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Digital Learning Platforms as Facilitator for University-Business Collaboration in Logistics Management Curriculum Design

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ABSTRACT

The logistics industry requires graduates who possess adaptive competencies and practical skills to respond effectively to dynamic industry demands, highlighting the importance of innovative and industry-oriented curriculum design. This study aims to analyze the implementation of a Logistics Management curriculum based on graduate competencies, with a particular focus on the application of learning strategies as a core component of the curriculum. **A quantitative approach** was employed using the fourth phase of Design and Development Research (DDR), which involved the experimental implementation of learning strategies in two logistics management classes following a needs analysis, competency identification, and curriculum design stages. The curriculum was developed based on five key components, competencies, learning objectives, content of materials, learning strategies, and evaluation. The **results** indicate that active learning approaches, including Project-based Learning (PjBL), Problem-based Learning (PBL), and Case Methods, positively support student engagement and competency development, students also reveal the need for more hands-on learning experiences, clearer instructional guidance, and stronger integration between theoretical knowledge and real-world logistics practices. **This study contributes** to innovation in logistics curriculum design by demonstrating how technology-enhanced active learning supported by digital learning platforms can function as enablers of industry-oriented education, strengthen university–business collaboration, and better prepare graduates for professional roles in the logistics sector.

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1. INTRODUCTION

Logistics plays a strategic role in supporting economic activity and national competitiveness, particularly in an increasingly globalized and interconnected market. The effectiveness of logistics systems determines how efficiently goods, information, and resources move from suppliers to end users, directly influencing service quality, cost efficiency, and customer satisfaction [1]. As logistics operations become more complex, the demand for competent logistics professionals who can manage supply chain processes in a dynamic environment continues to grow. This condition positions higher education institutions as key actors in preparing future logistics professionals through relevant and industry-oriented curricula [2].

Despite its strategic importance, Indonesia's Logistics Performance (LP) remains relatively weak compared to neighboring countries, as reflected in international logistics competitiveness indicators. One critical factor contributing to this challenge is the gap between industry-required competencies and the skills possessed by logistics graduates [3]. Previous studies have highlighted persistent mismatches between academic training and practical industry needs, particularly in terms of adaptability, problem-solving, and applied managerial skills. This gap indicates that conventional teaching approaches and curriculum structures may no longer be sufficient to prepare graduates for the rapidly evolving logistics sector.

This study aligns with the United Nations Sustainable Development Goals (SDGs), particularly SDGs 4 (Quality Education) [4] and SDGs 9 (Industry, Innovation, and Infrastructure). SDGs 4 underscores the need for quality education that equips learners with relevant competencies, supporting competency-based logistics curricula and innovative teaching strategies [5]. Meanwhile, SDGs 9 emphasizes innovation and collaboration between educational institutions and industry to foster sustainable industrial development [6]. Through technology-enhanced active learning and university–business collaboration, this study contributes to strengthening human capital and innovation capacity for sustainable economic growth.

In response to these challenges, universities must redesign logistics management curricula by emphasizing competency-based learning and stronger industry collaboration. Active learning approaches such as PjBL, PBL, and case methods supported by educational technology provide effective mechanisms to bridge theory and practice. Accordingly, this study aims to design and analyze a Logistics Management curriculum aligned with graduate competency needs and industry expectations, focusing on technology-enhanced active learning to strengthen university–business collaboration [7]. Distinct from prior studies, this research empirically implements the fourth phase of DDR by positioning digital learning platforms as facilitators of industry collaboration rather than merely instructional tools.

2. LITERATURE REVIEW

The Council of Supply Chain Management Professionals (CSCMP) defines logistics as a set of services that facilitate the flow of information as well as the distribution and transportation of raw materials to their final destinations, transforming them into goods for trade and consumption [8, 9]. Logistics plays a crucial role in enabling the exchange of commodities between supply bases and markets [10]. While logistics focuses on the movement and storage of goods, logistics management represents a broader concept that integrates goods, services, information, and resources through managerial coordination to achieve service quality at minimal cost [11]. Logistics management encompasses procurement, production, and distribution activities, while Supply Chain Management (SCM) integrates logistics within a wider system of value creation.

Logistics performance significantly affects national competitiveness. According to [12], Indonesia continues to lag behind neighboring countries in logistics competitiveness. Despite gradual improvement from 2012 to 2018, Indonesia's ranking declined sharply to 63rd position in 2023, performing poorly in key dimensions such as Logistics Competence and Quality. Previous studies [13, 14] indicate that deficiencies in workforce competence and education remain a persistent challenge, underscoring the close relationship between logistics performance, human resources, and educational quality.

Several studies highlight a growing mismatch between the competencies required by the logistics industry and those provided by educational institutions [15, 16]. Indonesian logistics human resources are often criticized for weaknesses in quality and speed [17], while rapid digital transformation demands adaptability and continuous skill development [18]. Addressing these challenges requires collaboration among industry, government, and academia to build a competent domestic workforce capable of responding to globalization and technological change [19].

Curriculum development in higher education has therefore become a critical focus, particularly in logistics education [20]. Studies show that curricula are often interpreted differently, ranging from syllabus-oriented designs to process-based and praxis-based approaches [21–23]. Research on logistics education emphasizes the importance of aligning graduate competencies with industry needs, including practitioner perspectives and employability skills [24–26]. Competency-based curricula are increasingly viewed as the most suitable framework for logistics programs, as they prioritize workplace-relevant skills [27].

To meet future industry demands, universities must adopt innovative teaching and learning strategies that integrate active learning and technology. Approaches such as PjBL, PBL, and Case Methods promote collaboration, critical thinking, and real-world problem solving [28]. The integration of digital tools

and technology-enhanced learning environments supports these pedagogies by increasing engagement and relevance. Consequently, this study aims to design a Logistics Management curriculum grounded in graduate competencies required for future work adaptability, particularly within the evolving logistics industry.

3. METHOD

This study employed a quantitative method using the DDR approach. DDR is a systematic research framework focused on the design, development, and evaluation of educational products to establish an empirical basis for instructional improvement [29]. As emphasized by [30], research problems in DDR must be clearly defined because they directly shape the educational interventions proposed. Based on industry demand data and the Logistics Performance Index (LPI), this study addresses the mismatch between higher education graduate competencies and industry requirements, which is often caused by limited industry exposure and misalignment between Higher Education (HE) curricula and Business World/Industrial World (DU/DI) [31]. Therefore, this study identifies essential graduate competencies in Logistics Management by referring to the Indonesian National Qualifications Framework (KKNI) level 6 and the Indonesian National Work Competency Standards (SKKNI).

After completing the first and second stages of data collection through questionnaires and identifying the required logistics competencies using SPSS, the study proceeded to the third stage of logistics management curriculum design. Prior to further analysis, instrument reliability was assessed to ensure internal consistency. Cronbach's Alpha was used as the reliability indicator, and all constructs exceeded the acceptable threshold of 0.70, indicating reliable measurement items. The reliability analysis was conducted using IBM SPSS Statistics version 26 with standard settings, confirming that the data were statistically sound and suitable for subsequent curriculum design and experimental implementation within the DDR framework.

The third step of DDR was about designing the curriculum by formulating the competencies into components. The components used in curriculum for logistics management in this study were taken from [3, 32, 33]. The components are competencies, learning objectives, content of the materials, learning strategies, and evaluation. The template or format was taken from the institution and adjusted to the LP from DU/DI and SKKNI & KKNI level 6. The proposed curriculum was an enhancement of the existing curriculum based on modifications by researchers and related documents.

This study conducted experimental research as the fourth stage of the DDR framework by implementing active learning strategies in two logistics management classes. Various learning applications were used to align academic learning with industry needs [34]. A total of 62 students were selected through purposive sampling, consisting of participants who had direct exposure to the implemented strategies. Ethical standards were maintained through voluntary participation, informed consent, and anonymity, ensuring data credibility while acknowledging limitations in generalizability.

Experimental research is a systematic approach for examining causal relationships between variables by manipulating independent variables and observing their effects on dependent variables [35]. Unlike descriptive or correlational studies, this method enables direct investigation of cause-and-effect relationships through controlled conditions [36]. By applying rigorous control mechanisms and statistical principles, including random assignment, experimental research minimizes confounding factors and strengthens causal inference [37, 38]. This controlled manipulation allows researchers to observe behavioral or outcome changes attributable to the experimental treatment [39].

4. RESULT AND DISCUSSION

4.1. Logistics Management Curriculum Design

The proposed curriculum integrates needs analysis findings to prepare industry-ready logistics graduates for diverse career paths. Its vision emphasizes global competence, sustainability, efficiency, and technological adaptability in response to dynamic industry demands. Supported by philosophical, psychological, sociological, and juridical foundations, the curriculum ensures the development of key competencies such as analytical skills, communication, adaptability, and collaboration, while remaining aligned with national education standards and policies [40].

The breakdown into Professional, Performance, Adjustment, Process, and Subject Components provide a detailed taxonomy of learning outcomes. This structured approach ensures that the curriculum addresses knowledge acquisition, practical application, personal adaptability, cognitive processes, and the ability to inte-

grate new knowledge, offering a holistic development pathway for students. The Standard Competencies for Graduates (SK) further consolidate these components into measurable outcomes.

The comprehensive list of courses directly reflects the competencies identified in the needs analysis (e.g., Supply Chain & Logistics Management, Procurement & Strategic Sourcing, Sustainable Logistics & Transport). The inclusion of courses like "Triple Bottom Line" (implicitly via "Sustainable Logistics & Transport" and "Policy and Principles of Sustainable Logistics") despite its lower perceived importance in the needs analysis, signifies a forward-looking curriculum that aims to shape future industry practices rather than just respond to current ones. The detailed Course Credits allocation guidelines ensure structured and consistent learning delivery. The course syllabus of Logistics Management is provided in Appendix 1.

The emphasis on Collaborative Learning (PjBL, Team-based, PBL, Peer-based, Technology-based Learning) is a critical strength. These strategies move beyond traditional lecturing, fostering active learning, problem-solving, teamwork, and practical application, which are essential for developing psychomotor and affective competencies identified earlier.

- PjBL and PBL are particularly well-suited for logistics, allowing students to tackle real-world challenges and develop practical solutions.
- The University-Business Collaboration model for courses like "Supply Chain Analysis" is a strong mechanism for experiential learning, providing students with direct industry exposure, access to real data, and feedback from professionals, significantly enhancing their readiness for the workforce. The learning method using PjBL in this subject is provided in Appendix 2.
- The detailed assessment criteria, including Criterion-Referenced Assessment (PAP), grading scales, and specific requirements for final projects (thesis/scientific papers preferred for Logistics Management), ensure a robust evaluation of student learning. The higher minimum grade for thesis and Field Work Practice (PKL) compared to general graduation criteria underscores the importance of applied research and practical experience, reinforcing the curriculum's industry focus. The use of assessment rubrics tailored to collaborative learning strategies further ensures consistent and fair evaluation of the skills developed through these active learning methods. The assessment for PjBL is provided in Appendix 3.

4.2. Implementation of Active Teaching-Learning Approaches

PjBL emerged as the most popular and effective method among students. Many students highlighted how it helps them apply theory to practical scenarios, improving their problem-solving, communication, and analytical skills. Case-Method was also favored, as it enables students to engage in real-world problem-solving discussions, improving their critical thinking and decision-making skills. Students appreciated its relevance to industry situations. PBL also received positive feedback for encouraging active participation and honing students' skills in handling complex logistics problems, though some students felt more theoretical input from instructors was needed to guide them. 53,2% of 62 students agree that three approaches in active learning methods, PjBL, PBL, and case-method help them to be ready to adapt in the industry as stated in Figure 1. It shows that students are having mentality preparation by having various assignment in classes that could increase their confidence in building communication and dialogue with peers.

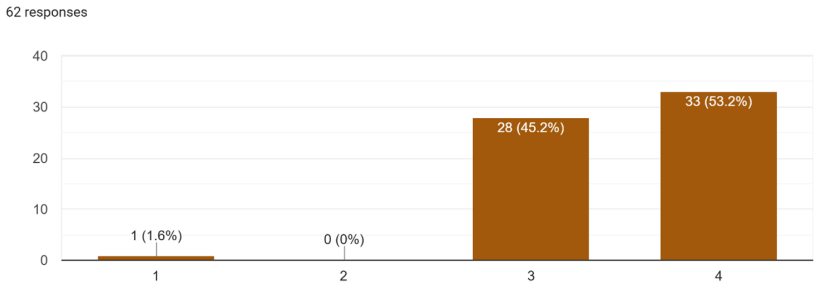

Figure 1. Students Readiness for Workplace Challenges Through Active Learning Approaches

Several students expressed concerns regarding the dominance of group presentations, noting that not all participants fully understood the material and that instructor clarification was often insufficient. Many

students preferred more direct explanations from lecturers and emphasized the need for increased practical exposure, such as site visits to warehouses or logistics hubs, to better connect theory with real-world logistics practices. Students also highlighted the limited use of logistics software and digital tools in learning, suggesting that greater integration of industry-relevant technologies and real-life case studies would enhance professional readiness. Additionally, critiques were raised about teaching pace and instructional clarity, as unclear guidance before assignments or presentations sometimes led to student confusion.

The methods encouraged teamwork, collaboration, and negotiation, particularly through discussions and problem-solving scenarios. These were seen as essential skills for working in logistics. Motivation for learning was highest when students felt actively involved in the learning process, especially when students were tasked with solving real-world problems or working on projects directly tied to their future careers.

PjBL is a pedagogical approach that centers educational experiences around the execution of projects, allowing students to acquire knowledge and skills through active engagement with real-world problems and scenarios [41]. This method encourages deeper understanding and critical thinking by requiring learners to apply theoretical concepts to practical challenges, mirroring the interdisciplinary demands of professional environments [42]. This approach often incorporates elements of the 5E instructional model, where students engage with concepts, explore them through activities, explain their understanding, elaborate on their knowledge, and finally evaluate their learning [42]. Based on Figure 2, it shows that 35 students of 62 agree that PjBL help them to make decision independently.

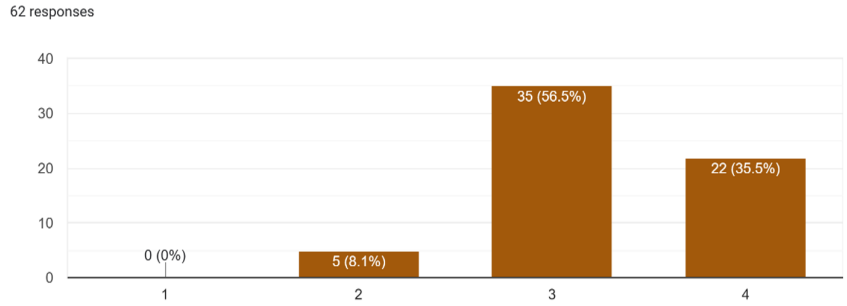

Figure 2. Students Independent Decision-Making Through PjBL

In Figure 3, it shows that 56,5% participants agree that PjBL motivate them to study in class using various projects (presentation, report writing, making posters) and various apps such as Blooket, Wayground, and others.

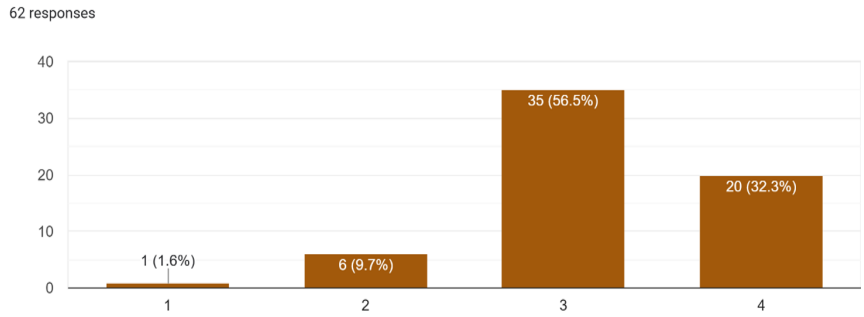

Figure 3. Students Learning Motivation Influenced by PjBL

Figure 4 focuses on students shared information that use logistics software in classroom's projects. The distribution of responses indicates that the majority of students reported moderate to high levels of motivation, suggesting that the integration of logistics software in classroom projects supports student engagement and enhances their interest in learning through practical, technology-supported tasks.

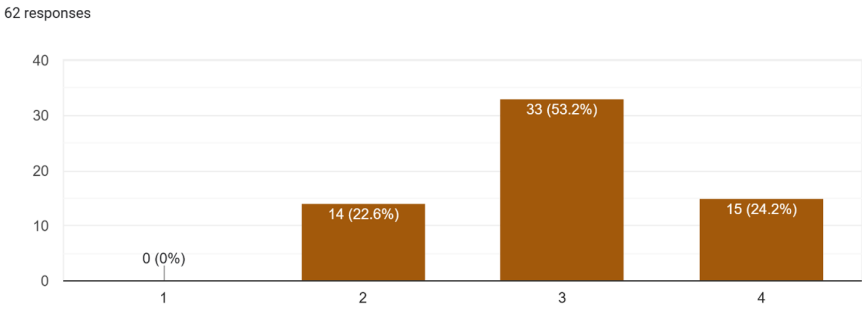

Figure 4. Students Use of Logistics Software in Project-Based Learning Activities

Problem based learning is a pedagogical strategy that emphasizes the development of problem-solving skills through confronting authentic, ill-structured problems [43]. This methodology is distinguished from traditional lecture-based instruction by its active learning components, which foster a ”hands-on” and ”minds-on” engagement with the subject matter [44]. Such active learning strategies move students into a more central role in their education, fostering deeper understanding through discussions, interactive technologies, and in-class questions rather than passive reception of information [45]. Figure 5 below shows that 48,4 percent of the participants agree that PBL train them to solve complicated problems.

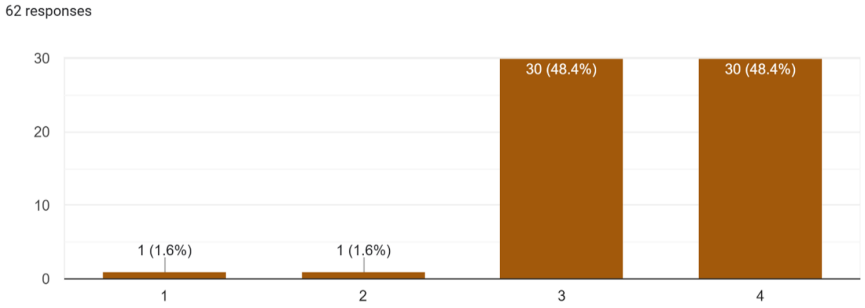

Figure 5. Students Ability to Solve Complex Problems Through PBL

Case-method is a teaching approach where students analyze and discuss real-world scenarios or dilemmas, thereby developing analytical skills and the ability to apply theoretical knowledge to complex situations. This method cultivates critical thinking and decision-making by immersing students in authentic problems, often leading to improved knowledge retention and self-efficacy [46, 47]. This approach allows students to engage with open-ended problems, fostering creativity and original thinking as students design experiments or analyses within a given framework [46]. It encourages students to generate new ideas, explore questions, and design their own investigations, fostering a deeper understanding of scientific processes and conceptual changes [42]. Figure 6 shows that case-method support 33 students to analyse problems attentively.

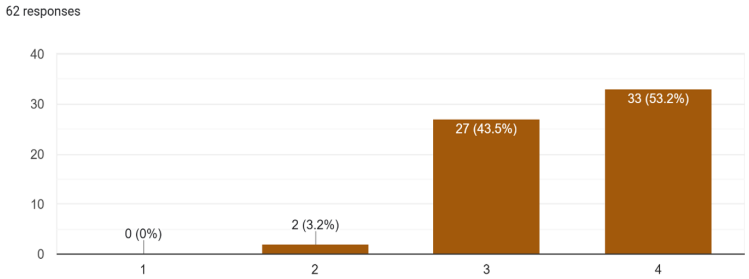

Figure 6. Students Critical Analysis Skills Developed Through the Case Method

More structured guidance from instructors, particularly during project-based or case-based learning sessions, could help students better grasp complex topics. Increased interaction with industry professionals (e.g., guest lectures or practitioner-led sessions) and more industry-specific assignments could give students a clearer understanding of the real-world applications of logistics principles. Field trips or site visits to logistics companies, warehouses, and ports were commonly suggested as crucial additions to the curriculum [48]. Improved classroom facilities and resources (e.g., functional projectors and clearer presentations) would contribute to a better learning environment.

4.3. Educational Apps Usage in Classes

Apps such as Blooket, Wayground, Wordwall, and Magic School support active learning by increasing student engagement through interactive content and providing educators with actionable data, enabling a shift from passive to active knowledge construction [49]. Their integration reflects the growing role of data-driven and intelligent technologies in logistics education, including AI-related features such as automated feedback, adaptive learning, and performance prediction [50, 51]. Furthermore, learning interaction data from quizzes and project-based activities can be analyzed to evaluate competency development and support data-informed instructional decision making.

- Wordwall and PBL, recent studies highlight Wordwall's effectiveness in enhancing PBL environments. [52] found that Wordwall-supported PBL significantly improved student outcomes in science education by enabling interactive problem-solving and immediate feedback. Another study emphasized Wordwall's gamification features as catalysts for increased engagement and deeper learning.

- Gamification and active learning, as implemented in Wordwall and Blooket, has been shown to improve both learning activities and outcomes. [53] demonstrated that integrating game elements into instructional design fosters motivation and supports the iterative nature of project-based and PBL.

- Blooket and case method, blooket's quiz-based competition format supports the case method by allowing students to test their understanding of complex scenarios in a low-stakes, engaging environment. While empirical studies are still emerging, anecdotal evidence suggests that Blooket enhances recall and encourages peer discussion, key components of case-based learning.

- Magic School and personalized learning, magic school leverages AI to generate differentiated materials, making it a valuable asset for scaffolding PjBL and PBL tasks. Its ability to tailor prompts, rubrics, and feedback aligns well with the diverse needs of learners engaged in open-ended inquiry.

- Wayground and PjBL, though less documented in academic literature, Wayground's collaborative workspace model supports PjBL by facilitating team-based planning, resource sharing, and milestone tracking. Its integration with classroom management tools also helps educators monitor progress and intervene effectively.

The integration of technological applications into active learning frameworks represents a fundamental pedagogical shift rather than a temporary trend. Tools such as Wordwall and Blooket support formative assessment through gamified interactions, Magic School facilitates personalized instructional support, and Wayground enables structured collaboration in project-based activities, collectively strengthening the implementation of PjBL, PBL, and case methods through more interactive, data-informed, and student-centered learning experiences. Empirical findings indicate that technology-enhanced active learning improves student engagement, competency development, and readiness for industry-oriented learning, while also revealing limitations related to instructional clarity, learning facilities, and institutional support. These results not only reflect pedagogical effectiveness but also provide valuable insights for curriculum development and academic management, forming the basis for further discussion on practical implications for logistics education and workforce preparation.

5. MANAGERIAL IMPLICATIONS

The findings of this study provide important managerial implications for higher education institutions and logistics industry stakeholders in addressing workforce readiness and competency gaps. University

managers, curriculum developers, and academic leaders are encouraged to strengthen competency-based curriculum design by systematically integrating active learning approaches such as PjBL, PBL, and Case Methods supported by the use of digital educational applications. From an industry perspective, logistics companies can benefit from closer collaboration with universities through structured partnerships, including industry-driven projects, internships, guest lectures, and access to real operational data, to ensure graduates acquire relevant practical skills, digital literacy, and problem-solving capabilities. For policymakers and institutional managers, the results highlight the need to invest in instructor capacity building, learning infrastructure, and educational technologies that support experiential learning. By aligning curriculum content, teaching strategies, and assessment methods with industry standards and real-world logistics practices, managers can enhance graduate employability, improve organizational performance in logistics operations, and contribute to the long-term competitiveness of the logistics sector.

6. CONCLUSION

The findings of this study on logistics management competencies are highly consistent with broader industry expectations and scholarly perspectives reported in previous research. The proposed curriculum design encompasses not only essential interpersonal skills but also core managerial, supply chain, and operational competencies that are critical for logistics professionals. In the context of a rapidly evolving logistics industry, prior studies further reinforce the growing importance of digital and data literacy, agility, and sustainability considerations beyond operational efficiency. Although these competencies are not always addressed explicitly, the curriculum presented in this study incorporates them through its forward-looking vision and the adoption of innovative learning methodologies, such as technology-based learning and PBL, thereby positioning graduates to meet contemporary and future industry demands.

Among the active learning strategies implemented, PjBL emerged as the most favored and effective approach from the students' perspective. Students reported that PjBL significantly enhanced their analytical, communication, and problem-solving skills by enabling them to apply theoretical knowledge to real-world logistics scenarios. The case method was also positively received, as it encouraged critical discussion and judgment through the analysis of practical business situations. PBL likewise contributed to active engagement and the development of complex problem-solving abilities, although some students indicated a need for clearer theoretical guidance from instructors to maximize its effectiveness.

Future research is recommended to further examine the long-term impact of competency-based logistics curricula on graduate employability and professional performance in the logistics industry. Subsequent studies could explore longitudinal outcomes by tracking graduates' career progression and assessing employer satisfaction with their competencies. Additionally, future research may investigate the integration of advanced digital technologies, such as logistics analytics platforms, artificial intelligence, and simulation tools, within active learning frameworks. Comparative studies across institutions or countries would also be valuable to validate the generalizability of the curriculum model and to identify best practices for strengthening university–industry collaboration in logistics education.

7. DECLARATIONS

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7.2. Author Contributions

Conceptualization: NI, Methodology: MA, Software: AH, Validation: MA and AH, Formal Analysis: NI, Investigation: NI, Resources: MA, Data Curation: AH, Writing Original Draft Preparation: NI and MA, Writing Review and Editing: NI and AH, Visualization: MA, All authors, NI, MA, and AH, have read and agreed to the published version of the manuscript.

7.3. Data Availability Statement

The data presented in this study are available on request from the corresponding author.

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The authors received no financial support for the research, authorship, and/or publication of this article.

7.5. Declaration of Conflicting Interest

The authors declare that they have no conflicts of interest, known competing financial interests, or personal relationships that could have influenced the work reported in this paper.

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Appendix 1.

COURSE SYLLABUS

Subject: Logistics Operation Management

Credit: 3

Course Description: A course that focuses on the management and optimization of logistics operations within an organization. This course covers various important aspects of logistics, including planning, controlling, and supervising the flow of goods, services, and information from the point of origin to the point of consumption in an efficient and effective manner.

Main Reference: Logistics Operations and Management, Concepts and Models / Elsevier

Week	Learning Objectives	Teaching Materials	Learning Method	Evaluation	References
1	Students receive an introduction to basic concepts and terminology in Logistics Management and establish a learning contract.	Basic Principles of Logistics Management	Lecture and Discussion	–	[54]
2	Students are able to understand and create the basic principles and identify the terms of Logistics Management.	Basic Principles of Logistics Management	Peer-based Learning	Presentation	
3	Students receive explanations related to techniques and strategies in inventory planning and control.	Inventory Management	Lecture and Discussion	–	[55]
4	Students are able to explain the techniques and strategies in inventory planning and control.	Inventory Management	Case-based Method	Presentation	
5	Students get the explanation of Logistics Information System.	Logistics Information System	Lecture and Discussion	–	[56]
6	Students are able to create the System of Logistics Information.	Logistics Information System	Team-based Method	Presentation	[56]
7	Students are able to understand the distribution and transportation flow.	Distribution and Transportation	Lecture and Discussion	–	[57]
Mid-Term Test					
8	Students are able to understand the trend of Contemporer Logistics.	Contemporer Logistics	Lecture and Discussion	–	[58]
9	Students are able to understand Warehouse Management.	Warehouse Management	Lecture and Discussion	–	[58]
10	Students are able to understand and create Warehouse and its Inventory.	Warehouse and Inventory	Project-based Learning (industry)	Written report of the flow of Warehouse Inventory	

Week	Learning Objectives	Teaching Materials	Learning Method	Evaluation	References
11	Students are able to understand and create Warehouse Management System.	Warehouse Management System	Project-based Learning (industry)	Written report of the flow of Warehouse Management System	
12	Students are to find out and get the information of Waste Management directly in the industry.	Waste Management	Project-based Learning (industry)	Poster or Infographic	[59]
13	Students can recognize and create plans related to Waste Management in a company.	Waste Management	Project-based Learning (industry)	Poster or Infographic	
14	The tasks/projects completion	–	Project-based Learning (industry)	Presentation	–
Assessment taken from the Project-based Learning done by students as the FINAL TEST score					

Appendix 2.

Project-based Learning (PjBL) in Supply Chain Analysis Class

Collaboration Theme: Improving Supply Chain Efficiency at Company N

Collaboration Responsible Parties: Supervising Lecturer and Institution

Collaboration Steps:

a. Role in collaboration

The supervising lecturers and the institution identify the scope and objectives of the program and recruit students to participate in it. Company N provides operational supply chain data. b. Data collection and analysis

Students collect and analyze the available data using SCM and statistical tools under the guidance of their supervising lecturers. The company provides suggestions and feedback on the data analysis that has been conducted, thereby helping students understand the real challenges of the working world.

c. Development of solutions

Students developed strategies to optimize the supply chain, such as implementing a just-in-time inventory system, renegotiating supplier agreements, and optimizing transportation routes. The company reviews the proposed solutions and provides feedback on the potential impacts that may arise.

For the fourth stage, Implementation and Testing, and the fifth stage, Evaluation and Reporting, they are adjusted according to the form of agreement or collaboration understanding between Educational Institutions and the Logistics industry.

Appendix 3. Rubric Assessment for Project-based Learning (PjBL)

No.	Assessment Criteria	Scoring			
		4	**3**	**2**	**1**
1	Understanding of the concept				
2	Quality of the product/task				
3	Process of collecting the data				
4	Precise analysis of the data				
5	Teamwork				

Note: The criteria can be changed based on the learning objective of each task/project.