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A comparative study of learning outcomes in the teaching factory and project based learning models in vocational high schools

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ABSTRACT

There are various learning models used by schools to fulfill student learning outcomes, such as the teaching factory model and project-based learning. The aims of this study are to (1) identify the learning achievements of students from the Marketing expertise program that implements the teaching factory model in Phase F at SMK Negeri 6 Surakarta and (2) identify the learning achievements of students from the Marketing expertise program that implements the project-based learning model in Phase F at SMK Negeri 3 Surakarta. This research is a study using a qualitative descriptive method. Data for this research were obtained from interviews with marketing program teachers and students, classroom observations, and document analysis. The results of this study are as follows: first, student learning outcomes in the marketing program implementing the teaching factory learning model can be achieved and result in industrial competencies. Second, student learning outcomes in the marketing vocational program using the project-based learning model still have several competencies that have not been achieved.

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INTRODUCTION

The Merdeka Curriculum is an educational curriculum that emphasizes students' interests and talents. It focuses on character and competency development and is designed to be flexible (Santi & Maureen, 2024). The Merdeka Belajar (Freedom to Learn) concept aims to equip students with 21st-century skills, commonly known as the 4Cs: Collaboration, Critical Thinking, Creativity, and Communication. In addition to this, Merdeka Belajar also seeks to improve students' soft and hard skills (Merlin et al., 2022). This curriculum offers diverse and optimized intramural learning experiences, providing students with adequate time to fully understand concepts and strengthen their competencies (Prasetyowati et al., 2023).

Accroding to Indonesia Law No. 20 of 2003 on the National Education System, vocational education is a form of secondary education that prepares students primarily for employment in specific fields. Vocational High Schools (Sekolah Menengah Kejuruan or SMK) are educational institutions designed to equip students with practical skills and knowledge (Wahyuni et al., 2022).

Learning in SMK aims to prepare students with competencies that will enable them to enter the workforce directly upon graduation. SMKs are expected to empower students to compete in the industrial and business sectors, either as employees or entrepreneurs (Wahyuni et al., 2022).

One of the government's efforts to improve the quality of vocational education, as initiated by the Directorate of Vocational High School Development, is the implementation of the Teaching Factory model. This model is intended to strengthen the collaboration between vocational schools and industry (Wahyuni et al., 2022). The Teaching Factory approach simulates real industrial environments, thereby bridging the gap between industrial demands and student competencies (Nurhasanah et al., 2022). It is a production-based learning process in which students create, promote, and sell products (Rohmah et al., 2021).

The purpose of Teaching Factory learning is to produce marketable goods or services, thereby adding value to the school and delivering quality that meets societal standards (Wahjusaputri & Bunyamin, 2022). This model enables students to develop their competencies and expertise through production activities that simulate real-world industry conditions within the school setting (Krisdayati & Hariyati, 2020).

In practice, however, the Teaching Factory model as proposed by the Directorate of Vocational High Schools (PSMK) has mainly been implemented in technical vocational programs (Rohmah et al., 2021). Another challenge is that not all schools have adopted this model, and some teachers experience difficulties in implementing it, which in turn affects students' learning outcomes (Delfiandra et al., 2022). This indicates that not all vocational programs apply the Teaching Factory model. An alternative model commonly used in vocational schools is Project-Based Learning (PjBL).

Project-Based Learning is designed to help students solve real-world problems through deep inquiry (Tahapary et al., 2021). In this model, students are guided to plan, design, and collaboratively carry out a project to produce a concrete product or solution (Zein, 2024). The PjBL model places students at the center of the learning process, while teachers take on the role of facilitators.

One of the vocational programs offered in SMKs is Marketing. However, not all schools with this program implement the Teaching Factory model; some adopt the Project-Based Learning approach instead. For instance, the Marketing program at SMK Negeri 6 Surakarta applies the Teaching Factory model, while SMK Negeri 3 Surakarta employs the Project-Based Learning model. Based on this background, this study aims to compare the learning outcomes of students in the Marketing program who experience these two different instructional models.

RESEARCH METHODOLOGY

This study employed a qualitative research method. The research was conducted at SMK Negeri 3 Surakarta and SMK Negeri 6 Surakarta, focusing on the Marketing expertise program. The data collection took place during March and April 2025. The data for this study were obtained through interviews with Marketing program teachers, students, and the vice principal for curriculum affairs, as well as through classroom observations and document analysis (including student grades, jobsheets, SOPs, block schedules, CP-ATP, and teaching modules). The sampling technique used was purposive sampling, a method of selecting research samples based on specific considerations. Purposive sampling is particularly suitable for qualitative research (Sugiyono, 2013). Data were collected using observation, interviews, and document analysis. The validity of the data was ensured through data and method triangulation. Validation is done by comparing data from interviews with data from observation and document analysis.

RESULTS AND DISCUSSIONS

Results

Learning Outcomes of Marketing Program Students through the Implementation of the Teaching Factory Model at SMK Negeri 6 Surakarta

Based on the findings, the implementation of the Teaching Factory model in the Marketing program at SMK Negeri 6 Surakarta is carried out through a retail store named Viskamart, which collaborates with Alfamart. Students in the Marketing program begin their practical training at Viskamart starting from Grade 10. They are trained to perform duties as sales clerks, replicating real industry conditions, thereby equipping them with practical skills and real-world experience.

Interview, observation, and document analysis results indicate that certain indicators of the Teaching Factory implementation such as job sheets, block schedules, products, and work culture have not been fully realized. The block schedule is implemented by alternating one week for practical work and one week for theoretical lessons. However, the job sheets used are still designed for traditional classroom activities and not tailored for Teaching Factory learning. The Teaching Factory implementation results in service-based products, such as customer service and digital marketing support. Observations and interviews revealed the presence of workplace culture elements, such as fixed working hours, dress code, rights and responsibilities of sales clerks, all of which follow the established SOPs.

Two learning models are applied in the Marketing program at SMK Negeri 6 Surakarta: Teaching Factory and Project-Based Learning. According to interview findings, both learning models encourage active student engagement. Students become the center of the learning process, while teachers act as facilitators. Respondents stated that these models support students in achieving the learning outcomes outlined in the curriculum. Teaching Factory, in particular, enhances students' comprehension of the material and has a positive impact on their learning achievement.

The Teaching Factory model encourages students to engage in direct practice, mirroring real industry environments. This industrial-like learning atmosphere helps students develop skills and knowledge relevant to the field of marketing. Student learning outcomes in the Marketing program at SMK Negeri 6 Surakarta through the combination of Teaching Factory and Project-Based Learning are successfully achieved. This is evident from student performance data, practical skills during training, attitudes both in class and at Viskamart, and their ability to work in industrial settings. The learning outcomes for each element are met optimally and align with the curriculum guidelines, resulting in students who are competent in their field.

In conclusion, implementing the appropriate learning model can significantly support the achievement of both academic learning outcomes and industrial competencies. In this case, SMK Negeri 6 Surakarta utilizes the Teaching Factory model, supported by Project-Based Learning, to help Marketing students meet their learning goals and prepare them with the competencies needed in their professional field. The hands-on experience gained during their school years builds students' confidence in facing the workforce or industrial world.

Learning Outcomes of Marketing Program Students through the Implementation of the Project-Based Learning Model at SMK Negeri 3 Surakarta

SMK Negeri 3 Surakarta applies the Project-Based Learning (PjBL) model across all expertise programs, including the Marketing program. The selection of the Project-Based Learning model is based on various considerations, one of which is to equip students with hands-on experience gained through direct practice. By engaging students in project work, the learning process emphasizes practical activities, enabling students to develop not only theoretical knowledge but also practical skills.

Based on interview results, the implementation of the Project-Based Learning model provides significant benefits in enhancing the skills required in today's industrial world. One

essential set of skills that students must master includes the 4C competencies: communication, collaboration, critical thinking, and creativity. According to interviews, the implementation of Project-Based Learning follows several stages or syntaxes: the first stage involves introducing the initial material and posing essential questions; the second stage is project planning; the third stage is project execution; and the fourth stage involves testing and evaluating the project outcomes. Through the Project-Based Learning model in the Marketing program at SMK Negeri 3 Surakarta, students are able to produce products such as flower bouquets and wedding gifts (mahars) that can be marketed to the public.

Learning outcomes are closely tied to the role of teachers during the learning process. The implementation of the Merdeka Curriculum emphasizes student-centered learning, positioning teachers as facilitators. The adoption of the Project-Based Learning model within the Marketing program at SMK Negeri 3 Surakarta supports this paradigm shift, reinforcing the teacher's role as a facilitator and placing students at the center of the learning experience. Interview findings suggest that students' understanding of the subject matter improves significantly when engaged in project work, as hands-on practice provides meaningful real-world experiences.

Further interviews revealed that the learning model implemented greatly influences students' learning outcomes. The school learning process serves as a preparatory stage for students to enter the workforce; therefore, the content delivered must equip students with skills relevant to their fields to produce competitive graduates. The application of the Project-Based Learning model in the Marketing program at SMK Negeri 3 Surakarta proves to be effective in supporting students' achievement of learning outcomes. Students are equipped not only with practical skills but also with theoretical knowledge, which aligns with the fundamental objectives of vocational education.

However, based on interviews, it was found that the achievement of learning outcomes across all elements within the Marketing program at SMK Negeri 3 Surakarta still requires further improvement. Not all students have mastered every learning element; each student tends to excel in specific areas, leading to uneven achievement across elements. Moreover, the student projects, particularly in the business and management sectors, have not yet been fully aligned with the specific competencies of their field, indicating a need for further refinement and development of student project activities. These improvements are necessary to better meet learning outcomes and industrial competency standards.

Discussion

Learning Outcomes of Marketing Program Students through the Implementation of the Teaching Factory Model at SMK Negeri 6 Surakarta

Accroding to the Decree of the Minister of Education, Culture, Research, and Technology No. 56 of 2022, learning outcomes are defined as the competencies that students are expected to achieve at each phase of learning. These outcomes can be achieved effectively through the implementation of instructional models that align with current educational developments. One such model that supports the achievement of student learning outcomes is the Teaching Factory model. As a vocational education institution in Indonesia, SMK (Vocational High School) aims to produce graduates who are skilled, competitive, and adaptive to the demands of the modern era, particularly by equipping students with competencies relevant to the industrial world (Wahyuni et al., 2022). The Teaching Factory model serves as a government initiative to enhance human resource quality by incorporating industry-standard practices and procedures into school-based learning environments (Prasloranti et al., 2021).

Based on the results of interviews, classroom observations, and document analysis, the implementation of the Teaching Factory model in the Marketing program at SMK Negeri 6 Surakarta supports the achievement of student learning outcomes. This model is designed to simulate industrial conditions in the classroom by adopting real-world work standards and procedures, thereby allowing students to experience environments that closely mirror those of the

industry. As a result, students are equipped with competencies that are directly relevant and comparable to those required in actual industrial settings.

The key indicators for the implementation of the Teaching Factory model include block schedules, job sheets, products, and workplace culture (Hendra et al., 2020). In the case of SMK Negeri 6 Surakarta, however, the application of the Teaching Factory model cannot yet be deemed fully established. This is due to the absence of job sheets specifically designed for the Teaching Factory context. Currently, teaching and learning activities rely instead on SOPs (Standard Operating Procedures), which are not fully aligned with the core principles of Teaching Factory-based instruction.

Interview and observation data show that students in the Marketing program at SMK Negeri 6 Surakarta possess competencies in line with their area of specialization. The Marketing expertise program includes eight learning elements in Phase F, each with defined learning outcomes according to the Merdeka Curriculum. The data collected indicate that students' learning outcomes in the Marketing program at SMK Negeri 6 Surakarta are being met, supported by the competencies they have developed. These results are presented in the following table.

Tabel 1.Student learning outcomes in the marketing expertise program at SMK Negeri 6 Surakarta

No	Element	Student Competency Description
1	Marketing	Students are able to promote products.
2	Business Planning	Students are capable of planning a business, from drafting a business proposal to marketing the product.
3	Business Communication	Students are able to conduct business communication and deliver business presentations.
4	Digital Branding	Students are capable of designing product logos and creating digital promotional content.
5	Digital Onboarding	Students are able to sell products through online marketplaces.
6	Digital Marketing	Students are able to conduct sales via social media platforms.
7	Digital Operation	Students are capable of preparing online purchase and sales reports.
8	Retail Business Management	Students are able to conduct stock-taking, display merchandise, and perform cashier services.

The competencies demonstrated by students in the Marketing expertise program at SMK Negeri 6 Surakarta indicate that the learning outcomes have been achieved in accordance with the guidelines set forth in the Merdeka Curriculum. In particular, the competencies in retail business management strongly support student engagement in internships (PKL) and help prepare them to enter the workforce upon graduation.

Student Learning Outcomes in the Marketing Expertise Program Using the Project-Based Learning Model at SMK Negeri 3 Surakarta

Learning activities in the Merdeka Curriculum are guided by predetermined learning outcomes (Decree of the Minister of Education, Culture, Research, and Technology Number 56 of 2022). Learning outcomes provide a framework for the skills that students must achieve, serving as a basis for selecting the appropriate learning model. One model that supports the achievement of these outcomes is project-based learning (PBL). PBL is a student-centered instructional model where students engage in meaningful projects, and teachers act as facilitators (Rehani & Mustofa, 2023). Vocational High Schools (SMK) offer specialized programs designed to equip students with the knowledge and skills needed to enter the workforce in their specific fields (Afdi et al., 2024). The curriculum for vocational schools consists of components covering expertise, competencies,

and aspects of learning (Rahmawati & Suranto, 2024). To support student competencies and achieve the intended learning outcomes, SMKs can implement the project-based learning model, which fosters both students' knowledge and practical skills.

Based on observations and interviews, the products resulting from project-based learning activities in the Marketing expertise program at SMK Negeri 3 Surakarta are tangible goods. These products include flower bouquets and wedding dowries (mahar). However, the products created by the students are not yet fully aligned with the field of marketing and do not fully represent the broader domain of business and management. Therefore, further development of project designs is necessary to ensure that students are equipped with skills relevant to their area of expertise.

There are eight elements in Phase F of the Marketing expertise program at SMK Negeri 3 Surakarta. Each element has corresponding learning outcomes that must be achieved by students, as stipulated by the Merdeka Curriculum. The achievement of these outcomes across the eight elements in the Marketing expertise program at SMK Negeri 3 Surakarta is presented in the following table.

Tabel 2.Student learning outcomes in the marketing expertise program at SMK Negeri 3 Surakarta

No	Element	Student Competency Description
1	Marketing	Students are able to promote products from project results.
2	Business Planning	Students are able to conduct business planning, from drafting business proposals to marketing products.
3	Business Communication	Students are only able to perform business communication.
4	Digital Branding	Students are able to create product logos and digital content for product promotion.
5	Digital Onboarding	Students have not been seen selling products through online marketplaces.
6	Digital Marketing	Students are able to sell products via social media.
7	Digital Operation	Students are able to prepare reports on online purchases and sales.
8	Retail Business Management	Students are only equipped with theory and have not practiced.

Based on the table above, there are several learning outcomes of the students that have not been fully achieved. The elements of business communication, digital onboarding, and retail business management still show incomplete learning outcomes, as the students' competencies have not yet met the criteria outlined in the guidelines. The retail business management element is particularly important to achieve, as during the Field Work Practice (PKL), students will often serve as shop attendants. The experience gained from the retail business management element is crucial to equip students for their PKL activities.

Comparison of Learning Outcomes Between Teaching Factory Model and Project-Based Learning in the Marketing Vocational Program

The Kurikulum Merdeka is a curriculum with the concept of "Merdeka Belajar" and applies student-centered learning, which aligns closely with constructivist theory (Hakiky et al., 2023). Both the teaching factory model and project-based learning also align with the principles of constructivism. According to constructivist theory, individuals must construct knowledge and derive meaning through real-life experiences (Wahab & Rosnawati, 2021). Constructivism posits that knowledge is a construct or outcome of the analysis conducted (Masgumelar & Mustafa, 2021). Both of these teaching models provide students with experiences that enable their knowledge and skills to develop effectively.

There are differences in the learning outcomes between the marketing program at SMK Negeri 6 Surakarta, which uses the teaching factory model, and SMK Negeri 3 Surakarta, which implements the project-based learning model. These comparisons are explained in the following table:

Tabel 3. Comparison of learning outcomes between teaching factory model and project-based learning

No	Teaching Factory		Project Based Learning	
	Element	Description	Element	Description
1	Marketing	Achieved	Marketing	Achieved
2	Business Planning	Achieved	Business Planning	Achieved
3	Business Communication	Achieved	Business Communication	Not Fully Achieved
4	Digital Branding	Achieved	Digital Branding	Achieved
5	Digital Onboarding	Achieved	Digital Onboarding	Not Fully Achieved
6	Digital Marketing	Achieved	Digital Marketing	Achieved
7	Digital Operation	Achieved	Digital Operation	Achieved
8	Retail Business Management	Achieved	Retail Business Management	Not Fully Achieved

Based on the results of interviews and observations, the application of the teaching factory and project-based learning models has benefits in the learning process. Both of these teaching models actively engage students in the learning process, thus ensuring that learning is student-centered. However, there are aspects that still need to be evaluated. In the marketing program at SMK Negeri 6 Surakarta, it cannot yet be considered a full teaching factory since jobsheets have not been applied in the learning activities. In the marketing program at SMK Negeri 3 Surakarta, the products created by students from the projects do not fully represent the marketing field of expertise. It appears that the learning outcomes of the marketing program at SMK Negeri 6 Surakarta are more advanced than those at SMK Negeri 3 Surakarta. According to an interview with the marketing program teacher at SMK Negeri 3 Surakarta, the learning outcomes of the students still need to be improved in order to produce more qualified graduates.

CONCLUSION

The marketing program at SMK Negeri 6 Surakarta implements a teaching factory model through a retail store called Viskamart. However, there are still indicators of the teaching factory model that have not been fully applied, such as jobsheets, which are currently replaced by Standard Operating Procedures (SOPs). The implementation of the teaching factory model allows students to achieve learning outcomes in line with the curriculum guidelines. Students are equipped with the skills and knowledge that support competencies relevant to the industrial world. The teaching model used in the marketing program at SMK Negeri 3 Surakarta is project-based learning. This model provides knowledge and skills through project activities. The learning outcomes of students using the project-based learning model are quite good, but there is still room for improvement in several elements. The design of the projects undertaken by students needs further development to ensure it aligns with their field of expertise.

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