

Poac-based management of automotive workshops to enhance students' competence in vocational high schools

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ABSTRACT

This study aims to analyze the application of POAC (Planning, Organizing, Actuating, Controlling) management functions in the management of automotive workshops at SMKN 1 Cijulang and SMKN 1 Padoherang, as well as assess its contribution to improving student competence. The approach used is qualitative descriptive, with data collection techniques through in-depth interviews, participatory observations, and documentation studies. Data analysis was carried out using the Miles and Huberman interactive model which included data reduction, data presentation, and conclusion drawn, with validation through triangulation of sources and methods. The results of the study show that the implementation of management functions has been running in both schools, but it is not fully optimal. In terms of planning, limited facilities and budgets cause the goals to be not fully realistic. The organization already has a clear structure, but coordination and support personnel are still lacking. The implementation of the practice has followed the teaching factory model, but it has not been effective due to limited time and facilities. Meanwhile, supervision is still limited to technical aspects without assessing entrepreneurial competencies and soft skills. This research emphasizes the need to strengthen workshop management through collaboration with the industrial world, resource optimization, and competency-based evaluation so that vocational school graduates have high competitiveness in the world of work.

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Introduction

Vocational High School (SMK) is an educational institution directed to produce graduates who are ready to face challenges in the world of work with appropriate skills and competencies. The main goal of vocational schools is to develop the knowledge, skills, and ethical attitudes of students so that they are able to contribute to various industrial sectors. The emphasis on practical experience, such as Field Work Practice (PKL) activities, is a key element in vocational education because it links theoretical learning with real application in the work environment (Sa'idah, Rukmanasari, and Mahanani 2022).

In the digital era and industry 4.0, the success of vocational education also depends on effective knowledge management through the implementation of a Knowledge Management

System (Beng et al. 2021). The application of problem-based learning methods and the use of innovative technology are important strategies in equipping students with soft skills and hard skills needed by the modern world of work (Rizaldi and Putri 2021; Sari 2023). The transformation of vocational education in vocational schools must therefore go hand in hand with the demands of the job market, through the implementation of a link and match policy between the educational curriculum and industrial needs (Ahmanda et al. 2022; Tessa and Humaedi 2024).

Improving the quality of vocational schools is very important so that graduates have competencies that are relevant to the needs of society and the industrial world. This includes the development of an adaptive curriculum, continuous training, and the use of the latest technology in learning activities (Bahtiar et al. 2022; Z et al. 2022). One of the concrete steps in improving the quality of vocational education in Indonesia is the implementation of the SMK Center of Excellence program, which is designed to strengthen the relationship between schools and industry through a link and match approach so that graduates can be more competitive in the job market (Ahmanda et al. 2022).

The application of practice-based learning models such as teaching factories and cooperation with the industrial world has proven to be effective in equipping students with relevant skills (Judijanto et al. 2024; Sa'idah et al. 2022). In order for quality improvement to take place sustainably, periodic evaluations and adequate financial support are needed (Banjarnahor et al. 2024). The imbalance between the number of graduates and the absorption of industrial labor shows the need to strengthen collaboration between educational institutions and the business sector so that vocational school graduates are not only job seekers, but also able to create jobs (Wijaya and Utami 2021).

The construction and development of vocational schools is a shared responsibility between three main parties, namely schools, communities, and industry. Schools play the role of education providers who ensure the suitability of curriculum and learning methods with set competency standards. The community functions as a supporter through the active participation of parents and local communities in supporting educational programs and ensuring their relevance to regional needs (Sa'idah et al. 2022). Meanwhile, industry has a central role in providing input on the skills needed by the job market as well as providing internship and work practice facilities that allow students to integrate theory with real-world experience (Beng et al. 2021). The Directorate of Vocational Development as a government institution is tasked with coaching, setting policies, and supervising the implementation of education in line with the national vision of improving the quality of human resources (Rizaldi and Putri 2021).

In the context of national policy, strengthening vocational education is outlined in the Vocational Revitalization program as stated in the Minister of Education and Culture Regulation No. 34 of 2018. This policy emphasizes the importance of improving the curriculum to be more relevant to the needs of industry and the world of work (Ahmanda et al. 2022). One of the key aspects of this policy is the implementation of link and match, which is a synergy between education and industry that allows schools to design learning experiences that are integrated with the needs of the job market (Precalya 2022). The Directorate of Vocational Development plays an important role in providing funding support and technical guidance for schools to implement vocational education best practices (Muaddab, Zunitasari, and Martha 2024).

As a concrete form of implementing the policy, the concept of Teaching Factory and Project-Based Learning (PBL) is the main learning strategy that integrates theory and practice. Through this approach, students are trained to solve real industry problems and actively

participate in projects relevant to their areas of expertise (Kowaas, Kenap, and Liando 2023; Putra et al. 2024). The implementation of PBL in vocational schools has been proven to improve critical thinking skills, collaboratively, and strengthen students' work readiness (Sari 2023). By collaborating with industry, learning can be simulated to resemble real work scenarios, in line with the vision of Vocational Revitalization and the link and match policy (Lindawali 2023).

However, in practice, workshop management in vocational schools is often not managed professionally, so it has an impact on the low quality of learning and readiness of students to face the world of work. Many educational workshops are still traditionally run without a structured planning, supervision, and management system (Sa'idah et al. 2022). In fact, the implementation of a professional management system such as strategic planning, the use of standard operating procedures (SOPs), and efficient inventory management are important prerequisites for the creation of a learning environment that resembles the industrial world (Rizaldi and Putri 2021). This condition is exacerbated by the lack of cooperation between schools and industry in the provision of practical training facilities and resources. Limited investment in workshop facilities makes it difficult for vocational schools to adopt the latest technology and modern industrial practices (Tessa and Humaedi 2024). In fact, strengthening the capacity of teaching and workshop managers is urgently needed to create a learning system that is relevant and adaptive to changes in the industrial world (Bahtiar et al. 2022). Automotive workshops in vocational schools are often only seen as an additional activity, not as a productive learning unit that is the core of vocational education. The Teaching Factory model is a potential solution to change this perception by creating a learning environment that resembles the industrial world (Perwiranegara 2022; Purnami, Mulyanto, and Utomo 2021). Through this approach, students not only acquire technical knowledge but also managerial skills and professional work habits (Saputro et al. 2023; Sunarja and Maharani 2023).

However, the reality on the ground shows that the implementation of automotive workshop management is still not optimal. Research shows that many vocational workshops have not met the standards of practical facilities and infrastructure (Fauzi and Setiawan 2025; Milah et al. 2024). In some schools, material management and equipment maintenance are not well organized (Usman, Wiratmani, and Perdana 2021). The absorption rate of automotive vocational school graduates in the industry is still low, which is around 37%, indicating that there is a significant gap between the competence of graduates and the needs of the industry (Maknunah et al. 2023). This problem is increasingly complex because competency certification programs in a number of vocational schools have not achieved satisfactory results, with many students not passing the industrial competency test (Setyowati et al. 2023). This condition shows the importance of improving workshop management so that students gain adequate practical experience to face the challenges of the modern world of work (Ani, Budiarta, and Widiati 2021). In this context, the implementation of Total Quality Management can be an effective approach to improve the quality of educational services and ensure the readiness of graduates (Hakim and Abidin 2024; Supangat and Delastri 2023). Therefore, improving the management of automotive workshops in vocational schools is an urgency that cannot be ignored. Managerial training for teachers and managers, strengthening collaboration with industry, and sustainable policy support is needed so that vocational workshops can truly function as productive learning vehicles that produce competent and job-ready graduates (Karyaningsih, Fachriyah, and Yulistiyari 2022; Marta et al. 2024).

Previous research and Rationale

Previous studies on the management of automotive workshops in vocational high schools (SMK) have shown that the application of management functions and industry-based

learning models has a significant influence on improving student competence, but most of the research still focuses on certain aspects without comprehensively integrating all management functions. A and Sukardi (2020) show that the implementation of a teaching factory on the competence of machining engineering expertise can improve students' skills, but its implementation still depends on the readiness of facilities and teacher support. Khoiron (2016) emphasized that the teaching factory learning model has a positive effect on students' job readiness, but their research has not examined how school managerial aspects support the implementation of the model. Ngatiman, Supriyoko, and Teguh Mulyo (2022) highlight the importance of implementing Total Quality Management in vocational schools to improve the quality of learning, but the focus of the research is still on the school quality system in general, not workshop management in particular. Meanwhile, Rohaeni et al. (2021) stated that the implementation of a teaching factory is able to improve student competence if supported by good planning and supervision, but has not discussed the relationship between management functions as a whole. On the other hand, Wahjusaputri, Bunyamin, and Nastiti (2021) identified key factors for the successful implementation of teaching factories, such as partnerships with industry and human resource readiness, but this research was also conducted in schools with relatively complete facilities.

This conceptual gap is directly related to empirical findings in the field. Based on the results of observations at SMKN 1 Cijulang and SMKN 1 Padoherang, the management of automotive workshops is still not fully effective. In the planning aspect, for example, the workshop work program has not been prepared based on the analysis of equipment needs and systematic budget allocation. The organizational structure of the workshop has indeed been formed, but the division of tasks and coordination between personnel is still not running optimally due to the lack of support personnel. The implementation of practical activities has also not been able to reflect the application of modern learning methods such as teaching factories and project-based learning to the maximum due to limited facilities. Meanwhile, in the aspect of supervision, the evaluation of student practice results has not fully referred to industry competency standards, so that students' skills are not fully in accordance with the needs of the world of work.

This condition shows that there is a real gap between the management theory put forward in various previous studies and the practice of workshop management in the field. In other words, there have not been many studies that have comprehensively examined the relationship between the implementation of POAC management functions and the improvement of student competence in the context of schools that have limited resources.

The novelty of this research lies in its comprehensive and contextual approach. This study not only describes the application of management functions in automotive workshops, but also analyzes the relationship between management functions in a complete work system based on the POAC model. In addition, this research was conducted in vocational schools with limited facilities and infrastructure, thus providing a new perspective on how the concept of management can be adapted and applied effectively in a non-ideal context. The findings of this study are expected to enrich the study of vocational education management by displaying an empirical correlation between the quality of workshop management and the improvement of students' practical competence. Thus, this study offers a theoretical and practical contribution in the form of a POAC-based automotive workshop management model that is relevant to be applied in various vocational schools, especially in areas with limited resources.

Method

This study uses a qualitative approach with the main objective of understanding the phenomenon that occurs in the management of automotive workshops in Vocational High

Schools (SMK), especially related to the application of POAC (Planning, Organizing, Actuating, Controlling) management functions and its relationship with improving students' practice competencies. The qualitative approach was chosen because it allows researchers to explore information in depth and comprehensively, so that it can provide a more holistic picture of the situation being studied, including the internal dynamics of the school, the interaction between managers, teachers, and students, as well as the limitations of existing facilities and infrastructure (Creswell 2018; Sugiyono 2019). The method used is a descriptive method, which allows researchers to describe phenomena systematically and comprehensively. This method is considered appropriate because it can describe various sources of information, ranging from expert opinions, direct observation results, to interview data which is the main source of understanding of workshop management practices in the field. This approach also supports the mapping of problems that occur as well as the identification of best practices that can be applied to improve the quality of workshop management (Miles, Huberman, and Saldaña 2014).

The research locations were chosen purposively, namely SMKN 1 Cijulang and SMKN 1 Padoherang, because both schools have Light Vehicle Engineering (TKR) programs that are relevant to the research focus. These two locations also represent schools with different conditions of facilities and infrastructure, thus providing a more contextual perspective regarding the challenges faced in the management of automotive workshops at vocational schools (Sugiyono 2019). Data collection was carried out through in-depth interviews, participatory observations, and documentation. Interviews were conducted with school principals, productive teachers, workshop technicians, and some students to explore their experiences, perceptions, and views regarding the implementation of workshop management functions, challenges faced, and strategies considered effective (Kvale and Brinkmann 2019). Participatory observation was carried out during the practical activities, where the researcher recorded the practice planning process, division of tasks, teacher-student interaction, use of equipment, and the implementation of *teaching factory* and *project-based learning methods* (Purnami et al. 2021; Sunarja and Maharani 2023). Documentation in the form of work program archives, practice schedules, standard operating procedures, practice evaluation reports, and student competency certifications are used to complete field data and verify information obtained through interviews and observations (Miles et al. 2014).

Data analysis was carried out using the interactive model of Miles et al. (2014), which consisted of data reduction, data presentation, and conclusion drawing and verification. Data reduction is carried out by sorting, filtering, and highlighting important information to maintain the focus of the research. The presentation of data is carried out in the form of narratives, tables, and diagrams to facilitate understanding the patterns and relationships between POAC management functions in workshop practice. Conclusions and verification are carried out by reflecting on the findings, comparing with previous theories and research, and triangulating to ensure the validity and credibility of the data Miles et al. (2014). To improve the validity of the data, this study uses triangulation of sources and methods, where information from principals, teachers, technicians, and students is compared and validated through various data collection techniques. The researcher also conducted a follow-up with the respondents (*member check*) to ensure that the interpretation of the data was in accordance with real experience in the field Creswell (2018).

Result

The management of automotive workshops at SMKN 1 Cijulang and SMKN 1 Padoherang shows a good implementation in supporting industry-based vocational practice activities. Both schools have a clear workshop management structure, involving workshop heads, productive teachers, and technicians. However, the results of the study show that the implementation of management functions which include planning, organizing, implementing,

and supervising (POAC) still faces a number of obstacles, especially in terms of infrastructure, internal coordination, and external collaboration with the Business and Industrial World (DUDI).

Overview of Research Results

Based on the management theory of Terry and Rue (2014), the implementation of POAC management functions in both schools has been seen in the automotive workshop management system, but it is not optimal at all stages. A summary of the findings is presented in the following table.

Table 1. Research Findings

Aspects	Key Findings	Note
Planning	Limited facilities and budgets cause goals to be less realistic and materials are not relevant to the latest technology. Realistic goal adjustments as well as collaboration with DU/DI are needed for the adoption of modern technology.	The material is not in accordance with the latest developments in automotive technology.
Organizing	It is necessary to strengthen the organizational structure, coordination between personnel, and long-term solutions such as facility expansion.	Limited support personnel, workshop space, and budget.
Implementation	Student grouping strategies, discipline coaching, and improved facilities are needed to ensure effective learning and according to industry standards.	Limited tools, practice time, and student discipline.
Supervision	It is necessary to develop a technology-based evaluation system and collaborate with BKK to increase the absorption of graduates.	Lack of precision evaluation tools and teacher evaluation training.

Comparison of POAC Implementation in Two Schools

The difference in the level of implementation of workshop management functions between the two schools shows variations in the effectiveness of implementation. SMKN 1 Padaherang is generally more systematic in planning and implementing activities, while SMKN 1 Cijulang excels in flexibility and technical improvisation. Details of the comparison can be seen in the following table.

Table 2. Comparison of Workshop Management Implementation at SMKN 1 Cijulang and SMKN 1 Padaherang

Aspects	SMKN 1 Cijulang	SMKN 1 Padaherang	Brief Analysis
Planning	It already has an annual plan, but it is not based on an analysis of	Involving productive teachers and program heads, but not yet adjusting to	Both need to develop a plan based on the needs of the industry and

	equipment and fund needs.	industrial technological developments.	the latest technology.
Organizing	The organizational structure has been formed, but coordination between personnel is not optimal.	The structure is more formal, but the implementation of the role is still inconsistent.	It is necessary to strengthen communication and proportionate division of responsibilities.
Implementation	Practice runs routinely, but limitations of tools and time reduce effectiveness.	The implementation is more disciplined and structured, but the number of tools is not proportional to the number of students.	Improving the practice rotation system is needed so that all students get the same opportunity.
Supervision	Supervision is carried out by teachers and workshop heads, but without standard evaluation instruments.	The evaluation is based on the competency rubric, but it does not include soft skills and work ethic.	It is necessary to develop industry-based evaluation instruments and digitalize monitoring systems.

Analysis Per Aspect of POAC

a. Planning

The planning of workshop activities in both schools is carried out every year and refers to the national curriculum. However, the planning is not completely based on the real needs of the industry and the condition of workshop facilities. Some targets, such as equipment updates and teacher training on the latest automotive technologies, are often delayed due to funding constraints. Collaboration with DUDI is still incidental, not yet integrated into the annual work plan. This condition shows the need for data-driven planning and sustainable partnerships so that relevance to industry needs increases.

b. Organizing

The structure of workshop management in both schools is clear with the division of tasks between workshop heads, productive teachers, and technicians. However, the implementation of coordination still faces communication obstacles and overlapping roles. Most activities are still centered on individual initiatives, not yet on a directed collective work system. A routine coordination mechanism and visualization of a stronger organizational structure are needed for the management function to run effectively.

c. Implementation (Actuating)

The process of implementing practical learning in automotive workshops has adopted a *teaching factory approach* that emphasizes contextual and project-based learning. However, its effectiveness is still limited due to the lack of practical tools and learning time. Teachers

often have to arrange group rotations so that all students have a chance to practice, but this system is not yet efficient. Student work discipline is also a concern, especially in terms of implementing work safety procedures. Therefore, increasing discipline development and strengthening facilities are important factors for the success of the implementation stage.

d. Supervision (Controlling)

Supervision activities have been carried out through direct supervision and assessment of practice results. However, the evaluation instrument is still simple and does not include non-technical aspects such as soft skills and entrepreneurial abilities. Evaluation assesses the end result more than the learning process. The involvement of the Special Job Exchange (BKK) is also still limited in providing feedback related to the absorption of graduates. Thus, the development of a data-based and collaborative supervision system is an urgent need to improve the quality of graduates.

Improvement Priority Plan

Based on the results of the analysis, strategic steps were formulated to improve the effectiveness of workshop management in both schools as presented in the following table.

Table 3. Priority Plan for Improvement of Each Aspect of POAC

Aspects	Key Issues	Recommended Improvements	Urgency
Aspects	Lack of needs analysis and budget limitations	Develop a plan based on real needs and engage industry partners	Tall
Planning	Weak coordination and ineffective division of tasks	Revision of organizational structure and routine coordination schedule	Keep
Organizing	Low discipline and effectiveness of practice	Implementation of a planned rotation system and coaching of student work discipline	Tall
Implementation	The evaluation is not yet comprehensive and technology-based	Development of competency-based digital evaluation systems and industry partnerships	Tall

Discussion

Discussion

The results of this study indicate that the management of automotive workshops at SMKN 1 Cijulang and SMKN 1 Padoherang has been implemented in accordance with the principles of the POAC model (Planning, Organizing, Actuating, and Controlling) proposed by Terry and Rue (2014). However, the implementation of these functions varies in effectiveness due to structural, technical, and human resource limitations. A deeper discussion of each

management function reveals several strengths, weaknesses, and strategic implications that can be developed to improve workshop management performance and student competence.

Planning

Planning serves as the foundation for all managerial activities. The study found that both schools have developed workshop work programs aligned with the national curriculum and industrial competencies. However, the planning process has not yet been based on a comprehensive *needs assessment* that reflects technological changes and industrial trends. This finding aligns with A and Sukardi (2020), who revealed that many vocational schools rely on internal administrative planning without systematic coordination with industry needs. As a result, certain materials and objectives have become outdated, especially regarding recent automotive technologies such as electronic fuel injection, hybrid systems, and digital diagnostic tools.

Limited budgets also constrain equipment renewal and curriculum alignment. Therefore, it is necessary to apply a *strategic planning* approach that integrates partnership-based collaboration between schools and industries (*link and match* program). Effective planning should also incorporate *outcome-based education (OBE)* principles, ensuring that learning objectives are directed toward measurable competencies required by industry. A participatory planning model involving teachers, workshop heads, and industry partners would help ensure that plans are realistic, relevant, and sustainable.

Organizing

The organizing function in both schools demonstrates that clear structures exist, with workshop heads, productive teachers, and technicians assigned specific roles. However, coordination and communication mechanisms remain weak, causing inefficiencies in resource utilization. The division of labor has not fully followed a competency-based structure, and overlaps in responsibilities between teachers and technicians still occur.

This finding resonates with Khoiron (2016), who emphasized that successful implementation of vocational learning models requires not only organizational clarity but also a culture of collaboration and leadership distribution. The lack of coordination indicates limited application of *distributed leadership* principles, where responsibilities should be delegated based on professional expertise. Strengthening this function requires the development of clearer organizational charts, competency-based role distribution, and regular coordination meetings. Moreover, the workshop management system needs to incorporate a *collaborative management* approach, encouraging shared decision-making and better alignment between teaching and administrative functions.

Actuating

Actuating, or implementation, represents the operational phase of management where plans and structures are put into practice. The study shows that both schools have implemented *teaching factory* and *project-based learning* approaches to bring real industrial situations into the learning process. However, the limited number of tools, constrained workshop space, and inconsistent student discipline hinder the efficiency of practical learning.

In line with Rohaeni et al. (2021), the success of the *teaching factory* model depends not only on curriculum design but also on resource adequacy and consistent mentoring from instructors. Furthermore, from the perspective of *experiential learning theory*, limited access to hands-on experience disrupts students' reflective learning cycles, restricting higher-order

skill development. Therefore, adaptive implementation strategies such as modular rotation systems, time-block management, and small-group specialization are needed to optimize tool use and learning outcomes. Strengthening student motivation and discipline through mentoring and industrial-style evaluation can also enhance work culture and simulate real workplace conditions.

Controlling

The controlling function is essential for ensuring that workshop activities align with established standards and objectives. The study found that both schools conduct supervision and assessment, but the evaluation still focuses on technical skills rather than holistic competencies. Soft skills, work attitudes, and entrepreneurial competencies are rarely included in the assessment instruments.

This limitation is consistent with findings from Wahjusaputri et al. (2021), who asserted that effective evaluation in vocational education must integrate technical and non-technical dimensions to achieve comprehensive competency development. The absence of a structured feedback mechanism from industry partners further weakens the supervision system, leading to a disconnection between student outcomes and labor market expectations.

To strengthen control mechanisms, both schools need to adopt a *continuous quality improvement* approach supported by digital evaluation tools and industry-aligned rubrics. Integrating the role of the *Special Job Exchange (BKK)* in monitoring graduate employability can also serve as a feedback loop to refine planning and implementation phases, making the management cycle more responsive and evidence-based.

Synthesis and Managerial Implications

The overall analysis shows that the effectiveness of workshop management is strongly influenced by the balance and integration of POAC functions. Weakness in one function, such as planning or controlling, can undermine the entire management system. This finding reinforces the perspective of Ngatiman et al. (2022), who emphasized that school management effectiveness depends on the interdependence of managerial components rather than isolated excellence. The results of this study contribute theoretically and practically to vocational school management. Theoretically, it expands the understanding of POAC application in resource-limited contexts, providing evidence that integrated management models can still be effective through collaboration and innovation. Practically, the study proposes the development of an adaptive *POAC-Based Workshop Management Model* that aligns with the *Merdeka Belajar – Vokasi* policy, emphasizing partnership-based planning, collaborative organizing, adaptive implementation, and data-driven supervision. Strengthening these managerial functions is expected to improve the quality of workshop learning, enhance student competence, and increase the employability of vocational school graduates in an increasingly competitive labor market.

Conclusion

The management of automotive workshops at SMKN 1 Cijulang and SMKN 1 Padoherang has implemented the POAC (Planning, Organizing, Actuating, Controlling) function, but the implementation is not fully optimal. In the planning aspect, the work program already refers to the curriculum and industry standards, but it is not based on real needs analysis and is constrained by budget and facility limitations. The organization has a clear structure, but coordination and support staff are still weak. The implementation of practical

activities has followed the teaching factory model, but its efficiency is hampered by limited tools, time, and student discipline. While supervision is already running, but the evaluation instrument does not yet cover aspects of soft skills and entrepreneurship. Overall, the effectiveness of automotive workshop management in both schools still needs to be improved through collaboration with the industrial world, resource optimization, and the implementation of a more comprehensive evaluation system so that graduates have better competence and work readiness.

References

- A, M. Sofyan Hadi, and Thomas Sukardi. 2020. "PELAKSANAAN TEACHING FACTORY KOMPETENSI KEAHLIAN TEKNIK PEMESINAN DI SMK MUHAMMADIYAH PRAMBANAN." *Jurnal Pendidikan Vokasional Teknik Mesin* 8(2):165–74. doi:10.21831/TEKNIK.
- Ahmada, Wina, Arris Maulana, R. E. Murtinugraha, and Shilmi Arifah. 2022. "Implementasi Program SMK Pusat Keunggulan Dilihat Dari Konsep 8+i Link and Match." *Indonesian J. Build. Eng.* 2(2):59–74. doi:10.17509/jptb.v2i2.51290.
- Ani, Ni K., I. N. P. Budiarta, and Ida A. P. Widiati. 2021. "Perjanjian Perkawinan Sebagai Perlindungan Hukum Terhadap Harta Bersama Akibat Perceraian." *Jurnal Analogi Hukum* 3(1):17–21. doi:10.22225/ah.3.1.2021.17-21.
- Bahtiar, Bahtiar W., Lilik Kurniawan, Hanif Fitriyanto, Muhammad F. Tegar, and Arif Wibowo. 2022. "Pelatihan Update Teknologi Otomotif Jurusan Teknik Kendaraan Ringan SMK Insan Cendekia Yogyakarta." *Jurpikat (Jurnal Pengabdian Kepada Masyarakat)* 3(3):498–504. doi:10.37339/jurpikat.v3i3.1072.
- Banjarnahor, Rapita R., Hotmarito Hutabarat, Tia M. Tampubolon, Rico M. Sihotang, and Tetti Manullang. 2024. "Analisis Sumber Dana Pendidikan SMKS St.Nahanson Parapat Sipoholon." *Jurilma* 1(1):63–71. doi:10.69533/841y2b87.
- Beng, Jap T., Fenny Lusiana, Kirey Larasati, and Sri Tiatr. 2021. "Penjajakan Penerapan Sistem Manajemen Pengetahuan Di Sekolah Menengah Kejuruan." *Jurnal Muara Ilmu Sosial Humaniora Dan Seni* 5(1):293. doi:10.24912/jmishumsen.v5i1.10002.2021.
- Creswell, John W. 2018. *Qualitative Inquiry and Research Design: Choosing among Five Approaches*. 4th editio. Thousand Oaks, California: SAGE Publications.
- Fauzi, Moch., and Intoyo B. Setiawan. 2025. "Managemen Bengkel TKR SMK Di Surabaya Dalam Mewujudkan Sekolah Berbasis Industri." *Jiip - Jurnal Ilmiah Ilmu Pendidikan* 8(7):6987–91. doi:10.54371/jiip.v8i7.8315.
- Hakim, Muhammad N., and Achmad A. Abidin. 2024. "Platform Merdeka Mengajar: Integrasi Teknologi Dalam Pendidikan Vokasi Dan Pengembangan Guru." *Kharisma Jurnal Administrasi Dan Manajemen Pendidikan* 3(1):68–82. doi:10.59373/kharisma.v3i1.47.
- Judijanto, Loso, Nanny Mayasari, Yosep H. E. Baruno, Tasrip Tasrip, and Muhammad Rusdi. 2024. "Analisis Pengaruh Kemitraan Sekolah-Industri Dan Program Magang Terhadap Keterampilan Kerja Dan Kesiapan Karier Siswa SMK Di Jawa Tengah." *Jurnal Multidisiplin West Science* 3(03):378–88. doi:10.58812/jmws.v3i03.1074.
- Karyaningsih, Dentik, Eva Fachriyah, and Eka I. Yulistiyari. 2022. "Workshop Peningkatan Pemahaman Manajemen Referensi Dalam Penulisan Penelitian Tindakan Kelas Bagi Guru." *Dasabhakti Jurnal Pengabdian Masyarakat* 1(1):24–28. doi:10.30656/dasabhakti.v1i1.5612.
- Khoiron, Ahmad Mustamil. 2016. "THE INFLUENCE OF TEACHING FACTORY LEARNING MODEL IMPLEMENTATION TO THE STUDENTS' OCCUPATIONAL READINESS." *Jurnal Pendidikan Teknologi Dan Kejuruan* 23(2):122–29. doi:10.21831/JPTK.V23I2.13176.
- Kowaas, Ailen, Audy A. Kenap, and Olivia E. S. Liando. 2023. "Penerapan Project Based Learning Untuk Meningkatkan Hasil Belajar Dasar Grafis Siswa Kelas X Multimedia SMK Negeri 1 Tompasobaru." *Edutik Jurnal Pendidikan Teknologi Informasi Dan Komunikasi* 3(2):221–27. doi:10.53682/edutik.v3i2.6944.

- Kvale, S., and S. Brinkmann. 2019. *InterViews: Learning the Craft of Qualitative Research Interviewing*. 3rd ed. Thousand Oaks, CA: Sage Publications.
- Lindawali, Puzi A. N. 2023. "Analisis Aktivitas Peserta Didik Pada Pembelajaran Kimia (Studi Kasus Proses Pembelajaran Mata Pelajaran Kimia Di SMK Negeri 1 Siabu Tahun Pelajaran 2022/2023)." *Cognoscere: J. Komunikasi Dan Media Pendidikan* 1(1):37–43. doi:10.61292/cognoscere.137.
- Maknunah, Jauharotul, Fauzan Amri, Karsid Karsid, Indra Fitriyanto, Tri Haryanti, Icha Fatwasauri, Soh N. Jaelani, and Kriesna K. Purwanto. 2023. "Implementasi Standard Keselamatan Dan Kesehatan Kerja Di Bengkel Teknik Dan Bisnis Sepeda Motor SMK Yapin Kertasemaya." *JMM (Jurnal Masyarakat Mandiri)* 7(6):5727. doi:10.31764/jmm.v7i6.17852.
- Marta, Rizkayeni, Ambiyar Ambiyar, Ermita Ermita, and Rezkiyana Hikmah. 2024. "Analisis Evaluasi Dalam Pendidikan Vokasi Serta Dampaknya Pada Program Pendidikan Ditinjau Berdasarkan Persepsi Publikasi Ilmiah Berbasis Meta-Analysis." *Voteteknika (Vocational Teknik Elektronika Dan Informatika)* 12(2):254. doi:10.24036/voteteknika.v12i2.128802.
- Milah, Ai R., Tatin Suhertin, Deti Kurnia, Neneng Nurmallasari, Misbahhudin Misbahhudin, and Fauzan Dhiaulhaq. 2024. "Manajemen Sarana Dan Prasarana Pendidikan Dalam Mendukung Proses Pembelajaran." *Jurnal Pelita Nusantara* 1(4):529–34. doi:10.59996/jurnalpelitanusantara.v1i4.373.
- Miles, M. B., A. M. Huberman, and J. Saldaña. 2014. *Qualitative Data Analysis: A Methods Sourcebook*. 3rd ed. Thousand Oaks, CA: Sage Publications.
- Muaddab, Hafis, Ika Zunitasari, and Jefry A. Martha. 2024. "Problematisasi Green Skill Terhadap Kesiapan Kerja Lulusan SMK Di Sektor Industri Hijau." *Research and Development Journal of Education* 10(1):460. doi:10.30998/rdje.v10i1.23324.
- Ngatiman, Ngatiman, Ki Supriyoko, and A. Mufrod Teguh Mulyo. 2022. "Implementation of Total Quality Management (TQM) in Vocational High Schools (Analytical Study at SMK Karya Nugraha Boyolali Regency)." *Journal Research of Social Science, Economics, and Management* 1(9):1483-1500–1483 – 1500. doi:10.59141/jrssem.v1i9.150.
- Perwiranegara, Agus A. 2022. "Teaching Factory Management in the Industrial Era 4.0 in Indonesia." *International Journal of Science and Society* 4(3):151–62. doi:10.54783/ijssoc.v4i3.508.
- Precalya, Hayu M. 2022. "Liberalisme Pendidikan Dan Wacana Link and Match Sekolah Kejuruan Di Indonesia." *Jurnal Basicedu* 6(4):6580–90. doi:10.31004/basicedu.v6i4.3310.
- Purnami, Agustina S., Mulyanto Mulyanto, and Susilo Utomo. 2021. "Teaching Factory, Internal Quality Assurance System, and Vocational Teacher Quality Culture." *Journal of Education and Learning (Edulearn)* 15(3):406–13. doi:10.11591/edulearn.v15i3.18947.
- Putra, Pinto A., Hanesman Hanesman, Ilmiyati R. Jasril, and Hendra Hidayat. 2024. "Pengaruh Model Pembelajaran Project Based Learning Terhadap Hasil Belajar Siswa SMK Negeri 1 Guguk." *Voteteknika (Vocational Teknik Elektronika Dan Informatika)* 12(2):141. doi:10.24036/voteteknika.v12i2.125490.
- Rizaldi, Nur I. N., and Ananda S. Putri. 2021. "Apakah Model Pembelajaran Problem-Based Learning Efektif Diterapkan Pada Pendidikan Kejuruan Abad 21?" *Integr. J. Inf. Tech. Vocational. Educ.* 3(1):1–18. doi:10.17509/integrated.v3i1.32735.
- Rohaeni, Een, Sutaryat Trisnamansyah, Iim Wasliman, and Supyan Sauri. 2021. "Implementation of Teaching Factory in Improving the Competence of Vocational

- High School Students (SMK)." *Journal of Social Science* 2(5):598–609. doi:10.46799/jss.v2i5.220.
- Sa'idah, Magfirotus, Feny Rukmanasari, and Prima A. R. Mahanani. 2022. "Peningkatan Pengalaman Kerja Siswa Sekolah Kejuruan Berbasis Praktik Lapangan Pada Dinas Pendidikan Kota Kediri." *Journal of Empowerment* 3(2):238. doi:10.35194/je.v3i2.2736.
- Saputro, Ida N., Aryanti Nurhidayati, Suharno Suharno, Chandra Winiawati, Revira Yunika, and Mutiara P. Kusumadevi. 2023. "Evaluation of the Factory Implementation of the CIPP Method in Indonesian Vocational Education." *Al-Ishlah Jurnal Pendidikan* 15(4):4972–82. doi:10.35445/alishlah.v15i4.3903.
- Sari, Damar F. 2023. "Peningkatan Mutu Pendidikan Kejuruan Pada Era Pembelajaran Abad Ke-21 Untuk Menjawab Tantangan Industri 4.0." *Sang Acharya Jurnal Profesi Guru* 4(1):71–79. doi:10.25078/sa.v4i1.3234.
- Setyowati, Elis, Hery Muljono, Fetrimen Fetrimen, and Satriyana Satriyana. 2023. "Evaluasi Implementasi Program Uji Sertifikasi Kompetensi Keahlian Akuntansi Dan Keuangan Lembaga Di SMK Yapimda Jakarta." *Comserva Jurnal Penelitian Dan Pengabdian Masyarakat* 3(06):2191–98. doi:10.59141/comserva.v3i06.992.
- Sugiyono. 2019. *Metode Penelitian Pendidikan: Pendekatan Kuantitatif, Kualitatif, Dan R&D*. Bandung: Alfabeta.
- Sunarja, Darmawan, and Ony D. Maharani. 2023. "The Implementation of Teaching Factory Through Department Division in Hospitality Skill Programme at Metland Tourism Vocational School." *Indonesian Journal of Educational Development (Ijed)* 4(2):139–49. doi:10.59672/ijed.v4i2.2684.
- Supangat, Supangat, and Lita Delastri. 2023. "Manajemen Mutu Terpadu Pendidikan Di Perguruan Tinggi." *JCS* 2(12):1480–91. doi:10.59188/jcs.v2i12.556.
- Terry, George R., and Leslie W. Rue. 2014. "Dasar-Dasar Manajemen, (Principles of Management)." in *Jakarta*.
- Tessa, Adhis, and M. A. Humaedi. 2024. "Upaya Memperkuat Link and Match Melalui Program SMK Pusat Keunggulan: Studi Kasus SMKN 1 Bantul." *Jurnal Penelitian Kebijakan Pendidikan* 16(2). doi:10.24832/jpkp.v16i2.751.
- Usman, Ridwan, Elfitria Wiratmani, and Surya Perdana. 2021. "Pelatihan Manajemen Bengkel Di SMK Kesuma Bangsa 1 Kota Depok." *Jurnal PKM (Pengabdian Kepada Masyarakat)* 4(2):194. doi:10.30998/jurnalpkm.v4i2.6318.
- Wahjusaputri, Sintha, Bunyamin Bunyamin, and Tashia Indah Nastiti. 2021. "Critical Success Factors in Implementing Teaching Factory-Based Competency for Vocational High School Students." *Jurnal Cakrawala Pendidikan* 40(3):584–92. doi:10.21831/cp.v40i3.28877.
- Wijaya, Miko O., and Efri D. Utami. 2021. "Determinan Pengangguran Lulusan SMK Di Indonesia Tahun 2020." *Seminar Nasional Official Statistics* 2021(1):801–10. doi:10.34123/semnasoffstat.v2021i1.1048.
- Z, Ulfah I., Riyan Maulana, Syarifuddin Syarifuddin, Rizaldi Akbar, and Rita Zahara. 2022. "Teaching Factory Sebagai Bagian Dari Edupreneurship: Strategi Revitalisasi SMK Melalui Technopark." *JPP* 1(1):67–78. doi:10.61992/jpp.v1i1.52.