

A CIPP-Based Conceptual Framework for Evaluating Educational Field Practice in Vocational High Schools: Career Readiness, Teacher Independence, and Quality Education

Lelen Aprilia Dian Putri^{1*}, Riki Mukhaiyar¹, Thamrin¹, Jonni Mardizal¹

¹ Study Program of Vocational Technology Education, Faculty of Engineering, Universitas Negeri Padang, Padang, Indonesia.

Received: June 7, 2026

Revised: September 20, 2026

Accepted: September 25, 2026

Published: September 30, 2026

Corresponding Author:

Lelen Aprilia Dian Putri

lelenapriliadianputri23041998@gmail.com

DOI: [10.29303/jppipa.v12i9.15589](https://doi.org/10.29303/jppipa.v12i9.15589)

 Open Access

© 2026 The Authors. This article is distributed under a (CC-BY License)



Abstract: The transition of vocational education toward human-centred and technology-intensive work environments requires field-based teacher preparation that addresses both professional competence and career development. Educational Field Practice (PLP) provides authentic teaching experience, yet its evaluation is often oriented toward implementation and compliance rather than developmental outcomes. This conceptual study develops a CIPP-based framework for evaluating PLP in vocational high schools by refining the Product dimension to focus on career readiness and teacher independence. An integrative literature review was conducted using literature published primarily between 2021 and 2026 from Scopus, Web of Science, and Google Scholar, complemented by seminal evaluation literature. Relevant studies were thematically synthesized and mapped onto the Context, Input, Process, and Product dimensions. The resulting framework identifies contextual alignment, resource readiness, implementation quality, and developmental outcomes as interconnected evaluation domains. The Product dimension is conceptually specified through career readiness and teacher independence, while its indicators are presented as proposed dimensions for subsequent expert validation and empirical testing rather than as validated instruments. The framework offers a theoretical basis for future empirical evaluation of PLP and may inform quality-oriented teacher preparation without claiming direct macro-level effects on Industry 5.0 or the Sustainable Development Goals.

Keywords: Career readiness; CIPP model; Educational field practice (PLP); Quality education; Teacher independence; TVET

Introduction

The transformation of Technical and Vocational Education and Training (TVET) is increasingly shaped by technological change, globalization, digitalization, and the human-centred orientation associated with Industry 5.0. These developments require vocational education systems to prepare teachers who can combine technical expertise with adaptability, communication, collaboration, reflective practice, and professional agency. Recent work on twenty-first-century

competencies emphasizes that technological development does not reduce the importance of human capabilities; rather, it increases the need for professionals who can work adaptively with technology and changing organizational demands (Ikenga & Sijde, 2024). Research on TVET also identifies digital transformation, sustainability, and changing employment structures as important drivers of vocational education development (Parua & Yang, 2024).

How to Cite:

Putri, L. A. D., Mukhaiyar, R., Thamrin, T., & Mardizal, J. (2026). A CIPP-Based Conceptual Framework for Evaluating Educational Field Practice in Vocational High Schools: Career Readiness, Teacher Independence, and Quality Education. *Jurnal Penelitian Pendidikan IPA*, 12(9), 21–29. <https://doi.org/10.29303/jppipa.v12i9.15589>

Educational Field Practice (PLP) is a critical component of vocational teacher preparation because it connects university-based learning with authentic teaching situations (Wetstone & Rice, 2023). Through PLP, prospective vocational teachers encounter classroom management, lesson planning, assessment, mentoring, school culture, and the practical demands of teaching. Evidence from teaching-practice research indicates that the quality of supervision and support received by preservice technical teachers is important for their preparation for the world of work (Olabiya, 2022). At the same time, studies of vocational teacher development report persistent needs related to professional learning, relevant training, and opportunities to develop innovative practice (Murwaningsih & Fauziah, 2022). These conditions make PLP evaluation important not only for determining whether activities have been implemented, but also for examining whether the experience is conceptually aligned with the professional development expected from prospective vocational teachers.

The CIPP model—Context, Input, Process, and Product—provides a suitable structure for examining program needs, resources, implementation, and results. Its strength is not merely procedural accountability; CIPP was designed to support decision making and program improvement by connecting contextual needs, resource decisions, implementation processes, and products. Recent vocational-education studies continue to demonstrate the usefulness of CIPP for evaluating teaching factories, certification programs, online learning, and other educational initiatives (Alvianita et al., 2022; Astutik, 2023; Yoto et al., 2024; Friadi et al., 2024). Consequently, the issue is not that CIPP needs to be transformed from a procedural model into a results-oriented model. Instead, the opportunity addressed in this study is to sharpen the interpretation of the Product dimension so that it explicitly captures developmental outcomes that are particularly relevant to prospective vocational teachers.

Career readiness is one such developmental outcome. In vocational education, readiness for professional transition is associated with adaptability, communication, collaboration, problem solving, technology use, and other competencies that allow individuals to respond to changing work conditions. A systematic review of vocational high-school work readiness identified technology adoption, communication, collaboration, adaptability, problem solving, critical thinking, innovativeness, independence, creativity, and curiosity as important dimensions of readiness (Nurjanah et al., 2022). Career adaptability has also been associated with career decision-making among higher vocational students (Mahmudah et al., 2023; Wang et al., 2023; Fang et al., 2024; Firdaus et al., 2024).

For prospective teachers, however, career readiness should be understood not only as readiness to obtain employment, but also as readiness to enter and sustain professional teaching roles.

Teacher independence is a complementary outcome. In this study, teacher independence refers to the prospective teacher's capacity to plan, implement, evaluate, reflect on, and improve learning with appropriate professional judgment. International evidence shows that teacher autonomy is associated with professional learning and instructional practice, while vocational teacher research highlights autonomy and agency in pedagogical decision making (Lin & Gao, 2023; Kolho, 2024; Afriwandi et al., 2025; Gao & Mohamad, 2025). Indonesian evidence likewise suggests that teacher autonomy can shape classroom instruction during curriculum reform (Nihayah et al., 2023). These studies provide a theoretical basis for treating professional independence as an important developmental outcome of field-based teacher preparation.

The state of the art also reveals a more specific gap in PLP evaluation. Existing vocational evaluation studies using CIPP tend to examine program alignment, resources, implementation, facilities, stakeholder support, or student competence (Kuntjoro et al., 2021; Astutik, 2023; Yoto et al., 2024). Studies of teaching practice emphasize the quality of supervision and preparation (Olabiya, 2022), while studies of vocational teacher competence examine technological-pedagogical competence and professional development needs (Maknun, 2022; Murwaningsih & Fauziah, 2022). These studies are valuable, but they do not provide an integrated conceptual structure in which the Product dimension of PLP explicitly connects career readiness and teacher independence. Thus, the gap is not the absence of CIPP in vocational education; it is the limited conceptual specification of PLP outcomes that represent the professional development of prospective vocational teachers.

Based on this gap, the novelty of the present study lies in refining the Product dimension of the CIPP framework for the specific context of vocational teacher field practice. The study does not claim to replace or fundamentally transform CIPP. Rather, it proposes a context-sensitive conceptualization in which career readiness and teacher independence are positioned as developmental outcomes that can be examined after the Context, Input, and Process conditions of PLP have been considered. This focus is important because an evaluation framework that stops at attendance, administrative completion, or procedural compliance may overlook whether PLP contributes to the professional capabilities required when prospective teachers enter vocational schools (Hayat et al., 2023).

The study therefore aims to develop a conceptual CIPP-based framework for evaluating PLP in vocational high schools, with particular attention to the relationship among contextual alignment, resource readiness, implementation quality, career readiness, and teacher independence. The framework is intended as a theoretical foundation for subsequent instrument development and empirical validation. Its relevance to quality education and workforce preparation is presented as a potential contribution at the program level rather than as a direct claim that the framework itself achieves Industry 5.0 or the Sustainable Development Goals.

Method

This study uses a conceptual research design employing an integrative literature review. The purpose of the review was to synthesize theoretical and empirical literature and use the synthesis to construct a coherent conceptual framework for PLP evaluation. An integrative review was selected because the study seeks to combine conceptual discussions, empirical findings, and evaluation-model literature rather than to conduct a protocol-driven systematic review with meta-analysis.

Relevant literature was identified primarily through Scopus, Web of Science, and Google Scholar. The search used combinations of the following terms: “CIPP model” AND “vocational education”; “CIPP evaluation” AND “vocational school”; “educational field practice” AND “preservice teacher”; “teaching practice” AND “vocational teacher”; “career readiness” AND “vocational education”; “teacher independence” OR “teacher autonomy”; and “TVET” AND “Industry 5.0”. The main literature window was 2021–2026, while

seminal evaluation literature was retained when necessary to explain the theoretical foundations of CIPP.

The literature was screened for relevance to four thematic areas: evaluation models, PLP or teaching practice, vocational teacher competence and development, and career-related developmental outcomes. Studies were retained when they provided conceptual definitions, empirical evidence, or evaluation dimensions that could inform one or more CIPP components. The review did not claim a complete census of the literature; instead, it used purposive and relevance-based synthesis appropriate to a conceptual paper.

Analysis was conducted through qualitative thematic synthesis. First, recurring concepts were extracted from the literature. Second, the concepts were grouped into themes concerning contextual alignment, resource readiness, implementation quality, and developmental outcomes. Third, these themes were mapped onto Context, Input, Process, and Product. Finally, the Product dimension was refined into two outcome domains—career readiness and teacher independence—because these domains directly represent the professional development of prospective vocational teachers. Figure 1 summarizes the conceptual development pathway.

The resulting framework is conceptual rather than an empirically validated instrument. The dimensions and sub-dimensions presented in the framework are therefore proposed constructs for future operationalization. Developing a ready-to-use questionnaire would require additional stages, including expert judgment, item development, pilot testing, and validity and reliability analysis. This distinction is important to avoid overstating the methodological output of a conceptual literature-based study.

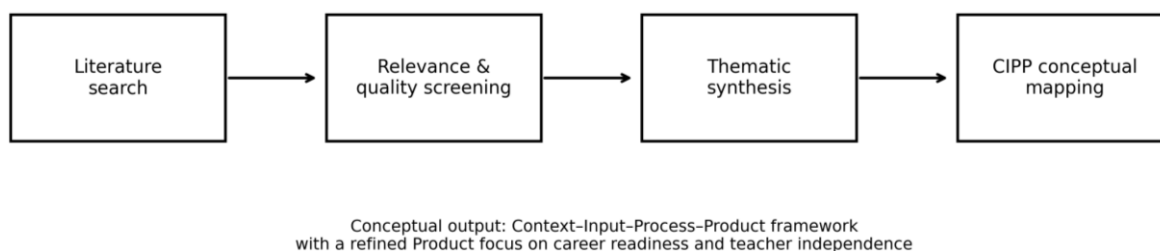


Figure 1. Conceptual development pathway. The figure summarizes the literature-to-framework synthesis without implying empirical validation

Result and Discussion

The literature synthesis resulted in a conceptual CIPP framework consisting of four interconnected components: Context, Input, Process, and Product. The framework retains the core logic of CIPP while

sharpening the Product dimension for vocational teacher development. The proposed dimensions are summarized in Table 1. Because the study is conceptual, the table presents evaluation dimensions and proposed sub-dimensions rather than validated operational indicators.

Context: aligning PLP with vocational professional demands. The Context component addresses why PLP is needed and whether its objectives correspond to the environment in which prospective teachers will work. In vocational education, relevance includes alignment with school needs, vocational curriculum, workplace expectations, and institutional policies. Research on school-industry alignment and vocational education emphasizes the importance of connecting educational programs with changing occupational demands (Sari &

Hamdi, 2021; Putri et al., 2022; Abdurrahman et al., 2023; Wijanarka et al., 2023; Suparmi et al., 2024; Umara et al., 2024; Xiang et al., 2024; Marlyna et al., 2025; Muzaki et al., 2025; Widiantie et al., 2025; Marlina et al., 2025). From a CIPP perspective, these contextual elements establish the rationale and criteria against which subsequent inputs and processes can be interpreted. The proposed framework therefore treats contextual alignment as a prerequisite for meaningful PLP outcomes rather than as a separate administrative component.

Table 1. Proposed CIPP dimensions for educational field practice evaluation

CIPP component	Evaluation focus	Proposed dimensions
Context	Program relevance and enabling conditions	PLP objectives; alignment with vocational-school and workplace needs; institutional policy support
Input	Readiness of people and resources	Prospective teacher competence; mentor quality; facilities and learning resources; coordination mechanisms
Process	Quality of implementation	Teaching practice; supervision and mentoring; feedback; reflective practice; collaboration
Product	Developmental outcomes	Career readiness: adaptability, communication, collaboration; Teacher independence: planning, implementation, evaluation and professional judgment

Input: ensuring readiness for authentic field learning. The Input component focuses on the resources required to make PLP a meaningful professional learning experience. These resources include the competence of prospective teachers, the quality and preparedness of mentors, facilities, teaching resources, communication between university and school, and mechanisms for coordination. Evidence from vocational teacher studies shows that professional competence and continuing development remain important areas of need (Maknun, 2022; Murwaningsih & Fauziah, 2022). Studies using CIPP in vocational education similarly demonstrate that input conditions such as facilities, human resources, and program support shape the quality of implementation (Yoto et al., 2024; Muhab et al., 2024). The conceptual implication is that career readiness and teacher independence should not be interpreted without considering whether adequate learning resources and mentoring opportunities were available.

Process: examining learning through practice, mentoring, and reflection. The Process component represents what actually occurs during PLP. It includes teaching practice, observation, supervision, mentoring, feedback, collaboration, problem solving, and reflective activities. Teaching practice research indicates that support from cooperating teachers is relevant to the preparation of preservice technical teachers for professional work (Olabiyi, 2022). The process dimension is therefore more than a checklist of whether activities occurred; it concerns the quality of interaction through which prospective teachers learn to make

professional decisions. This interpretation is consistent with the role of experiential learning and reflective practice in teacher development and with evidence that supportive professional environments can strengthen teacher autonomy and engagement in professional learning (Pasternak et al., 2023; Reeve & Cheon, 2024).

Product: refining the outcome focus toward career readiness and teacher independence. The central conceptual contribution of this study is located in the interpretation of Product. CIPP already includes results through the Product component; therefore, the contribution is not to convert CIPP into a results-oriented model. Instead, the framework specifies two developmental outcome domains that are particularly relevant to PLP in vocational teacher education. The first is career readiness, which includes adaptability, communication, and collaboration. The second is teacher independence, reflected in the capacity to plan, implement, evaluate, reflect on, and improve teaching with appropriate professional judgment. This formulation is supported by literature on vocational work readiness and career adaptability, which emphasizes adaptability, communication, collaboration, independence, and problem solving as important capabilities for transitions into work (Nurjanah et al., 2022; Wang et al., 2023).

Career readiness as a PLP outcome. Career readiness in this framework is broader than immediate employability. It represents preparedness to enter a professional role and respond constructively to changing demands. Vocational education research emphasizes that readiness is shaped by individual

competencies, practical experiences, curriculum relevance, and exposure to industry or workplace contexts (Nurjanah et al., 2022; Naufalin et al., 2024). Work-based learning has also been associated with career adaptability in vocational education (Mahfud et al., 2024). For prospective teachers, PLP can provide an authentic context in which communication, collaboration, adaptability, and professional problem solving are practiced. The framework therefore positions career readiness as a plausible developmental product of well-aligned PLP, while recognizing that its actual level must be tested empirically in future studies.

Teacher independence as a PLP outcome. Teacher independence is conceptually related to autonomy, agency, professional judgment, and self-directed development. International research indicates that teaching autonomy is associated with professionalism and the conditions in which teachers work (Lin & Gao, 2023), while vocational teacher research links autonomy and agency with pedagogical decision making (Kolho, 2024; Deliana & Anwar, 2025). Evidence from Indonesia also shows that curriculum reform can change the degree to which teachers exercise autonomy in classroom instruction (Nihayah et al., 2023). In the proposed framework, independence is therefore not equated with working without supervision. Rather, it refers to the progressive capacity to make informed professional decisions, use feedback, evaluate one's own teaching, and take responsibility for improvement. This definition is particularly appropriate for PLP because prospective teachers are expected to move from guided practice toward greater professional responsibility.

Relationship among the four CIPP components. The proposed framework conceptualizes Context, Input, Process, and Product as related rather than isolated categories. Context provides the rationale and relevance of PLP; Input represents the conditions available to support learning; Process describes how the field experience is enacted; and Product represents the developmental outcomes that may emerge from those conditions and experiences. This interpretation is consistent with recent applications of CIPP in vocational and educational settings, where the model is used to examine program relevance, resource readiness, implementation, and outcomes (Alvianita et al., 2022; Astutik, 2023; Yoto et al., 2024). The conceptual refinement is therefore additive and contextual: it specifies what kinds of developmental outcomes are worth examining in PLP rather than altering the fundamental architecture of CIPP.

Positioning against previous PLP and vocational evaluations. Existing evaluations provide important evidence about program implementation but frequently emphasize program conditions, facilities, stakeholder support, competence, or immediate performance. For

example, teaching-factory evaluations have used CIPP to examine implementation and student skills, while teaching-practice research has focused on supervision and preparation (Kuntjoro et al., 2021; Yoto et al., 2024; Olabiyi, 2022). Other studies have examined vocational teacher technological competence or continuing professional development needs (Maknun, 2022; Murwaningsih & Fauziah, 2022). The present framework differs by bringing these strands together around PLP and explicitly specifying career readiness and teacher independence as Product domains. It thus offers a clearer conceptual bridge between program evaluation and professional-development outcomes.

Implications for evaluation practice. The framework can guide future empirical research in several ways. First, researchers can use the Context, Input, and Process dimensions to examine whether PLP is appropriately designed and supported. Second, researchers can develop separate measures of career readiness and teacher independence rather than treating Product as a single undifferentiated score. Third, the framework allows future studies to investigate whether stronger contextual alignment, better inputs, and higher-quality processes are associated with stronger developmental outcomes. Such relationships should be tested with appropriate quantitative or mixed-method designs rather than assumed from the conceptual framework.

Implications for Industry 5.0 and quality education. The framework has relevance to the human-centred orientation of Industry 5.0 because it emphasizes adaptability, collaboration, professional judgment, and reflective development alongside vocational competence (Ikenga & Sijde, 2024). It also has potential relevance to quality education because teacher preparation is one mechanism through which educational systems can strengthen professional capacity. However, the present study does not demonstrate a direct causal contribution to Industry 5.0 or SDG targets. Its contribution is more appropriately described as a conceptual foundation that may support future program-level evaluation and improvement related to teacher preparation and workforce readiness.

Methodological boundary and future validation. A major boundary of this conceptual study is that the proposed dimensions have not yet been validated as an empirical instrument. Research on instrument construction in CIPP demonstrates that moving from conceptual dimensions to measurable indicators requires additional procedures, including instrument development and validation (Alvianita et al., 2022). Similarly, research on vocational skills indicators shows that expert consensus through modified Delphi procedures can be used when a study intends to establish validated indicators (Yusop et al., 2023).

Accordingly, the present framework should be regarded as a conceptual specification ready for subsequent

operationalization, not as a validated measurement model.

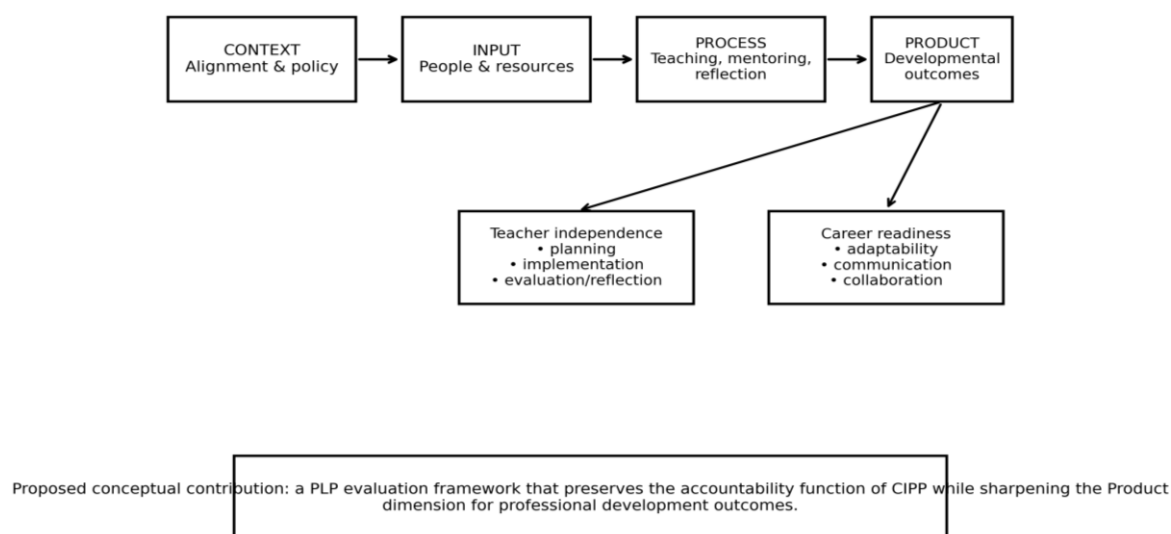


Figure 2. Proposed CIPP-based conceptual framework for Educational Field Practice. Career readiness and teacher independence are proposed Product domains; validation is required before instrument use

Limitations and Future Research

This study is limited by its conceptual design and literature-based synthesis. It does not report field data, expert consensus, instrument validity, reliability, or causal relationships among CIPP components and developmental outcomes. Consequently, the proposed dimensions should not be interpreted as validated indicators.

Future research should proceed through staged validation. An initial stage can involve expert judgment or a Delphi/FGD process to assess conceptual clarity and relevance. A second stage can translate the approved dimensions into questionnaire items or structured evaluation criteria. A third stage should test content validity, construct validity, reliability, and practical usability with appropriate samples of prospective vocational teachers, mentor teachers, and relevant institutional stakeholders. Mixed-method research can then examine how contextual conditions, inputs, and processes relate to career readiness and teacher independence in actual PLP settings.

Conclusion

This study proposes a CIPP-based conceptual framework for evaluating Educational Field Practice in vocational high schools by refining the Product dimension around two developmental outcomes: career readiness and teacher independence. The framework preserves the accountability and decision-support functions of CIPP while providing a more explicit focus on professional outcomes that may be overlooked when PLP evaluation concentrates mainly on implementation

procedures. Context addresses relevance and policy alignment; Input addresses human and material readiness; Process addresses teaching practice, mentoring, feedback, and reflection; and Product addresses career readiness and teacher independence. The framework is conceptual and has not been empirically validated. Therefore, its proposed dimensions should serve as a foundation for future expert validation, instrument development, and field testing. At the program level, the framework has potential to strengthen quality-oriented evaluation of vocational teacher preparation and to provide a clearer basis for examining workforce-related professional development.

Acknowledgments

The authors acknowledge the academic support and contributions of colleagues and institutions involved in the development of this conceptual study.

Author Contributions

Conceptualization, L.A.D.P. and R.M.; methodology, L.A.D.P., R.M. and T.; formal analysis, L.A.D.P.; investigation, L.A.D.P.; writing – original draft preparation, L.A.D.P.; writing – review and editing, R.M., T. and J.M.; supervision, R.M., T. and J.M. All authors approved the final manuscript.

Funding

This research received no external funding.

Conflicts of Interest

The authors declare no conflict of interest.

References

- Abdurrahman, I. S., Mahmudah, F. N., Paryono, P., Saryadi, S., & Cahyono, S. M. (2023). Collaborative Online Learning: Implementation of Vocational Alignment in Accordance with Industry's Needs. *Jurnal Pendidikan Teknologi dan Kejuruan*, 29(1), 1–14. <https://doi.org/10.21831/jptk.v29i1.53082>
- Afriwandi, A., Maksum, H., Rifdarmon, R., & Indrawan, E. (2025). Innovation of Learning Media: Developing a Car Air Conditioning Trainer to Improve Student Performance in Vocational Physics and Engineering. *Jurnal Penelitian Pendidikan IPA*, 11(10), 553–558. <https://doi.org/10.29303/jppipa.v11i10.12423>
- Alvianita, C., Tanti, T., & Hariyadi, B. (2022). Construction and Validation of Evaluation Instruments for Science Learning Programs Based on Context, Input, Process, and Product (CIPP) Models. *Jurnal Penelitian Pendidikan IPA*, 8(3), 1089–1095. <https://doi.org/10.29303/jppipa.v8i3.1369>
- Astutik, I. L. I. (2023). Evaluasi Pelaksanaan Uji Sertifikasi LSP P1 Terhadap Peningkatan Kompetensi Peserta Didik Melalui Model CIPP di SMK Negeri 2 Kota Kediri. *Jurnal Teknologi Pendidikan: Jurnal Penelitian dan Pengembangan Pembelajaran*, 8(1), 173–183. <https://doi.org/10.33394/jtp.v8i1.6834>
- Deliana, D., & Anwar, M. (2025). Effectiveness of STEM-Oriented Project-Based Learning Modules in Visual Communication Design to Support Science and Technology Skills in Vocational Education. *Jurnal Penelitian Pendidikan IPA*, 11(4), 339–345. <https://doi.org/10.29303/jppipa.v11i4.10542>
- Fang, M., Pan, R., Ding, R., Hou, Z., & Wang, D. (2024). Effect of Proactive Personality on Career Adaptability of Higher Vocational College Students: The Mediating Role of College Experience. *Frontiers in Psychology*, 15, 1333677. <https://doi.org/10.3389/fpsyg.2024.1333677>
- Firdaus, H., Syafrizal, S., & Nulhakim, L. (2024). Electronic Teaching Materials to Improve Student Learning Effectiveness Automotive Vocational High School. *Jurnal Penelitian Pendidikan IPA*, 10(11), 9791–9798. <https://doi.org/10.29303/jppipa.v10i11.7338>
- Friadi, J., Asro, A., Lubis, A. L., Yani, D. P., Suroto, S., Bora, A., & Alfiyandri, A. (2024). E-Learning Evaluation Based on Context, Input, Process, and Product (CIPP). *Jurnal Penelitian Pendidikan IPA*, 10(SpecialIssue), 67–73. <https://doi.org/10.29303/jppipa.v10iSpecialIssue.7383>
- Gao, Q., & Mohamad, M. (2025). A Conceptual Model of Learning Adaptability of Higher Vocational Students in China. *The Asia-Pacific Education Researcher*, 34, 1063–1075. <https://doi.org/10.1007/s40299-024-00921-7>
- Hayat, M. S., Sumarno, S., Yunus, M., & Nada, N. Q. (2023). STEAM-Based “IPAS Project” Learning as a Study of the Implementation of the Independent Curriculum in Vocational Schools. *Jurnal Penelitian Pendidikan IPA*, 9(12), 12139–12148. <https://doi.org/10.29303/jppipa.v9i12.6005>
- Ikenga, G. U., & Sijde, P. V. D. (2024). Twenty-First Century Competencies; About Competencies for Industry 5.0 and the Opportunities for Emerging Economies. *Sustainability*, 16(16), 7166. <https://doi.org/10.3390/su16167166>
- Kolho, P. (2024). A Vocational Education and Training Subject Teacher for Fostering Students' Entrepreneurial Skills—The Development of a Conceptual Model. *International Journal of Training and Development*, 28(4), 430–453. <https://doi.org/10.1111/ijtd.12335>
- Kuntjoro, Y. S., Sutopo, Y., Hudallah, N., & Syamwil, R. (2021). The Evaluation of Teaching Factory Implementation in Pika Industrial Wood Working School Semarang by Using CIPP Approach. *Journal of Vocational and Career Education*, 6(1). <https://doi.org/10.15294/jvce.v6i1.34883>
- Lin, Q., & Gao, X. (2023). Exploring the Predictors of Teachers' Teaching Autonomy: A Three-Level International Study. *Teaching and Teacher Education*, 126, 104338. <https://doi.org/10.1016/j.tate.2023.104338>
- Mahfud, T., Masek, A. B., Suyitno, S., Ihsan, A. N. N., Fransisca, Y., Pranoto, P. W., Pranoto, A., Hadi, S., & Susanto, A. (2024). The Role of Work-Based Learning in Enhancing Career Adaptability: An Empirical Study from Vocational Students in Indonesian and Malaysian Universities. *Integration of Education*, 28(3), 436–453. <https://doi.org/10.15507/1991-9468.116.028.202403.436-453>
- Mahmudah, F. N., Baswedan, A. R., & Cahyono, S. M. (2023). Digital Entrepreneurship Competence of Vocational Students. *Jurnal Pendidikan Teknologi dan Kejuruan*, 29(2), 125–140. <https://doi.org/10.21831/jptk.v29i2.55497>
- Maknun, J. (2022). The Technological Pedagogical Content Knowledge (TPACK) Competence of Vocational High School Teacher. *Jurnal Pendidikan Teknologi dan Kejuruan*, 28(1), 63–75. <https://doi.org/10.21831/jptk.v28i1.42624>
- Marlina, R., Miaz, Y. F. F., & Ardipal, A. (2025). The Influence of Project Based Learning LKPD in Improving 21st Century Skills for Class V Elementary School Students. *Jurnal Penelitian*

- Pendidikan IPA*, 11(1), 634-641. <https://doi.org/10.29303/jppipa.v11i1.8972>
- Marlyna, D., Mardizal, J., Giatman, M., & Waskito. (2025). Analysis of Vocational High School Teachers' Abilities in Sarolangun to Integrate 21st Century Skills Through School Leadership Perception. *Jurnal Penelitian Pendidikan IPA*, 11(3), 282-294. <https://doi.org/10.29303/jppipa.v11i3.10508>
- Muhab, S., Rini, T. D. S., Erdawati, E., & Irwanto, I. (2024). Evaluation of Differentiated Learning in Chemistry by Using the CIPP Evaluation Model. *Jurnal Penelitian Pendidikan IPA*, 10(2), 923-939. <https://doi.org/10.29303/jppipa.v10i2.5985>
- Murwaningsih, T., & Fauziah, M. (2022). The Problem and Need for Continuing Professional Development of Vocational School Teachers. *Jurnal Pendidikan Teknologi dan Kejuruan*, 28(1), 76-92. <https://doi.org/10.21831/jptk.v28i1.42860>
- Muzaki, A., Hidayati, A., Rahmi, U., & Ridwan, R. (2025). Development of Moodle-Based Learning Management System Integrated with Virtual Programming Lab for Basic Vocational Subjects of Software and Game Development. *Jurnal Penelitian Pendidikan IPA*, 11(2), 898-909. <https://doi.org/10.29303/jppipa.v11i2.9914>
- Naufalin, L. R., Indriayu, M., & Sulistyandari, S. (2024). Work Readiness Generation Z's on Diploma Programme: The Influence Internship Program and Digital Literacy. *Jurnal Pendidikan Vokasi*, 14(2), 208-219. <https://doi.org/10.21831/jpv.v14i2.73642>
- Nihayah, R. W., Dina, W. F., Wijayanti, D., & Asyah, A. N. (2023). How Does Granting Teacher Autonomy Influence Classroom Instruction? Lessons from Indonesia's Curriculum Reform Implementation. *Jurnal Penelitian Kebijakan Pendidikan*, 16(1). <https://doi.org/10.24832/jpkp.v16i1.768>
- Nurjanah, I., Ana, A., & Masek, A. (2022). Systematic Literature Review: Work Readiness of Vocational High School Graduates in Facing the Industrial 4.0 Era. *Jurnal Pendidikan Teknologi dan Kejuruan*, 28(2), 139-153. <https://doi.org/10.21831/jptk.v28i2.48552>
- Olabiyi, O. S. (2022). Assessing Effectiveness of Teaching Practice Towards Quality Preparation of Preservice Technical Teachers. *Jurnal Pendidikan Teknologi dan Kejuruan*, 28(2), 168-184. <https://doi.org/10.21831/jptk.v28i2.48793>
- Parua, R., & Yang, W. (2024). The Driving Logic of Digital Transformation in TVET. *Vocation, Technology & Education*, 1(2), e17. <https://doi.org/10.54844/vte.2024.0590>
- Pasternak, D. L., Harris, S. D., Lewis, C., Wolk, M. A., Wu, X., & Evans, L. M. (2023). Engaging Culturally Responsive Practice: Implications for Continued Learning and Teacher Empowerment. *Teaching and Teacher Education*, 122, 103976. <https://doi.org/10.1016/j.tate.2022.103976>
- Putri, D. R. K., Supriatna, M., & Yudha, E. S. (2022). The Validity and Reliability of Career Readiness Instruments for Vocational High School Students. *Psychocentrum Review*, 4(3). <https://doi.org/10.26539/pcr.431193>
- Reeve, J., & Cheon, S. H. (2024). Learning How to Become an Autonomy-Supportive Teacher Begins with Perspective Taking: A Randomized Control Trial and Model Test. *Teaching and Teacher Education*, 148, 104702. <https://doi.org/10.1016/j.tate.2024.104702>
- Sari, D. N., & Hamdi, S. (2021). Is Online Learning Effective Implemented in the Outbreak of Covid-19? An Evaluation Approach in the Vocational High Schools. *Jurnal Pendidikan Teknologi dan Kejuruan*, 27(2). <https://doi.org/10.21831/jptk.v27i2.36107>
- Suparmi, S., Sukmawati, F., Cahyono, B. T., Santoso, E. B., Prihatin, R., & Juwita, R. (2024). Implementation of Project Based Learning Model in Vocational High School: A Systematic Literature Review. *Jurnal Penelitian Pendidikan IPA*, 10(12), 890-901. <https://doi.org/10.29303/jppipa.v10i12.8847>
- Umara, A. M., Pardjono, P., & Pratama, G. N. I. P. (2024). Analysis of the Indirect Correlation between Academic Achievement, Intrinsic and Extrinsic Motivation, and Self-Efficacy on Teaching Readiness. *Jurnal Pendidikan Vokasi*, 14(1), 29-42. <https://doi.org/10.21831/jpv.v14i1.59766>
- Wang, Z., Fan, C., & Niu, J. (2023). Predicting Effects of Career Adaptability and Educational Identity on the Career Decision-Making of Chinese Higher Vocational Students. *International Journal for Educational and Vocational Guidance*, 25(1), 111-130. <https://doi.org/10.1007/s10775-023-09591-1>
- Wetstone, H., & Rice, K. G. (2023). Enhancing Career Adaptability Among University Students: An Intervention Study. *Journal of Career Development*, 50(6), 1279-1292. <https://doi.org/10.1177/08948453231187910>
- Widiantie, R., Setiawati, I., Junaedi, E., & Amanah, S. P. (2025). Development of 21st Century Skills Integrated Mini Research E-Assessment for Prospective Teacher. *Jurnal Penelitian Pendidikan IPA*, 11(4), 104-112. <https://doi.org/10.29303/jppipa.v11i4.10512>
- Wijanarka, B. S., Wijarwanto, F., & Mbakwa, P. N. (2023). Successful Implementation of Teaching Factory in Machining Expertise in Vocational High Schools. *Jurnal Pendidikan Vokasi*, 13(1), 1-13. <https://doi.org/10.21831/jpv.v13i1.51811>
- Xiang, Y., Li, L., Yang, Q., Fang, Y., Xu, W., Ding, X., & Yang, Q. (2024). Career Adaptability and

- Correlating Factors Among Secondary Vocational Nursing Students in China. *Frontiers in Public Health*, 12, 1377323. <https://doi.org/10.3389/fpubh.2024.1377323>
- Yoto, Y., Marsono, M., Qolik, A., & Romadin, A. (2024). Evaluation of Teaching Factory Using CIPP (Context, Input, Process, Product) Model to Improve Vocational High School Students' Skills. *Jurnal Pendidikan Vokasi*, 14(1), 12–28. <https://doi.org/10.21831/jpv.v14i1.62573>
- Yusop, S. R. M., Rasul, M. S., Yasin, R. M., & Hashim, H. U. (2023). Identifying and Validating Vocational Skills Domains and Indicators in Classroom Assessment Practices in TVET. *Sustainability*, 15(6), 5195. <https://doi.org/10.3390/su15065195>