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Development Of Vocational Curriculum Based on Industrial Needs in Vocational High Schools

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ABSTRACT

The high unemployment rate among Vocational High School (SMK) graduates in Indonesia indicates an urgent mismatch between educational competencies and industrial needs. This research aims to explore the development of an industry-based vocational curriculum through a case study at SMK Negeri 2 Semarang. Using qualitative methods, the study analyzes the curriculum adjustment process and its implications for student work readiness. Data was collected through in-depth interviews with seven respondents selected via purposive sampling, observations, and document analysis. Data analysis followed the Miles and Huberman model to ensure methodological rigor. The results demonstrate the successful implementation of the Independent Curriculum (*Kurikulum Merdeka*) through annual alignment with specific partners like Alfamidi and PT Metropolitan Golden Management. These findings provide theoretical implications that validate Ralph Tyler's Theory in a modern SMK context. Despite challenges regarding work culture adaptation and school capacity, this approach effectively increases graduate employability. It is recommended that national standardization for curriculum alignment procedures be established as a practical policy measure.

ABSTRAK

Tingginya angka pengangguran lulusan SMK di Indonesia mengindikasikan urgensi mismatch antara kompetensi pendidikan dan kebutuhan industri. Penelitian ini bertujuan mengeksplorasi pengembangan kurikulum vokasi berbasis kebutuhan industri melalui studi kasus di SMK Negeri 2 Semarang. Dengan metode kualitatif, penelitian ini menganalisis proses penyesuaian kurikulum dan implikasinya terhadap kesiapan kerja siswa. Data dikumpulkan melalui wawancara mendalam terhadap tujuh responden yang dipilih secara purposive sampling, observasi, dan analisis dokumen. Analisis data menggunakan teknik Miles dan Huberman untuk menjamin kekokohan metodologi. Hasil penelitian menunjukkan keberhasilan implementasi Kurikulum Merdeka melalui penyelarasan tahunan bersama mitra spesifik seperti Alfamidi dan PT Metropolitan Golden Management. Temuan ini memberikan implikasi teoretis yang memvalidasi Teori Ralph Tyler dalam konteks SMK modern. Meskipun terdapat tantangan adaptasi budaya kerja dan kapasitas sekolah, pendekatan ini efektif meningkatkan keterserapan lulusan. Disarankan adanya standarisasi prosedur penyelarasan kurikulum secara nasional sebagai langkah kebijakan praktis.

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INTRODUCTION

Vocational education in Indonesia is currently at a crucial turning point in facing increasingly competitive global economic challenges. As institutions designed to produce a ready-to-use workforce, Vocational High Schools (SMK) bear the significant burden of aligning their educational output with the actual needs of the business and industrial world (DUDI) (Indrawati & Kuncoro, 2021; Rosina et al., 2021). However, facts on the ground show a contradictory reality; data from the Central Bureau of Statistics (BPS) as of February 2024 revealed that the Open Unemployment Rate (TPT) for SMK graduates remains the highest among other educational levels, reaching 8.62%. This condition indicates an unresolved mismatch between the competencies taught in schools and the qualifications required by the modern labor market (Lawal & Isah, 2025; Riyanto et al., 2025).

The root cause of this high unemployment rate often stems from a rigid and less adaptive curriculum. Conventional curricula tend to be slow in responding to rapid technological changes and shifting industrial trends (Fatoni et al., 2024; Ramadhan et al., 2023). As a strategic step, the Indonesian government, through the Ministry of Education, Culture, Research, and Technology, launched the SMK Revitalization program and the Independent Curriculum (Kurikulum Merdeka). These initiatives provide broader autonomy for educational units to modify their curricula to be more flexible (Vinaya et al., 2025). The main focus is strengthening the "link and match" program, where industry does not only act as a place for internships but is actively involved in designing learning materials from upstream to downstream (Ahmad et al., 2024; Desriandi et al., 2022).

While various policies have been issued, the effectiveness of their implementation at the school level remains a focus of interesting study. Curriculum alignment requires deep synergy between educators and industry practitioners to formulate relevant Graduate Competency Standards (SKL) (Khomsah et al., 2025; Muharam et al., 2025). This process involves identifying specific technical skills (hard skills) and strengthening work character (soft skills) that match the culture of partner companies (Subagja et al., 2025; Suminar et al., 2024). In this regard, SMK Negeri 2 Semarang has emerged as a model institution that proactively integrates industrial needs into its curriculum structure through collaboration with various multinational companies across different expertise sectors. Such collaboration reflects the broader trend of strengthening vocational education partnerships to improve student competence and employability (Fitrianti et al., 2025; Yuwantiningrum et al., 2025).

Previous research has documented vocational curriculum management practices extensively, but the majority still focus on general evaluations of infrastructure or macro-level job placement effectiveness. There is a significant research gap regarding how a school technically performs curriculum adjustment at the program level by involving specific industry partners at a micro level. The novelty of this research lies in the in-depth analysis of curriculum alignment strategies at SMK Negeri 2 Semarang, which partners with specific entities such as Alfamidi for marketing and PT Metropolitan Golden Management for hospitality accounting partnerships rarely dissected specifically in previous educational management literature. Recent studies have emphasized the importance of strategic partnerships and industry-driven curriculum synchronization, yet detailed institutional case studies remain limited (Hertanto, 2026; Lawal & Isah, 2025).

To provide a solid scientific foundation, this research utilizes the Curriculum Development Theory developed by Ralph Tyler. This theory emphasizes four

fundamental pillars: determining clear educational objectives, selecting appropriate learning experiences, systematic organization of materials, and continuous evaluation of learning outcomes. The relevance of the Tyler model in modern vocational education lies in its ability to filter complex industrial needs into practical and measurable teaching modules (Du, 2024). In the context of vocational reform, curriculum development models that are adaptive and competency-oriented are increasingly considered essential for strengthening workforce readiness in the era of digital transformation (Fatoni et al., 2024; Sun, 2025). By applying Tyler's principles, the process of transforming industrial requirements into pedagogical language at school can proceed in a more structured and scientific manner while maintaining essential educational values.

Based on this background, this research aims to explore industry-based vocational curriculum development strategies at SMK Negeri 2 Semarang, identify obstacles in student adaptation to work culture, and analyze the real implications of these adjustments on graduate employability. Through a qualitative case study approach, this study is expected to provide not only a descriptive overview but also a theoretical contribution regarding the validation of the Tyler model in the era of the Independent Curriculum. The results of this study are intended to serve as a policy reference for stakeholders in drafting national curriculum alignment operating standards to close the skills gap and increase the competitiveness of the Indonesian workforce (Komara & Iskandar, 2025; Riyanto et al., 2025).

METHOD

This research employs a qualitative approach with a case study design to conduct an in-depth exploration of vocational curriculum development based on industrial needs at SMK Negeri 2 Semarang. Epistemologically, this study is rooted in the descriptive-interpretive paradigm, which aims to understand how educational actors perceive and implement curriculum alignment policies within the daily reality of the school environment. The case study approach was selected for its capacity to provide a holistic understanding of the technical processes of curriculum adjustment, the practical challenges that emerge, and the implications for students' work readiness within a specific institutional context (Mahmudah & Santosa, 2021; Rosina et al., 2021).

The selection of SMK Negeri 2 Semarang as the research site was based on its status as a leading vocational institution actively synchronizing its curriculum across various industrial sectors through industrial classes and strategic partnerships (Astuti et al., 2023). Research subjects or informants were selected using the Purposive Sampling technique to ensure rich and authoritative data. The informants consisted of seven individuals: one school principal to provide a managerial policy perspective, three vocational teachers directly involved in managing industrial classes, and three students currently enrolled in specialized industry classes such as Alfamidi or Crocodic. These criteria were established to ensure that the data reflects the direct experiences of those executing industry-based curriculum modifications.

Data collection was conducted from July 29 to August 9, 2024, utilizing a variety of techniques to achieve data triangulation. The primary research instrument was the researcher, supported by a semi-structured interview guide, which allowed for deep exploration of responses while remaining focused on the core research topics. In addition to interviews, participant observation was specifically carried out to monitor the interaction between industry mentors and students within the

industrial classrooms, as well as to observe the implementation of the aligned teaching modules. Document studies were also performed by analyzing school curriculum policies, modified teaching modules, and student learning evaluation reports to validate the verbal data obtained from the informants. The use of industrial classes and experiential learning contexts is considered relevant in vocational education research because it reflects the direct integration of industrial culture into the learning process (Fania et al., 2024).

To ensure data trustworthiness and validity, this study utilized source triangulation and method triangulation techniques. Source triangulation was achieved by comparing information from the principal, teachers, and students regarding the same phenomena, while method triangulation involved checking the consistency of data across interviews, field observations, and written documents. Despite the limited timeframe, temporal triangulation efforts were made by verifying data at different intervals during the collection period to ensure consistent information patterns. The data gathered were then analyzed using the Miles, Huberman, and Saldana model, which includes the stages of data condensation, data display, and conclusion drawing and verification. This analytical process is widely applied in vocational education studies to interpret complex educational interactions and evaluate the effectiveness of curriculum alignment practices in responding to industrial demands (Riyanto et al., 2025).

RESULTS AND DISCUSSION

Aligning the Vocational Curriculum in Vocational High Schools with Industry Needs to Be Relevant to the Demands of the Job Market

SMK Negeri 2 Semarang, as a leading central school implementing the Independent Curriculum, demonstrates a high commitment to curriculum adaptation through annual synchronization with industrial partners. This systematic alignment ensures that pedagogical goals remain congruent with the dynamic requirements of the global workforce (Hertanto, 2026; Rosina et al., 2021). A summary of the key industrial partnerships and their specific collaborative formats is presented in Table 1 below, providing a clear overview of how the school integrates market demands into its educational framework.

Table 1. Industrial Partnerships and Curriculum Integration at SMKN 2 Semarang

Industrial Partner	Expertise Program / Class	Type of Collaboration
Alfamidi	Marketing Expertise	Curriculum alignment since 2014 & direct recruitment
PT Itho Indostock	Programmer Industrial Class	Programming materials & specialized training
Crocodic	Software Engineering	Digital industry trend integration
PT MGM (Hotel Horison)	Hospitality Accounting	Monthly professional mentoring & recruitment

This approach allows for a seamless transition from the classroom to the professional sphere. In these specialized classes, representatives from the respective industries provide monthly instructional materials tailored to current operational standards. Furthermore, the implementation of direct recruitment for students who successfully complete these programs eliminates the friction of external selection processes, thereby increasing the absorption rate of graduates.

This phenomenon aligns with research emphasizing that industry-linked vocational education significantly reduces the skills gap and strengthens workforce competitiveness (Muharam et al., 2025; Yusri, 2025).

The empirical data from respondents G1, KS, and G2 highlights that the curriculum is a living document, refined through intensive discussions with partners like Matahari, POS Sekolah, and Horizon. By focusing on practical competencies, the school ensures its graduates are not merely theoretically sound but possess "ready-to-use" skills. This evidence confirms the effectiveness of the "link and match" policy, distinguishing SMKN 2 Semarang from conventional vocational schools that often rely solely on government-standardized curricula without direct market intervention. The strengthening of school–industry partnerships has increasingly become a strategic approach in vocational education reform to ensure graduate relevance to labor market demands (Soleh et al., 2023).

The following direct quotes from the leadership and faculty underscore the strategic importance of this collaborative model:

> "At the beginning of every year, SMK Negeri 2 Semarang always aligns the curriculum by involving industry representatives to ensure that the curriculum we implement is relevant to the needs of the world of work," stated the G1 respondent.
>
> "Since 2014, the Marketing Expertise Program at SMK Negeri 2 Semarang has collaborated with Alfamidi... Collaborations like this allow our students to gain practical skills that fit the needs of today's market. Not only that, we also have a special class for Accounting in the Hospitality Industry in collaboration with PT Metropolitan Golden Management (Hotel Horison Group)," explained respondent KS.

In the industrial classes, practitioners actively convey the latest trends and technical requirements, ensuring students remain competitive. This proactive engagement by industry mentors serves as a critical bridge between academic theory and real-world application. While previous studies emphasize the general importance of industry involvement, the findings here specifically highlight how monthly professional intervention and direct hiring create an extreme level of “industrial trust” that accelerates career readiness (Fania et al., 2024; Somantri & Pramudita, 2024).

> "In the industrial classes of SMK Negeri 2 Semarang, every month representatives from related industries provide materials that are tailored to the needs of the world of work," noted respondent G2.
>
> "They actively convey the latest developments, industry trends, and practical skills needed... This approach ensures our education is relevant to the demands of the industry and facilitates the transition from education to the workforce," G2 added.

Challenges in the Implementation of Vocational Curriculum Based on Industrial Needs in Vocational High Schools

The implementation of an industry-based curriculum at SMKN 2 Semarang faces various complex obstacles that can be categorized into two primary dimensions: internal challenges related to student adaptation and external challenges regarding synchronization with industrial partners. Internally, the transition from a flexible academic environment to a rigid industrial ecosystem often triggers a psychological “culture shock” among students. The fundamental gap between classroom theory and field practice requires students to undergo a mental reorientation toward real-world productivity standards. This suggests that curriculum

development must not only involve technical adjustments but also a reinforcement of sociological aspects and soft skills, such as discipline and mental resilience, to mitigate these work culture barriers (López & Rodríguez-López, 2020; Nurjanah et al., 2022).

> "Adaptation to industrial work culture is often a big challenge for us. At school, we are used to a more relaxed atmosphere, but in the world of work, everything is much more disciplined, and our work results are considered very strict. Usually, in addition to teachers, there are also industry parties who teach us, and they have standards and work practices that are very different from what we learn in the classroom. They have very clear expectations about productivity and work quality, which are sometimes far from what we get in theory lessons. So, we have to learn to adapt to tight schedules, clear targets, and procedures that may be very different from what we are used to in school."

Externally, challenges arise in the form of a capacity imbalance between rapidly changing industrial dynamics and the school's ability to respond to these changes consistently. This gap is often caused by limitations in school infrastructure or bureaucratic regulations that are less flexible compared to technological innovations in the industrial sector. This mismatch of expectations demands more intensive two-way communication and periodic evaluations to ensure the curriculum remains relevant without overwhelming the school's operational capacity. The success of this synergy relies heavily on the ability of both parties to align practical needs with existing educational resource constraints in a sustainable manner. Similar challenges have been identified in vocational education systems facing digital transformation and outcome-based educational reforms (Damit et al., 2021; Zhang, 2025).

> "Maintaining cooperation between schools and industry is not easy. We must continue to coordinate and adjust the curriculum to the needs of the industry that continues to change. Often, there is a gap between industry expectations and our ability in schools to meet those needs. The industry needs clear feedback, and schools must also actively update the curriculum so that it remains relevant. If communication does not go well, cooperation can be disrupted. Therefore, it is very important to continue to evaluate and adjust our curriculum so that it still matches the needs of the job market."

Implications of Developing an Industrial Needs-Based Vocational Curriculum on Students' Skills and Readiness to Enter the World of Work

The implementation of a vocational curriculum aligned with industrial needs significantly impacts student work readiness through the mastery of technical skills and a deep understanding of corporate culture (Mahmudah & Santosa, 2021; Rosina et al., 2021). One of the strongest indicators of this strategy's success is the phenomenon where industrial partners directly recruit students even before they receive their diplomas. This industrial trust proves that curriculum synchronization is capable of producing graduates who meet competency standards and professional ethics without requiring lengthy external selection processes. By bridging the gap between academic theory and field practice, this curriculum development effectively accelerates the transition of students from the classroom to a competitive professional world (Affandi et al., 2025; Düzgünçınar, 2025).

> "With a curriculum that is tailored to the demands of the industry, we can get knowledge that is really in accordance with the world of work. So, we not only learn theory, but also practice that makes us more prepared. For example, we can immediately experience working in the field through internships, or

> cooperation with companies. This makes us understand more about industrial culture and makes us more confident to enter the world of work. So, get ready, because this curriculum makes us more competent and has a great chance to succeed after graduation".

Respondents S2 and G2 emphasized that the balance between theoretical reinforcement and practical experience is the primary key to increasing student confidence and competence. Through internship programs and industrial classes, students have the opportunity to apply classroom knowledge in real-world situations, which in turn sharpens their ability to adapt to dynamic work environments. This integration provides added value for graduates because they become accustomed to industrial productivity standards and work ethics from an early stage. Consequently, students do not only master "what" must be done technically but also understand "how" to behave professionally, making them highly sought-after candidates in the labor market (Fania et al., 2024; Sutiman et al., 2022).

> "So, in this day and age, the job readiness of vocational school graduates really depends on how well they can balance theory and practice... There are so many industries that have recruited vocational school students before they graduate, because they are already used to work standards and professional ethics. So, it's very clear, the combination of learning theory in school and direct experience in the industry is very important to prepare vocational school students to face work challenges more confidently and competently".

Recent studies further confirm that internship-based and work-integrated learning approaches contribute significantly to improving vocational students' employability and workplace adaptation skills. Strong collaboration between schools and industries enables students to internalize workplace values, communication patterns, teamwork culture, and productivity standards, all of which are increasingly demanded in the era of Industry 4.0 and Industry 5.0 (Fitrianti et al., 2025; Wahyuningsih et al., 2025). Additionally, the development of interpersonal skills, adaptability, and professional attitudes has become an important dimension in preparing vocational graduates who are resilient to technological disruption and labor market competition (Jaedun et al., 2024; Ubihatun et al., 2024).

Critical Discussion of Vocational Curriculum Development and Industry Integration

The successful adaptation of the Independent Curriculum at SMK Negeri 2 Semarang underscores a pivotal shift toward industry-driven education. By establishing a yearly synchronization cycle with partners such as Alfamidi, PT Metropolitan Golden Management, and technology leaders like PT Itho Indostock and Crocodic, the school ensures its pedagogical goals are directly informed by market requirements. This collaboration creates a "just-in-time" learning model where industry representatives provide up-to-date monthly materials, facilitating an effective transition from classroom to workplace. Unlike conventional models, the extreme level of "industrial trust" observed here is evidenced by direct recruitment before graduation, which bypasses traditional external selection processes and validates the curriculum's practical relevance (Somantri & Pramudita, 2024; Tong, 2024).

However, the implementation of this industry-based curriculum reveals a significant psychological gap in student adaptation. The transition from a relatively relaxed school atmosphere to the "culture shock" of a rigorous industrial environment where productivity and quality are strictly measured remains a primary challenge. This suggests that while technical alignment is improving, there is a

critical need to deepen the sociological and psychological preparation of students, focusing on the "mental experience" required to withstand industrial discipline. Furthermore, the capacity imbalance between the high-speed innovation of the industry and the slower bureaucratic response of schools highlights a systemic external hurdle that requires ongoing flexibility and communication (Liu & Paramalingam, 2025; Ubihatun et al., 2024).

To address these challenges, the application of Ralph Tyler's Curriculum Adjustment Theory (1988) offers a structured yet evolving framework. By aligning educational objectives with market demands and organizing learning materials to match the latest technology, the school creates a cohesive path for student development. However, a critical examination suggests that the traditional Tyler model must be adapted for Industry 4.0; the "material organization" component must transition from a rigid structure to a more flexible, modular approach to keep pace with rapid technological shifts. By integrating periodic evaluations with industry participation, the curriculum ensures that graduates possess the precise blend of technical expertise and essential soft skills such as teamwork and professional ethics necessary to excel in a competitive labor market (Tjahjono et al., 2025; Yoto et al., 2024).

The application of the Theory of Curriculum Adjustment by Ralph Tyler provides a robust framework for addressing the persistent mismatch between vocational education and industry requirements. At SMK Negeri 2 Semarang, this theoretical application is operationalized through four critical components: defining educational objectives based on market demands, tailoring learning experiences to practical needs, organizing materials to match the latest technology, and conducting evaluations according to professional standards. Specifically, educational objectives are focused on specific market demands by involving industry representatives directly in the curriculum drafting process. Students engage in industrial classrooms and specialized programs, such as the Programmer Industry Class with PT Itho Indostock or Marketing with Alfamidi, which allow for direct interaction with professional technology and workflows. Furthermore, material organization is periodically updated based on industry input to remain congruent with rapid technological shifts, while evaluation of learning outcomes is measured against actual workplace standards through periodic assessments involving industrial partners (Shifwah et al., 2025; Sudarsono & Pratama, 2025).

This structured approach highlights the superiority of industry-based vocational schools, which establish a direct connection to the workforce compared to traditional schools that often rely solely on government-prepared curricula. In these specialized environments, students gain practical experience that often leads to direct recruitment by partner companies before graduation, bypassing external selection entirely. To further reduce the unemployment rate of graduates, an integrated policy approach is essential; while schools must focus on creating strong internship programs and industry-linked curricula, the government must provide strategic support. This support should include offering incentives for participating companies, funding advanced skills training for unemployed graduates, and establishing career centers in every vocational school to provide guidance in job searching and soft skills development. Such a combination of institutional and governmental effort is vital for producing a competitive workforce capable of contributing effectively to the modern job market (Düzgünçınar, 2025; Sarmila et al., 2025).

CONCLUSION AND RECOMMENDATION

The development of an industrial needs-based vocational curriculum at SMK Negeri 2 Semarang demonstrates that a total annual curriculum synchronization strategy involving industry partners effectively creates precise competency alignment. The successful implementation of the Independent Curriculum in this institution is marked by the integration of strategic partners such as Alfamidi, PT Metropolitan Golden Management, and various technology sectors who not only assist in drafting materials but also conduct direct recruitment before student's graduate. However, significant challenges arise regarding sociological aspects, where students face hurdles in adopting a disciplined and rigorous industrial work culture, alongside a mismatch between rapid industrial dynamics and the school's adaptive capacity. Overall, this approach has proven effective in mitigating skill mismatches and accelerating the absorption of graduates into the workforce.

Regarding recommendations and limitations, future research should move beyond simply increasing the number of school locations toward utilizing quantitative or mixed methods approaches to statistically measure the correlation between Tyler's curriculum adjustment strategies and graduate income levels or welfare. Furthermore, the national standardization of curriculum alignment procedures is recommended so that success models in flagship schools can be widely adapted by other vocational institutions. Future data collection must also involve a broader spectrum of respondents, including industrial managers, to obtain a holistic view of the effectiveness and real-world challenges within the "link and match" ecosystem. These steps are expected to provide more relevant and applicable vocational education policy recommendations on a national scale.

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