
Jl. Ciwaru Raya, Cipare, Kec. Serang, Kota Serang,
Banten 42117, Indonesia
E-mail: 2284200018@untirta.ac.id

p-ISSN 2339-0344
e-ISSN 2503-2305

INTRODUCTION

Education is a fundamental social institution that shapes and prepares high quality human resources capable of competing in today's dynamic world (Hartono, 2018). Beyond the acquisition of knowledge, education fosters collaboration and social interaction, enabling individuals to meet their needs more effectively (Hadi, 2022). In the Indonesian context, education is anchored in Pancasila and the 1945 Constitution, incorporating religious values, national culture, and responsiveness to global changes (Hermanto, 2020). These principles are reinforced by the National Education Law No. 20 of 2003, which defines education as a conscious and well-planned effort to create a learning atmosphere that actively develops learners' potential, spiritual strength, self-control, intelligence, noble character, and skills necessary for societal and national needs (Kemendikbud, 2018).

Vocational High Schools (Sekolah Menengah Kejuruan or SMK) represent a crucial pillar of formal education in Indonesia, specifically designed to produce graduates equipped with mid-level technical and professional skills relevant to the workforce (Dewi, 2020). One of the prominent departments in SMK is Light Vehicle Engineering (Teknik Kendaraan Ringan Otomotif or TKRO), which emphasizes practical learning in automotive technology using gasoline, diesel, or electric-powered light vehicles (Bararah, 2020). The TKRO curriculum is predominantly practical, with approximately 70% of instructional time allocated to hands-on training (Alfaruq et al., 2020). This aligns with vocational education standards, which prioritize student readiness for specific occupations and industries (Amin, 2015).

However, successful implementation of vocational education depends not only on curriculum and instructional quality but also on adequate infrastructure. According to the Indonesian Ministry of Education Regulation No. 34 of 2018, vocational schools must meet eight national standards, one of which is the availability of sufficient facilities and infrastructure. These include classrooms, laboratories, workshops, administrative rooms, health units, prayer rooms, and supporting tools tailored to each skill program (Rahayu et al., 2022).

In an effort to produce graduates who are ready to enter the industrial workforce, mastery of job competencies is a key focus in vocational education. According to the study "Operator Competency Model for Mechanical Engineering Expertise", the success of mechanical engineering operators is not solely determined by technical skills, but also by standardized operational competencies such as accuracy, understanding of equipment, and work efficiency (Ikhsan et al., 2023). Therefore, vocational high schools specializing in mechanical engineering must ensure that their workshop facilities and infrastructure effectively support the development of these competencies. Without adequate practical support, achieving industry-standard competency outcomes becomes difficult to realize (Abizar et al., 2023).

Despite these regulations, many vocational schools still struggle to meet these requirements. A field observation at SMK Negeri 5 Kota Serang on November 18, 2024, revealed several shortcomings in the TKRO workshop. According to the head of department, Mr. Iim Mulana, S.Pd., the limited space prevents the creation of a dedicated room for periodic service practice, and most equipment must be relocated frequently, causing inefficiency and discomfort. Furthermore, essential tools such as lifts are insufficient only one unit is available out of the four required and some equipment, like oil storage units, are damaged and need replacement. These deficiencies may directly impact students' ability to fully engage in practical learning.

Supporting this observation, student performance data in the 2024/2025 academic year show that most students in Grade XI TKRO failed to achieve competency standards in the overhaul practice of light vehicle engine systems. This raises concerns about factors affecting learning outcomes. While the limitations of workshop facilities are visibly prominent, other factors such as student motivation (Nabillah & Abadi, 2019) , teacher competence (Anna, 2018), and time management in practical sessions also contribute to these challenges. Teachers with low pedagogical and professional skills may fail to

develop systematic and engaging practical learning strategies. Additionally, limited instructional time may prevent students from fully mastering essential skills.

Previous research suggests that sufficient facilities and infrastructure are positively correlated with student learning outcomes in vocational education (Kartika, 2019). National policies such as the Ministry of Education Decree No. 129a/U/2004 set a minimum service standard requiring 90% of schools to provide adequate facilities. More recently, the 2023 Regulation No. 22 on infrastructure emphasized the mandatory availability of dedicated workshop rooms and equipment in vocational institutions. However, there is limited empirical research that quantitatively examines the influence of these facilities on specific learning outcomes in automotive vocational education, particularly in under-resourced schools (Menteri Pendidikan, Kebudayaan, 2024).

Therefore, this research aims to analyze the effect of the adequacy of workshop facilities and infrastructure on students' practical learning outcomes in the TKRO department at SMK Negeri 5 Kota Serang. By identifying whether these infrastructural challenges are a significant contributing factor, this study seeks to provide evidence-based insights that can guide future improvements in vocational education, balancing both theoretical perspectives and practical application in the field of automotive engineering.

METHOD

Research Methode

This study employs a quantitative approach with an ex-post facto design, aiming to examine the influence of workshop facilities and infrastructure on student learning outcomes. The research was conducted at SMK Negeri 5 Kota Serang from October to December 2024, involving all 73 students of Grade XI TKRO as the sample, selected through total sampling. The primary data were collected using a validated questionnaire based on the National Education Standards (Permendikbud No. 34/2018), while secondary data were obtained from school documents, including student practical scores and workshop inventory records.

Analysis Research

The instruments were tested for validity and reliability using SPSS 22. Data were analyzed using descriptive statistics, normality tests, linearity and homogeneity tests, and simple linear regression analysis to determine the influence of facilities on learning outcomes. Workshop materials observed include engine lifts, overhaul tool kits, and safety equipment. The technical procedures, instruments, and statistical methods provided in this study ensure that it can be replicated in similar educational contexts (Sugiyono, 2017). The relationship between variables can be explained in the diagram below.

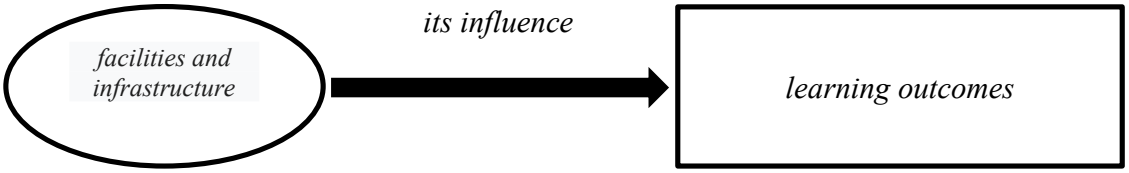

Figure 1. Relationship between variables

RESULTS AND DISCUSSION

Result

1. Descriptive Data of Learning Outcomes

Student learning outcomes were measured through practical test scores converted into quantitative data. The descriptive analysis showed that the average score was in the medium category, with a standard deviation that reflected a balanced distribution. Based on the frequency distribution, most students were in the "not good" and "good" categories, while only a few fell under the "very good" category. To strengthen the interpretation of data distribution, a histogram and tendency score table were used. These results form the basis for further analysis of the factors influencing student learning outcomes, including the adequacy of school facilities and infrastructure.

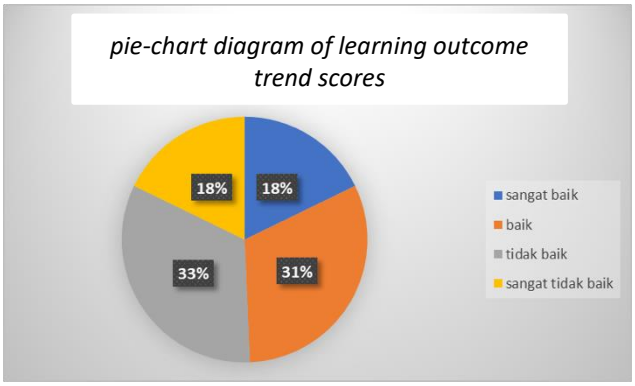

Figure 2. pie-chart diagram of learning outcome trend scores

2. Contribution of Each Indicator of Facilities and Infrastructure

Each indicator of the facilities and infrastructure variable was analyzed for its contribution to student learning outcomes using the squared value of the correlation coefficient (r^2). The analysis revealed that the learning media indicator had the highest contribution, followed by the practice room, additional equipment, and other indicators.This finding indicates that not all components of facilities have the same influence. Interactive and context-appropriate learning media play a significant role in improving learning effectiveness. Conversely, supporting facilities such as storage or work tables had the lowest contribution, which implies their influence on outcomes is not substantial.

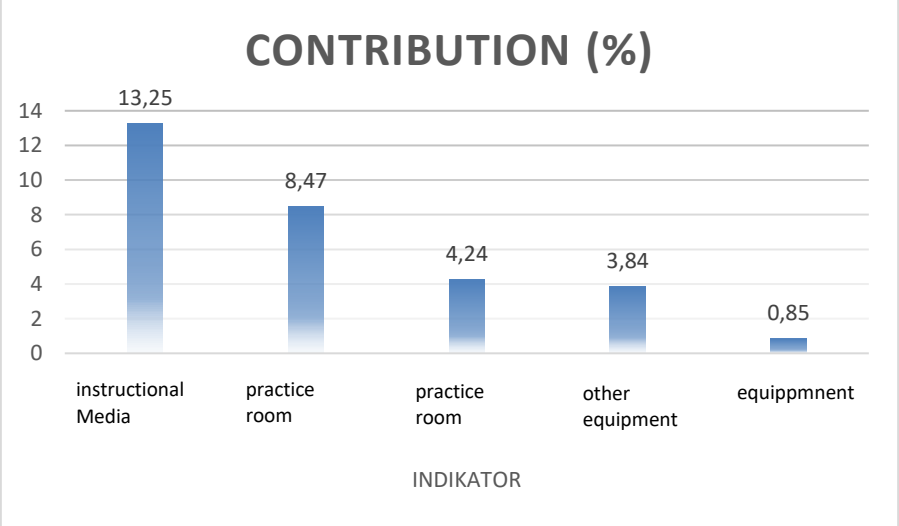

Figure 3. Contributions of Each Infrastructure Indicator to Student Learning Outcomes

3. Assumption Testing for Parametric Analysis

Prior to conducting regression analysis, assumption tests were carried out, including normality, linearity, and homogeneity tests. The normality test ensured data followed a normal distribution, while the linearity test checked whether the relationship between independent and dependent variables was linear. The homogeneity test examined whether data variance was equal across groups. Based on SPSS output, all variables had significance values above 0.05 in the normality and homogeneity tests, while the linearity test confirmed a linear relationship between facilities and learning outcomes. These findings validated that the data met the assumptions required for parametric statistical testing.

4. Simple Linear Regression Analysis

To determine the influence of facilities and infrastructure on learning outcomes, a simple linear regression test was conducted. The results showed that facilities and infrastructure had a

positive and statistically significant influence, although in the low category. The coefficient of determination (R^2) was 0.119, meaning 11.9% of the variation in learning outcomes could be explained by the facilities and infrastructure variable.

The resulting regression equation is as follows:

$$\mathbf{Y = a + bX}$$

This equation indicates that for every one-unit increase in the adequacy of facilities and infrastructure, student learning outcomes are expected to increase by 0.405 points. Although the influence is categorized as low, it is still significant and positive. Therefore, the alternative hypothesis (H_1), stating that there is an effect of facilities and infrastructure on learning outcomes, is accepted.

Discussion

This study shows that the condition of workshop facilities and infrastructure in the TKRO department at SMKN 5 Kota Serang based on student perceptions is considered adequate. However this adequacy does not necessarily lead to optimal learning outcomes. The findings reveal that most students have not reached the expected level of competency even though they have practiced in environments perceived to be physically sufficient. This suggests that the mere availability of tools and equipment does not automatically guarantee effective learning outcomes without proper support and utilization.

Several obstacles were identified such as complaints about equipment arrangement cleanliness of the workshop area limited availability of personal protective equipment and the underutilization of learning media by teachers. These findings are consistent with the study by (Sutisna & Effane, 2022) who explained that the quality of vocational learning is not only influenced by the availability of infrastructure but also by how those facilities are integrated into the learning process. In their research they concluded that well managed facilities that are linked directly to learning objectives tend to support better student performance.

The statistical results of this study indicate that the influence of facilities and infrastructure on learning outcomes is low with a contribution of eleven point nine percent. This finding suggests that other non physical variables have a more significant effect on learning success (Zamzami et al., 2023) emphasized that internal factors such as student learning motivation teaching strategies and student learning discipline play a more dominant role than physical resources in vocational education. This aligns with the findings of the current study which place greater weight on behavioral and instructional components.

The position of this study differs from earlier works that often assumed a strong direct relationship between the adequacy of physical resources and student success. This research emphasizes that such a relationship is conditional depending on the presence of additional variables such as teacher competence student engagement and school culture. The study contributes a new perspective by showing that although facilities are important their influence is limited unless they are accompanied by strong management systems and effective pedagogical practices. One of the new findings of this research is the identification of a disconnect between perceived facility adequacy and actual student performance. Students may consider their learning environment sufficient in terms of tools and space but this does not automatically mean that learning is effective. The study finds that without proper layout maintenance and consistent use of learning media even good infrastructure cannot fully support learning outcomes. This nuance adds depth to existing discussions in the field of vocational education and offers a more critical view on how learning environments are assessed and improved.

In practical terms this research emphasizes the need for integrated management of facilities that includes regular maintenance proper utilization and alignment with learning goals. Furthermore the study highlights the importance of pedagogical skills in vocational teachers which are often overlooked when infrastructure becomes the main focus of development. As (Triyono et al., 2024) stated the improvement of learning outcomes in vocational schools cannot

rely solely on infrastructure investment but must also involve teacher training character development and the strengthening of learning motivation. For practical subjects such as engine overhaul learning is not limited to operating tools but involves safety discipline problem solving and attitude. These aspects require direct interaction guided practice and meaningful feedback which are pedagogical functions that must complement physical resources. This reinforces the conclusion by (Alimah et al., 2024) who argued that the integration of hard and soft components in vocational learning is the key to successful competency development.

Learning in the Light Vehicle Engineering (TKRO) program at vocational high schools requires a strong integration between the availability of workshop facilities and students' learning motivation (Ramadhan et al., 2021) found that although physical infrastructure supports the learning process, student motivation plays a more dominant role in determining learning outcomes. This aligns with the present study's findings, which confirm that well-equipped TKRO workshops do not automatically translate into high student competency. Similarly,(Nurharirah, Siti & Effane, 2022) emphasize that industrial work practices and intrinsic motivation have a stronger influence on student achievement than merely relying on school facilities. Therefore, in the TKRO context, learning becomes more effective when practice-based experiences and student motivation are balanced with the provision of adequate tools and equipment.

In TKRO learning environments, the presence of complete workshop facilities must be complemented by teacher readiness, student engagement, and a disciplined learning culture. While educational policies often prioritize infrastructure procurement, this study highlights that successful practical learning in TKRO depends on the synergy between physical resources and pedagogical readiness. Teachers must be continuously trained to utilize learning media effectively, tools must be regularly maintained, and occupational safety habits must be instilled from the start. As a result, TKRO workshops should not only serve as spaces for technical skill development but also as environments that cultivate character and a strong work ethic. This underscores the need for a holistic development approach in TKRO, where pedagogical and cultural aspects are equally prioritized alongside infrastructure.

This study makes a significant contribution to the development of TKRO learning, particularly in managing workshop facilities and optimizing the practical learning environment in vocational high schools. The findings reveal that having adequate physical resources alone does not guarantee successful learning outcomes. Thus, school administrators and policymakers are advised to balance equipment procurement with investments in teacher competency, student motivation, and a supportive learning culture. Furthermore, this research can serve as a reference for future studies aiming to assess the effectiveness of TKRO programs through a more comprehensive approach one that integrates physical infrastructure with pedagogical strategies tailored to the automotive field.

This study reveals a mismatch between students' perceptions of facility adequacy in TKRO workshops and their actual competency achievements. While students believe the physical environment is sufficient, this does not necessarily lead to optimal learning outcomes. The success of TKRO training is heavily influenced by how well infrastructure is integrated with structured teaching practices. Key factors such as the ergonomic layout of tools, cleanliness of the workshop, and teacher engagement in using media all contribute to learning effectiveness. Therefore, this study emphasizes that well equipped TKRO workshops only become impactful when supported by effective management, continuous teacher development, and a learning culture that mirrors real-world automotive industry standards.

CONCLUSION

Based on the research findings, formulated problems, and objectives of the study, it can be concluded that the availability and quality of workshop facilities and infrastructure have a measurable influence on students' learning outcomes in the Automotive Light Vehicle Engineering (TKRO) program at SMK Negeri 5

Kota Serang. Although other factors may play a greater role, the presence of adequate and appropriate facilities contributes positively to improving students' practical performance. Students perceive the current state of facilities as generally sufficient, yet some limitations in space and equipment affect learning efficiency. This research contributes to the field of vocational education by highlighting the importance of aligning learning infrastructure with the practical needs of technical education. It also provides empirical evidence supporting the necessity of continuous investment and improvement in school facilities to enhance educational outcomes and better prepare students for industry demands.

REFERENCES

Abizar, H., Ramdani, S. D., & Putra, A. Y. W. (2023). Analisis perangkat pembelajaran terintegrasi dudika pada kompetensi keahlian teknik pemesinan. 10(November).

Alfaruq, S. M., Achmad, N., Mahendra, S., Kendaraan, T., Smk, R., & Bangsa, T. (2020). Pengaruh Sarana Prasarana Bengkel Terhadap Hasil Belajar Siswa Teknik Kendaraan Ringan. Journal of Vocational Education and Automotive Technology, 1(1), 30–35.

Alimah, A., Haque, R., Qudus, N., & Sukamta, S. (2024). The Implementation of Learning Media in the Teaching Process of Productive Subjects in the Building Engineering Department at SMK Negeri 7 Semarang. Journal of Vocational Career Education, 9(2), 50233.

Amin, R. & P. (2015). Pengaruh kelengkapan peralatan praktik dan penerapan keselamatan dan kesehatan kerja (k3) terhadap hasil belajar kompetensi perbaikan kopling. Jurnal Pendidikan Teknik Mesin, 13(2), 82–86.

Anna, Z. (2018). Pengaruh minat kejuruan, praktik kerja industri, dan efikasi diri terhadap kesiapan kerja. 7(2), 526–542.

Bararah, I. (2020). Pengelolaan Sarana Dan Prasarana Pendidikan Dalam Meningkatkan Kualitas Pembelajaran. Jurnal MUDARRUSUNA, 10(2), 351–370. http://dx.doi.org/10.22373/jm.v10i2.7842

Dewi, R. P. (2020). Pengelolaan Sarana dan Prasarana Dalam Meningkatkan Mutu Pendidikan (Studi Deskriptif Kualitatif di SMPN 05 Lebong). Jurnal Manajer Pendidikan, 14(3).

Hadi, B. (2022). Fenomena Learninng Loss pada Pendidikan Sekolah Menengah Kejuruan di Indonesia. Edudikara: Jurnal Pendidikan dan Pembelajaran, 6(4), 290–296. https://doi.org/10.32585/edudikara.v6i4.262

Hartono, F. (2018). Pendidikan Sejarah Sebagai Penguat Pendidikan Karakter. Jurnal Ilmiah Ilmu Sosial, 4(2), 127–134.

Hermanto, B. (2020). Perekayasaan sistem pendidikan nasional untuk mencerdaskan kehidupan bangsa. Foundasia, 11(2), 52–59. https://doi.org/10.21831/foundasia.v11i2.26933

Ikhsan, M. R., Rifdarmon, Martias, & Setiawan, D. (2023). Studi Kelayakan Sarana dan Prasarana Praktik Teknik Sepeda Motor di SMK Swasta Pembina Bangsa Bukittinggi. Jurnal Teknologi Dan Pendidikan Vokasi Indonesia, 453–462.

Kartika, S. (2019). Pengaruh Kualitas Sarana dan Prasarana terhadap Minat Belajar Siswa dalam Pembelajaran Pendidikan Agama Islam. 7(1).

Kemendikbud. (2018). Peraturan Menteri Pendidikan dan Kebudayaan RI Nomor 34 Tahun 2018 Tentang Standar Nasional Pendidikan Sekolah Menengah Kejuruan/ Madrasah Aliyah Kejuruan. In Jdih.Kemdikbud.Go.Id (hal. 1–1369).

Menteri Pendidikan, Kebudayaan, R. dan T. (2024). Peraturan Menteri Pendidikan, Kebudayaan, Riset dan Teknologi Republik Indonesia Nomor 12 Tahun 2024 Tentang Kurikulum Pada Pendidikan Anak Usia Dini, Jenjang Pendidikan Dasar, Dan Jenjang Pendidikan Menengah. Badan Pengembangan Sumber Daya Manusia Pendidikan dan

Kebudayaan dan Penjaminan Mutu Pendidikan, 1–26.

Nabillah, T., & Abadi, A. P. (2019). Faktor penyebab Rendahnya Hasil Belajar Siswa. Sesiomadika, 659–663.

Nurharirah, Siti & Effane, A. (2022). Hambatan dan Solusi dalam Manajemen Sarana dan Prasarana Pendidikan. Karimah Tauhid, 1, 219–225.

Rahayu, R., Rosita, R., Rahayuningsih, Y. S., Hernawan, A. H., & Prihantini, P. (2022). Implementasi Kurikulum Merdeka Belajar di Sekolah Penggerak. Jurnal Basicedu, 6(4), 6313–6319. https://doi.org/10.31004/basicedu.v6i4.3237

Ramadhan, M. A., Murtinugraha, R. E., & Subarkah, M. (2021). Kelayakan Standar Sarana dan Prasarana SMK Kompetensi Keahlian DPIB di Kota dan Kabupaten Bekasi (Studi Kasus di SMKN 6 Kota Bekasi dan SMKN 1 Cikarang Barat). Jurnal Sains, Teknologi, Sosial, Pendidikan, dan Bahasa, 6(1).

Sugiyono. (2017). Metode penelitian kuantitatif kualitatif dan R & D. Alfabeta.

Sutisna, N. W., & Effane, A. (2022). Fungsi Manajemen Sarana dan Prasarana. Karimah Tauhid, 1, 226–233.

Triyono, J., Abdillah, F., & Burhan, N. (2024). Studi Korelasi Kelayakan Sarana dan Prasarana Bengkel Otomotif Terhadap Permendiknas NO.40 Tahun 2008 Pada SMK Swasta di Boyolali. Journal of Vocational Education and Automotive Technology, 6(40), 46–58.

Zamzami, Alwi, E., Wakhinuddin, & Sugiarto, T. (2023). Hubungan Fasilitas Bengkel Terhadap Hasil Belajar Pemeliharaan Mesin Kendaraan Ringan Kelas XI TKRO SMK Negeri 2 Solok. Jurnal Teknologi Dan Pendidikan Vokasi Indonesia, 509–520.