Review paper

Outcome-Based Education (OBE) Approach in Vocational Education: Strategies, Advantages, and Challenges in Indonesia

El enfoque de la educación basada en los resultados (EFC) en la formación profesional: estrategias, ventajas y retos en Indonesia

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Abstract

Introduction: The implementation of Outcome-Based Education (OBE) in vocational education aims to align learning outcomes with specific industry demands, ensuring that graduates possess the skills required for the modern workforce. This study examines OBE's role in advancing vocational education in Indonesia by addressing key aspects such as curriculum design, teacher preparedness, and infrastructural support. **Methodology:** A qualitative literature review was conducted, analyzing academic articles, government regulations, and case studies related to OBE in vocational settings. This review synthesizes insights into critical implementation strategies, potential benefits, and recurring challenges with the aim of building a detailed understanding of OBE's impact. **Results and discussion:** The findings reveal that OBE significantly improves the alignment between vocational education curricula and industry needs, enhancing both technical expertise and essential soft skills. Initiatives like Teaching Factory illustrate OBE's practical advantages. However, challenges persist in areas such as teacher training, limited resources, and the complexity of evaluation mechanisms. Addressing these issues is crucial for sustainable and effective implementation. **Conclusions:** OBE holds transformative potential for vocational education by promoting curriculum flexibility and graduate readiness. Achieving this potential requires continuous investment in teacher development, infrastructure enhancement, and strengthened industry collaborations. These findings offer valuable insights for educators and policymakers who aim to refine OBE practices and frameworks to meet workforce demands.

Keywords
Outcome-Based Education; Vocational Education; Outcome-Based Curriculum Design; Industry Collaboration; Teaching Factory; Teacher Training; Graduate Readiness.

Resumen

Introducción: la implementación de la Educación Basada en Resultados (EBR) en la educación vocacional tiene como objetivo alinear los resultados del aprendizaje con las demandas específicas de la industria, lo que asegura que los graduados posean las habilidades requeridas por el mercado laboral moderno. Este estudio examina el papel de la EBR en el avance de la educación vocacional en Indonesia, abordando aspectos clave como el diseño curricular, la preparación docente y el apoyo infraestructural. **Metodología:** se realizó una revisión cualitativa de la literatura, analizando artículos académicos, normativas gubernamentales y estudios de caso relacionados con la EBR en entornos vocacionales. Esta revisión sintetiza conocimientos sobre estrategias clave de implementación, beneficios potenciales y desafíos recurrentes para construir una comprensión detallada del impacto de la EBR. **Resultados y Discusión:** los hallazgos revelan que la EBR mejora significativamente la alineación entre los planes de estudio de la educación vocacional y las necesidades de la industria, fortaleciendo tanto las competencias técnicas como las habilidades blandas esenciales. Iniciativas como la *Teaching Factory* ilustran las ventajas

Palabras Clave
Educación Basada en Resultados (OBE); educación vocacional en Indonesia; diseño curricular basado en resultados; colaboración con la industria; escuela fábrica; formación docente; preparación de graduados.

prácticas de la EBR. Sin embargo, persisten desafíos en áreas como la formación docente, la escasez de recursos y la complejidad de los mecanismos de evaluación. Abordar estos problemas es crucial para una implementación sostenible y efectiva. **Conclusiones:** la EBR tiene un potencial transformador para la educación vocacional al promover la flexibilidad curricular y la preparación de los graduados. Alcanzar este potencial requiere inversiones continuas en el desarrollo docente, la mejora de infraestructuras y el fortalecimiento de las colaboraciones con la industria. Estos hallazgos ofrecen valiosos conocimientos para educadores y responsables políticos que buscan perfeccionar las prácticas y marcos de la EBR para satisfacer las demandas del mercado laboral.

1. Introduction

The Fourth Industrial Revolution (Industry 4.0) and the accelerated pace of digitalization have fundamentally transformed global workforce demands. The emergence of new professions driven by advancements in artificial intelligence, automation, and data analytics highlights the need for educational systems to adopt adaptive strategies that align learning outcomes with these rapidly evolving industry requirements. Educational institutions are now challenged to address societal demands for future-ready skills, such as digital literacy, critical thinking, and collaboration, while also accommodating the growing prevalence of virtual education and lifelong learning initiatives.

Vocational education, which focuses on the development of practical and technical skills, plays a pivotal role in equipping a competent workforce to meet the demands of a competitive global market. However, traditional vocational education systems often face criticism for outdated curricula, misalignment with industry requirements, and limited adaptability to technological advancements (Aisjah, 2021; Zakiya & Falamy, 2024). Moreover, the importance of continuously updating teachers' knowledge and integrating emerging technologies into educational practices has become increasingly evident in ensuring the relevance of vocational training.

Outcome-Based Education (OBE), pioneered by William Spady (1994), has emerged as a transformative framework designed to address these challenges. By emphasizing measurable learning outcomes tailored to real-world needs, OBE provides a structured and flexible approach to curriculum design. This methodology ensures that educational programs focus on end goals, such as industry-specific skills and workplace readiness, which directly respond to learner and societal demands (Rao, 2020). Its adoption in countries such as Malaysia and the United States has demonstrated its effectiveness in improving graduate competencies and curriculum relevance (Kristianto et al., 2021).

In Indonesia, OBE was officially introduced in 2015, primarily in higher education. Despite its initial adoption, the broader application of OBE across various levels of vocational education remains limited. This gap represents a missed opportunity to align vocational education with national workforce priorities and global standards. Concepts such as Backward Curriculum Design, which begins with defining desired learning outcomes, and Constructive Alignment, which ensures coherence between teaching methods, assessments, and goals, further highlight

OBE's potential as a strategic tool for educational reform (Directorate of Quality Assurance Belmawa, 2018).

The implementation of OBE in vocational education also faces several challenges. These include inadequate infrastructure, limited understanding of OBE among educators, and the persistent disconnect between theoretical instruction and practical application. However, these challenges are outweighed by OBE's potential to transform vocational education. Through its emphasis on measurable outcomes, this approach can enhance curriculum relevance, improve graduate readiness, and foster stronger collaboration between educational institutions and industry.

This article explores the potential applications of OBE across various levels of vocational education in Indonesia. By examining implementation strategies, identifying key advantages, and addressing prevalent challenges, this study aims to highlight how OBE can bridge the gap between education and industry. Ultimately, adopting OBE can enable Indonesia's vocational education system to produce competent graduates, meet evolving workforce demands, and contribute to sustainable national economic development.

2. Methodology

This study adopts a qualitative descriptive-analytical approach to explore the application of Outcome-Based Education (OBE) in Indonesia's vocational education system. The research relies on secondary data, including academic publications, government policy documents, and case studies, to provide a comprehensive understanding of OBE's implementation, strategies, and challenges.

2.1. Data Collection

Relevant literature was systematically gathered from databases such as Scopus, ScienceDirect, and Google Scholar, as well as official government publications and reports. A step-by-step literature search process was employed to ensure thoroughness and transparency. The literature review was conducted through a structured process that involved three main stages. In the first place, keyword identification was used to guide the search, employing terms such as *"Outcome-Based Education," "vocational education," "curriculum alignment,"* and *"graduate readiness."* These keywords ensured the retrieval of literature directly related to the study's focus. The second part was the identification of inclusion criteria which were established to select sources based on their relevance to several core areas: the theoretical foundations and key principles of Outcome-Based Education (OBE); practical applications of OBE in vocational education settings; comparative studies and global implementations of the model; and contextual challenges and strategies specific to the Indonesian vocational education system. Finally, a source evaluation phase was carried out. Each selected document underwent rigorous assessment to ensure its credibility and relevance. Priority was given to peer-reviewed journal articles, government publications, and case studies supported by clear methodological frameworks.

2.2. Data Analysis

The collected data were analyzed using thematic analysis to identify recurring patterns, key themes, and relationships among concepts. The analytical process included coding**,** in which, each source was reviewed, and relevant information was coded into categories such as Backward Curriculum Design, Constructive Alignment, and Teaching Factory models. Then, the theme development was conducted by the identification of common themes and subthemes, with particular attention to the alignment of OBE principles with the goals of vocational education; the implementation strategies across various education level (e.g., vocational high school, higher vocational education, and industry training programs); and the identification of barriers and proposed solutions for successful OBE adoption. And the validation phase included the **c**ross-checking of themes that were conducted to ensure consistency and accuracy.

2.3. Replicability Standards

To ensure the study's validity and replicability, the methodology was designed with clear documentation of each research step. In the first moment, a search protocol was established and thoroughly recorded. This included a detailed account of the keywords used, the databases consulted, and the criteria for inclusion, thereby enabling other researchers to replicate the search process. Second, the data analysis process was carefully documented. All stages—ranging from coding to thematic grouping and interpretation—were systematically recorded to promote analytical transparency and facilitate peer review. Finally, triangulation was employed to strengthen the reliability of the findings. This involved cross-verifying data from diverse sources, including academic articles, official government documents, and real-world case studies, ensuring that conclusions were supported by multiple forms of evidence.

2.4. Ethical Considerations

All sources were properly cited, and the research adhered to ethical guidelines in secondary data usage by respecting copyright and intellectual property rights. This methodological approach provides a robust framework for analyzing the potential of OBE to transform vocational education in Indonesia. By integrating theoretical insights with practical applications, the study aims to generate actionable recommendations for educators, policymakers, and industry stakeholders.

3. Results

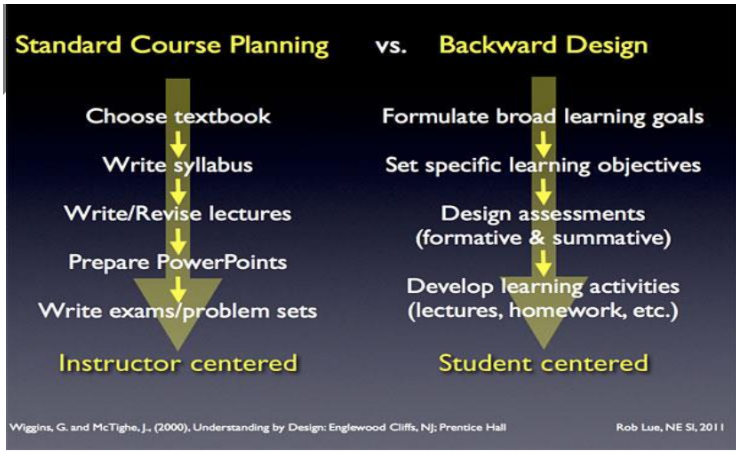
3.1. Outcome-Based Education (OBE) Concept and Framework

Outcome-Based Education (OBE) emphasizes measurable learning outcomes aligned with industry needs, focusing on the development of skills, knowledge, and attitudes critical for workplace readiness. Aisjah (2021) highlights OBE's ability to enable flexible and adaptive curriculum design, ensuring that vocational programs remain relevant amid evolving workforce demands. Similarly, Zakiya and Falamy (2024) emphasizes that OBE supports achieving targeted learning outcomes by prioritizing learner-centered approaches. Globally, Rao (2020) underscores that OBE fosters responsiveness to the demands of a competitive global economy, making it a critical framework for modern vocational education.

Specific applications further validate OBE's adaptability. For instance, Kusstianti et al. (2022)

describe OBE-based cosmetology curricula that align with industry standards, ensuring graduates meet competency requirements. Handayani and Zaim (2023) add that incorporating language philosophy in OBE-based curriculum development enhances students' critical thinking and comprehension, demonstrating how OBE integrates theoretical and practical dimensions for holistic development. These findings collectively suggest that OBE provides a structured yet flexible framework capable of bridging the gap between education and industry. In Indonesia, the OBE curriculum is known as the Backward Curriculum Design because it focuses on outcomes first and can be seen in Figure 1.

Figure 1
Backward Curriculum Design



Source: Directorate General of Learning and Student Affairs. (2018)

3.2. Outcome-Based Module and Curriculum Development

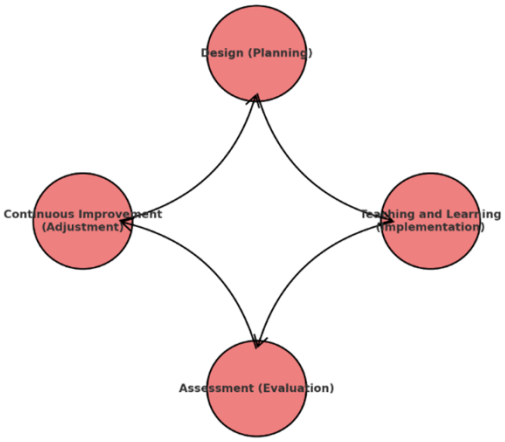
OBE has driven significant advancements in module and curriculum development, particularly in improving students' practical skills and industry readiness. Anggraini and Sukardi (2015) report that product-oriented modules in vocational schools enhance not only technical competencies but also entrepreneurial interests. This dual focus aligns with OBE's goals of preparing students for diverse career pathways. In creative fields, Putri et al. (2021) illustrate how OBE-based curricula in carving promote creativity and precision, directly addressing market needs. Rahayu and Anim (2022) further emphasize the effectiveness of structured modules like the Rayisah model in optimizing learning outcomes for training institutions, suggesting that well-designed modules can significantly enhance the quality of vocational education. Mahsar (2022) highlights OBE-based Content-Based Instruction (CBI) as a tool for improving English proficiency, particularly in tourism-related education, showcasing OBE's ability to adapt to specific sectoral demands. These findings demonstrate the transformative potential of OBE-driven curriculum development in diverse vocational contexts. Based on this explanation, it can be concluded that OBE also encourages the creation of a new cycle, namely a dynamic curriculum cycle, which can be seen in Figure 2.

3.3. Teaching Factory Learning Model in Vocational Schools

The Teaching Factory (Tefa) model exemplifies OBE's practical application by integrating theoretical knowledge with real-world practice. Studies by Nurtanto et al. (2017) and Yunanto (2016) show that Tefa significantly improves students' technical skills by simulating real-world work environments, fostering workplace readiness. This model bridges the gap between education and industry, ensuring that graduates are not only technically skilled but also familiar with the demands of professional settings. Moreover, Kurniawan (2014) demonstrates that the Tefa model effectively fosters entrepreneurial interest, reflecting OBE's emphasis on preparing independent and innovative graduates. These findings highlight the importance of experiential learning models in operationalizing OBE principles, ensuring that vocational education is both relevant and impactful.

Figure 2

Dynamic Curriculum Cycle with OBE



Source: Created by the author

3.4. Competence-Based Training (CBT) in Vocational Education

Competence-Based Training (CBT) aligns closely with OBE by emphasizing both technical skills and character development. Paryanto et al. (2013) and Rahdiyanta et al. (2015) underscore CBT's role in equipping students with practical competencies while fostering strong moral values, addressing both technical and ethical dimensions of workforce readiness. Additionally, Rusmulyani (2021) highlights the integration of soft skills in CBT, which are essential for producing adaptable and collaborative graduates. The findings emphasize that soft skills, such as communication and teamwork, are as critical as technical expertise in ensuring students' long-term success in the workplace. Fathurrochman (2017) expands CBT's applicability to civil service training, further showcasing OBE's flexibility across various educational sectors.

3.5. Evaluation of Competency-Based Learning Outcomes

Evaluation is a cornerstone of OBE, encompassing cognitive, affective, and psychomotor domains. Aziz et al., (2012) argue that outcome-based evaluation provides a holistic view of student achievement, ensuring alignment between learning outcomes and real-world demands. Kristianto et al. (2021) emphasize the importance of precise measurement tools in assessing curriculum effectiveness, highlighting the critical role of continuous feedback in curriculum refinement. Furthermore, Sadat et al. (2022) add that competency-based evaluations are vital in both traditional and independent learning systems, ensuring that learning outcomes are consistently met. These findings suggest that comprehensive and adaptive evaluation methods are essential for realizing OBE's full potential.

3.6. Community Empowerment Through OBE-Based Programs

OBE's influence extends beyond formal education into community empowerment initiatives. Arnady and Prasetyo (2016) highlight that OBE-based programs in community learning centers enhance life skills, enabling economic independence. The Department of National Education (2002) advocates for life skills-based approaches to increase community productivity, reinforcing the broader societal impact of OBE. Furthermore, Rakib and Syam (2016) emphasize the role of local potential-based training in fostering rural economic development. Shantini (2009) underscores OBE's inclusivity by showcasing its success in empowering disabled workers through tailored training programs. These findings illustrate OBE's potential to drive societal transformation by equipping diverse populations with the skills necessary for economic participation and independence.

4. Discussion

4.1. Advantages of OBE Implementation

4.1.1. Curriculum Relevance to Industry Needs

Outcome-Based Education (OBE) provides a framework that ensures curriculum alignment with labor market demands, a critical factor in vocational education. Studies by Ping (2020) and Zakiya and Falamy (2024) emphasize that this alignment enhances graduate employability by equipping them with industry-relevant competencies. For example, Kusstianti et al. (2022) illustrate how OBE fosters professional standards in cosmetology education, enabling graduates to meet industry expectations. This adaptability makes OBE not only applicable in Indonesia but also a valuable strategy for countries aiming to synchronize education with workforce demands in rapidly evolving global markets.

4.1.2. Development of Technical and Soft Skills

One of OBE's strengths is its balance between technical proficiency and essential soft skills, such as communication, teamwork, and adaptability. Rusmulyani (2021) and Sadat et al. (2022) highlight this integration as vital for producing versatile graduates who can navigate dynamic work environments. The ability to cultivate these dual competencies positions OBE as a transformative model for education systems globally, particularly in countries where workforce adaptability is key to addressing economic and technological shifts.

4.1.3. Innovation in Learning Methods

OBE encourages the adoption of innovative pedagogical approaches, including blended and experiential learning. Purwaningsih (2020) and Mahsar (2022) demonstrate how these methods improve outcomes, such as enhanced language proficiency and greater flexibility to cater to diverse learners. As countries adopt OBE, these innovations offer scalable strategies for modernizing education and promoting inclusivity across different socio-economic contexts. OBE encourages the adoption of innovative pedagogical approaches, including blended and experiential learning. Purwaningsih (2020) and Mahsar (2022) demonstrate how these methods improve outcomes, such as enhanced language proficiency and greater flexibility to cater to diverse learners. As countries adopt OBE, these innovations offer scalable strategies for modernizing education and promoting inclusivity across different socio-economic contexts. In line with this, the concept of Constructive Alignment provides a foundational framework for ensuring that these innovative strategies are implemented effectively. As illustrated in Figure 3, effective curriculum design requires a coherent alignment between Learning Outcomes, Teaching & Learning Activities, and Student Assessment. This triangular relationship ensures curriculum validity, learning effectiveness, and learning opportunities, reinforcing the integrity and impact of the learning process. The inclusion of the Design Cycle and Evaluation Cycle further supports continuous curriculum improvement, aligning pedagogical innovation with measurable educational goals. This alignment not only enhances the efficacy of Outcome-Based Education but also supports scalability and adaptability across diverse educational environments.

4.2. OBE Implementation Challenges

4.2.1. Educator Training

The successful implementation of OBE requires educators to adopt new roles as facilitators of outcome-based learning. Shaheen (2019) and Damit et al. (2021) emphasize the critical need for intensive training to equip educators with the knowledge and skills necessary for implementing OBE principles effectively. In Indonesia, gaps in educators' readiness for practice-based learning, highlighted by Fathurrochman (2017), mirror challenges faced in other developing countries. Addressing these gaps through structured training programs can enhance the global applicability of OBE.

4.2.2. Infrastructure Limitations

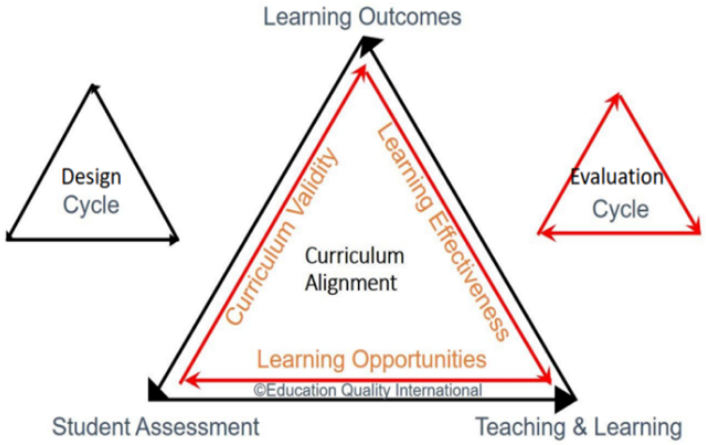
Adequate infrastructure is essential for practice-oriented education under OBE. Rahmawati and Wahyuni (2024) and Hidayat and Sa'ud (2015) identify a lack of laboratories, practice spaces, and technological tools as barriers to effective OBE implementation in Indonesia. These challenges resonate with those in other resource-constrained settings, where limited infrastructure hinders vocational education. Collaborative investments between governments and industry stakeholders could mitigate these barriers, creating a more supportive environment for OBE adoption.

4.2.3. Complexity of Holistic Evaluation

Evaluating both technical and soft skills in OBE requires sophisticated tools and methodologies to capture the multidimensional nature of learning outcomes. Aziz et al., (2012) and Kristianto

et al. (2021) highlight the need for comprehensive evaluation frameworks that integrate cognitive, affective, and psychomotor domains. This complexity poses challenges not only for Indonesia but also for countries implementing OBE, underscoring the importance of developing globally applicable evaluation standards.

Figure 3
Constructive Alignment



Source: Adapted from Anderson, 2002

4.3. Strategies for Advancing OBE Implementation

4.3.1. Strengthening Educator Training

Intensive training programs, as proposed by Ramli et al. (2022) and Fathurrochman (2017), are essential for building educators' capacity to implement OBE effectively. By adopting a structured approach to professional development, education systems worldwide can ensure that teachers are well-equipped to facilitate outcome-based learning.

4.3.2. Educational Infrastructure Development

Investments in laboratories, technology, and other facilities are critical for supporting OBE. The Directorate of Vocational Education (2020) emphasizes that these investments not only enhance learning outcomes but also create environments conducive to practice-based education. Lessons learned from Indonesia's challenges can inform infrastructure development strategies in other countries, particularly those with similar resource limitations.

4.3.3. Partnership with the World of Work

Strong collaborations between vocational institutions and industry stakeholders are essential for aligning curricula with real-world requirements. Siregar (2022) and the Directorate of Vocational Education (2020) advocate for joint initiatives, such as apprenticeship programs and curriculum co-design, to bridge the gap between education and employment. These partnerships offer a

replicable model for other countries seeking to improve graduate quality and workforce readiness.

4.3.4. Broader Implications of OBE Implementation

The findings of this study have broader implications for countries seeking to adopt OBE as a strategy for improving vocational education. Indonesia's experiences highlight both the transformative potential and the challenges of OBE, offering valuable lessons for other nations. For instance, developing countries can leverage Indonesia's strategies for overcoming barriers, such as infrastructure limitations and educator readiness, to design context-specific solutions. Furthermore, OBE's emphasis on measurable outcomes, holistic evaluation, and curriculum-industry alignment positions it as a globally relevant framework for education reform. Countries implementing OBE should prioritize international collaboration to share best practices, develop standardized evaluation tools, and foster cross-border partnerships between educational institutions and industries. By addressing these challenges and leveraging the advantages of OBE, vocational education systems worldwide can better equip graduates with the skills needed to thrive in an increasingly complex and competitive global workforce.

5. Conclusions and Implications

This research reveals that the implementation of Outcome-Based Education (OBE) in vocational education in Indonesia has great potential to improve the relevance, effectiveness, and work readiness of graduates amid the demands of the Industrial Revolution 4.0 and the era of labor disruption. One significant finding highlights the advantages of OBE in vocational education, as it emphasizes the achievement of clear learning outcomes, enabling a curriculum that aligns closely with job market needs. This approach, incorporating Backward Curriculum Design and Constructive Alignment, ensures optimal integration among learning objectives, teaching methods, and assessment strategies. Furthermore, the OBE model contributes to the enhancement of graduate competencies by strengthening both technical and soft skills, such as communication, collaboration, and problem-solving. Programs like Teaching Factory and outcome-based modules further support students' preparedness for the workforce. However, the study also identifies critical challenges to OBE implementation in Indonesia, including insufficient educator training, inadequate infrastructure, and the complexity of holistic evaluation systems. These limitations point to the need for sustainable and systemic strategies to ensure effective and lasting application. In addition, the research underscores the relevance of OBE in community empowerment efforts, particularly through training programs grounded in life skills and local potential, which can enhance individual productivity and promote economic independence at the community level.

The findings of this study point to several practical implications for advancing the implementation of Outcome-Based Education (OBE) in vocational contexts. One key implication is the need for educator capacity building, as the results emphasize the importance of intensive training to ensure educators fully grasp both the concept and application of OBE. Educational institutions, together with government support, are encouraged to create practice-oriented training programs to strengthen educators' skills in curriculum design, implementation,

and evaluation. Furthermore, investment in educational infrastructure is critical. The absence of essential facilities—such as laboratories, practical training rooms, and digital learning technologies—poses significant obstacles to OBE implementation. Strategic and sustained investment is needed to ensure effective practice-based learning environments. Additionally, curriculum alignment with industry must be prioritized. OBE depends on active collaboration with the labor sector to maintain curriculum relevance. Initiatives such as internship placements and project-based learning partnerships can help bridge the gap between education and employment needs. Lastly, the study underscores the importance of implementing a holistic evaluation system. Comprehensive assessment tools that address cognitive, affective, and psychomotor domains are essential to reflect real-world competencies and industry expectations. A more refined and multidimensional approach to evaluation is necessary to accurately measure learning outcomes and student readiness.

Theoretical implications of this study are centered on two main contributions. First, the research expands the academic literature on Outcome-Based Education (OBE) by deepening the understanding of its implementation in vocational education. The integration of theory and practice, along with the emphasis on holistic evaluation, represents a valuable addition to current academic discussions on OBE. Additionally, the study identifies a need for the development of more integrated evaluation frameworks within the OBE model. This finding is particularly relevant for scholars aiming to explore or refine assessment practices across different educational sectors.

Regarding the future research agenda, several directions are proposed. One promising area is the exploration of holistic evaluation effectiveness, particularly in assessing tools that encompass cognitive, affective, and psychomotor domains. Further empirical work could clarify the impact and applicability of such tools in diverse OBE settings. Another area for investigation involves the application of OBE across various educational levels. In-depth analysis of its implementation in higher education and professional training could yield insights into its adaptability and scalability. Finally, comparative studies between countries could provide valuable lessons. By examining how OBE has been successfully implemented in other national contexts, researchers and policymakers in Indonesia may gain a deeper understanding of best practices and potential pitfalls, thereby supporting the optimization of this approach**.**

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Conflict of interests

The authors declare that they do not have conflict of interest.

Authors' contribution

Research design, DJJ; data analysis, DJJ, PS, NER; methodology, PS; manuscript review, DJJ, PS, W, BSW. All authors have read and approved the final manuscript. Each author agrees to be accountable for all aspects of the work and confirms the integrity and accuracy of the research findings.

Declaration of generative AI-assisted technologies in the writing process

During the preparation of this manuscript, the authors used ChatGPT, an AI-powered language model, to assist in brainstorming and refining ideas. The AI tool was used primarily to enhance clarity, facilitate language structuring, and support the formulation of ideas based on the provided research content. No part of the manuscript was fully generated by AI without human review. The authors have carefully reviewed, revised, and edited all AI-assisted content and take full responsibility for the final version of this manuscript, ensuring its integrity, originality, and compliance with ethical standards.

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