

Skill Improvement for Vocational High School Graduates through Hybrid Learning: A Case Study of SMK Negeri 7 Bandung

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Abstract. Vocational education in Indonesia faces the challenge of ensuring that graduates have the skills that match industry requirements. The hybrid learning model, which combines online and face-to-face methods, is increasingly being adopted as a strategy to improve the quality of graduates' learning. This investigation examines the efficacy of hybrid learning in enhancing students' technical and interpersonal competencies, while also exploring their perceptions of this educational model at SMK Negeri 7 Bandung. This study used a mixed-methods approach, with quantitative data collected through surveys and pre- and post-intervention assessments, and qualitative data obtained through interviews and classroom observations. The sample consisted of students enrolled in various vocational programs, and the data were analyzed using descriptive statistics and thematic analysis. Hybrid learning contributed to a 25% improvement in technical skills and a 30% improvement in soft skills (communication, teamwork, and problem-solving). A total of 85% of students expressed satisfaction with this model, with flexibility and accessibility being the main factors. However, some students faced challenges in adapting to technology. Hybrid learning is effective in improving the skills and job readiness of vocational high school students, but its implementation requires support in the form of technology training and curriculum adjustment.

Keywords: Hybrid Learning, Technical Skills, Soft Skills, Vocational Education, Vocational High Schools.

1 Introduction

The vocational education landscape in Indonesia has undergone a significant transformation, particularly in response to rapid technological advances and the demands of the 21st-century workforce [1]. One of the most prominent phenomena is the increasing integration of hybrid learning models that combine traditional face-to-face teaching with online learning components. This shift is not just a trend but a necessary adaptation to equip students with the skills needed in a dynamic job market. The importance of this transformation is underlined by the high unemployment rate among vocational high school graduates, which has encouraged educators and

policymakers to explore innovative pedagogical approaches that can improve skills and employability [2], [3].

At SMK Negeri 7 Bandung, the adoption of hybrid learning has emerged as a strategic solution to overcome these challenges. This case study sought to test the effectiveness of hybrid learning in improving the competence of vocational high school graduates. Focusing on skill development is crucial, as vocational education aims to equip students for specific vocations, and the capacity to adapt to new learning contexts is essential. Research shows that students in hybrid learning environments show increased engagement and motivation, which are important for optimal learning outcomes. The incorporation of technology in education has shown an improvement in critical thinking and problem-solving skills, which are very important in today's workplace [4].

This research is important because it offers insights into the practical implementation of hybrid learning models in vocational education. This study aims to enhance the broader debate on educational innovation in Indonesia by analyzing the experiences of students and educators at the SMK Negeri 7 Bandung. These findings can guide future practices and policies to improve the quality of vocational education, thus increasing graduates' employability in an increasingly competitive job market [5]. This study emphasizes the need to modify educational practices to meet the changing needs of students and the labor market, thus emphasizing that successful vocational education is fundamental to economic development [6].

A literature review revealed several studies that investigated various aspects of hybrid and creative learning models in vocational education. An initial study examined the incorporation of production-based learning with industry capabilities, revealing that these models substantially improve students' practical skills and their readiness to enter the workforce [7]. This study emphasizes the importance of matching the educational process to industry standards to ensure that students learn relevant skills that meet market demands.

Hasan & Pardjono (2019) investigated the relationship between higher-order thinking skills (HOTS) and employability among vocational high school students. Their research showed that pedagogical methods that encourage critical thinking and problem solving are essential for equipping students to face difficulties in the real world [8]. This study emphasizes that vocational education should prioritize not only technical skills but also the development of cognitive talents that are important for success in the workplace.

The third study highlighted the efficacy of contextual project-based learning (PBL) in improving critical thinking, creativity, and problem-solving skills in vocational high school students. This study shows that involving students in practical projects significantly improves their educational outcomes and equips them for future careers [9]. This is in line with the goal of hybrid learning, which aims to foster a meaningful educational experience that aligns with students' professional ambitions and goals.

Collectively, these studies build a foundation for situating current research within the broader framework of vocational education reform in Indonesia. This case study examines the hybrid learning paradigm at SMK Negeri 7 Bandung, which aims to enhance discussions on educational innovation and its impact on skill development. This research is further reinforced by the growing recognition of the need for

educational institutions to adapt to the rapidly evolving labor market and the increasing significance of technology in education.

The rationale for placing this research in the current literature is interesting. The incorporation of a hybrid learning approach in vocational education is a contemporary and important issue for bridging the skills gap faced by graduates. As the labor market changes, the educational methodologies used to equip students for success must adapt. The focus on critical thinking and problem-solving skills is in line with the global education trend of prioritizing 21st-century competencies. Case study techniques facilitate a comprehensive examination of the different problems and achievements faced by SMK Negeri 7 Bandung, resulting in significant insights that can guide future practices and policies in vocational education in Indonesia.

The main objective of this study was to investigate the effectiveness of the hybrid learning model in improving the skills of vocational high school graduates at SMK Negeri 7 Bandung. This objective is driven by the urgent need to address the existing skills gap between graduate competencies and labor market demands. This study aims to provide empirical evidence on how hybrid learning can facilitate skills improvement, thus contributing to students' employability in a rapidly evolving job landscape.

This study had three objectives to achieve a broader goal. First, to evaluate the effect of hybrid learning on the development of students' technical skills. This study aimed to assess the extent to which the hybrid learning model used at SMK Negeri 7 Bandung improves students' practical skills in certain vocational disciplines. This study aimed to assess whether the implementation of hybrid learning results in a significant improvement in technical competence by analyzing student performance before and after its implementation. Second, to assess the impact of hybrid learning on improving students' soft skills. This study recognizes the importance of soft skills, including communication, teamwork, and problem-solving abilities, in addition to technical skills, in preparing students to enter the workforce. This objective seeks to examine how the hybrid learning environment encourages the development of important interpersonal skills that are increasingly valued by employers in various industries. Third, students' opinions about hybrid learning and its effectiveness in improving skills were investigated. Understanding students' perspectives is essential for evaluating the overall effectiveness of the hybrid learning paradigm. This study aimed to collect qualitative data regarding students' experiences, barriers, and successes in hybrid learning. This study sought to explain the effect of this instructional technique on their learning experience and skill acquisition by capturing their insights.

This study aimed to conduct a comprehensive analysis of the impact of hybrid learning on vocational high school graduates. This study seeks to provide significant insights for future practices and policies in vocational education by evaluating the acquisition of technical abilities, development of soft skills, and student perceptions. These findings are expected to improve educational practices that are in line with the needs of a dynamic labor market to improve the employability of graduates of SMK Negeri 7 Bandung.

2 **Method**

This study employed a mixed-methods approach, integrating quantitative and qualitative research methodologies to comprehensively assess the effectiveness of hybrid learning in enhancing vocational students' skills. Quantitative data were gathered through structured surveys, measuring students' acquisition of both technical and soft skills, while qualitative insights were obtained through semi-structured interviews and classroom observations. This dual-method strategy ensured a holistic analysis of the impact of hybrid learning, capturing numerical trends and in-depth contextual experiences. This research specifically focuses on SMK Negeri 7 Bandung, a leading vocational school implementing hybrid learning, chosen for its commitment to educational innovation and alignment with industry needs.

This study aimed to evaluate the impact of hybrid learning on students' technical and soft skills, as well as their perceptions of this learning model. Data were collected from a representative sample of students across different vocational programs, ensuring diverse perspectives. Surveys provide statistical evidence, interviews offer detailed student and teacher reflections, and observations document engagement and instructional effectiveness. The analysis integrated descriptive statistics and thematic analysis, allowing for an in-depth understanding of how hybrid learning influences skill acquisition. The findings will contribute to improving educational practices, curriculum development, and vocational training strategies, making graduates more adaptable to evolving workforce demands.

3. **Result and Discussion**

3.1 **The Impact of Hybrid Learning on Students' Technical Skills**

The implementation of hybrid learning at SMK Negeri 7 Bandung resulted in a significant improvement in students' technical skills, as evidenced by the quantitative and qualitative data collected during the study. This section discusses the findings related to the impact of hybrid learning on the acquisition of technical skills, with reference to relevant literature to contextualize the research results. Quantitative data were collected through pre- and post-intervention assessments that measured students' technical skills in various vocational disciplines.

Table 1. Improvement of Students' Technical Skills After the Implementation of Hybrid Learning

Assessment Aspect	Before Intervention (Average Score)	After Intervention (Average Score)	Increase (%)
Vocational Practice Assessment	65,2	81,5	+25%
Machine & Engineering Skills	62,8	79,2	+26%

Business Management Skills	67,1	83,5	+24%
Programming & Technology	64,5	80,7	+25%
Overall Average	64,9	81,2	+25%

Table 1 shows that after the implementation of hybrid learning, there was a significant improvement in students' technical competence in various vocational fields. This confirms that a learning method that combines direct interaction and digital technology can effectively improve understanding and practical skills. The results show a marked improvement in student performance after implementing hybrid learning. In particular, the average student score increased by approximately 25% in the practical assessment, indicating that the hybrid model effectively improved their technical competence. These findings are in line with previous research that highlights the positive effects of blended learning on student achievement in vocational education [10].

The improvement in technical skills can be attributed to the interactive nature of hybrid learning, which combines online resources with hands-on experiences. The integration of digital tools and resources allows students to engage with the material in a more flexible and personalized manner, facilitating a deeper understanding and retention of technical concepts. For example, the use of project-based learning (PBL) in a hybrid framework encourages students to apply their knowledge to real-world scenarios, thereby improving their problem-solving abilities and technical proficiency [11], [12].

In addition to quantitative assessments, qualitative data were collected through interviews and focus group discussions with the students and educators. Feedback from students showed a positive perception of the hybrid learning model, with many stating that the combination of online and face-to-face teaching helped them understand complex technical concepts more effectively. Students have reported that the availability of online resources, such as instructional videos and interactive simulations, allows them to review and practice skills at their own pace, which contributes to their confidence and competence in technical tasks [13].

Educators have also noted that hybrid learning facilitates a more engaging and dynamic classroom environment. The ability to combine various teaching methods, such as collaborative projects and peer learning, fosters a sense of community among students, motivating them to improve their technical skills. This is in line with the findings of M. Akhyar et al. (2024)., who emphasized the importance of a student-centered approach in vocational education to encourage active participation and skills development [3]

Although the results of this study show the positive impact of hybrid learning on technical skills, several challenges were identified during the implementation process. Some students expressed difficulty in adapting to the online component of the hybrid model, especially those who were less familiar with the technology. This highlights the need for targeted support and training to ensure that all students fully benefit from the hybrid learning experience. Additionally, educators face the challenge of balancing the demands of online teaching with the need for hands-on practical training. Ensuring that students receive adequate opportunities to apply their skills in a physical environment

remains an important consideration for the successful implementation of hybrid learning in vocational education [15].

The introduction of hybrid learning at SMK Negeri 7 Bandung has clearly improved students' technical skills, as shown by quantitative evaluations and qualitative feedback. The integration of online materials and practical experience fostered a more engaging and effective learning environment, enabling students to acquire competencies essential for future employment. Nevertheless, overcoming barriers related to technological adaptation and instructional balance is essential to optimize the benefits of hybrid learning in vocational education settings. Future research should continue to examine the long-term effects of hybrid learning on skill acquisition and employability outcomes among vocational high school graduates.

3.2 The Impact of Hybrid Learning on Improving Students' Soft Skills at SMKN 7 Bandung

The use of the hybrid learning model in vocational education is increasingly important, especially in improving students' soft skills, which are essential for success in today's world of work. This section analyzes the effect of hybrid learning on improving students' soft skills at SMK Negeri 7 Bandung using quantitative and qualitative data for a comprehensive examination. A structured survey was conducted to evaluate the impact of hybrid learning on students' soft skills, which was given to students before and after the implementation of the hybrid learning paradigm. The survey consisted of questions that assessed various soft skills, including communication, teamwork, problem-solving, and adaptation.

Table 2. Improvement in Student Soft Skills After Implementation of Hybrid Learning

Soft Skills Category	Before Intervention (Average Score)	After Intervention (Average Score)	Increase (%)
Communication	60,5	78,3	+30%
Teamwork	62,1	80,5	+30%
Problem Solving	58,9	76,6	+30%
Adaptation to Change	61,7	80,2	+30%
Overall Average	60,8	78,9	+30%

Table 2 shows that after the implementation of hybrid learning, there was a significant improvement in students' soft skills, including communication, teamwork, problem solving, and adaptation to change. These results reinforce previous findings that hybrid learning not only improves technical skills but also plays an important role in the development of interpersonal skills that are essential for success in the workplace. These findings show a significant improvement in soft skills, as reported by the students themselves, with an average increase of 30% in all assessed domains. These results are in line with previous studies that emphasize the effectiveness of hybrid learning in developing soft skills that are important for vocational high school [16], [17] The improvement in soft skills is due to the interactive characteristics of hybrid learning,

which encourages collaboration and communication among the students. The use of online discussion forums and collaborative projects encourages student connections, enabling them to improve their communication and cooperation skills in a conducive environment. This is in line with the research which highlights the importance of collaborative learning experiences in developing soft skills

Qualitative data were collected through interviews and focus group discussions with students and educators, which provided in-depth insights into the participants' experiences and perceptions of the influence of hybrid learning on the development of soft skills. The students indicated that the hybrid learning model facilitated their participation in various collaborative activities, including group projects and online conversations, which significantly increased their capacity to function well in a team. Many students reported that this experience increased their confidence in their communication skills and refined their capacity to explain their thoughts clearly [18].

Educators have observed the beneficial effects of hybrid learning on students' interpersonal skills. Students showed proactive improvement in their learning by initiating conversations and collaborating with others. This shift in behavior signaled the development of important soft skills, including leadership and adaptability, which are critical to workplace success (. These findings support the idea that hybrid learning environments facilitate opportunities for students to develop and improve soft skills in real-world contexts, equipping them to face the challenges of future employment [19].

Despite the positive results associated with hybrid learning, many issues were noted during implementation. Some students indicated challenges in adjusting to the online aspect of the hybrid model, especially for those with limited technological proficiency. This underlines the importance of providing adequate training and support to ensure that all students are fully engaged in the hybrid learning experience [20]

In addition, educators face problems aligning online teaching requirements with the need for experience-based training. It is crucial to provide students with many opportunities to utilize their soft skills in practical settings for the effective implementation of hybrid learning in vocational education. Emphasized that incorporating soft skills training into the curriculum is essential for equipping students to meet labor market expectations. The implementation of hybrid learning at SMK Negeri 7 Bandung has had a dramatic impact on improving students' soft skills, as shown by quantitative evaluations and qualitative feedback from students. The interactive and collaborative aspects of hybrid learning create an environment that enhances important soft skills, equipping students for future job success. Nevertheless, overcoming barriers related to technological adaptation and instructional balance is essential to optimize the benefits of hybrid learning in vocational education. Further research should investigate the long-term effects of hybrid learning on the development of soft skills and employability outcomes of vocational high school graduates.

3.3 Student Perceptions of Hybrid Learning and its Effectiveness at SMK Negeri 7 Bandung

A systematic questionnaire was administered to assess students' impressions of hybrid learning among a sample of individuals enrolled in various occupational programs. The poll had Likert scale items that evaluated satisfaction with the model, perceived efficacy in skill acquisition, and overall engagement in the learning process.

Table 3. Students' Perceptions of Hybrid Learning

Evaluation Aspect	Percentage of Students Agreeing (%)
Satisfaction with the hybrid learning model	85%
Perceived efficacy in skill acquisition	82%
Increased involvement in the learning process	87%
Increased motivation to learn	84%
Overall positive experience	85%
Satisfaction with the hybrid learning model	85%

This table shows that most students had a positive perception of hybrid learning, with 85% expressing satisfaction with this model. The main advantages perceived by the students included increased engagement, motivation, and effectiveness in skill acquisition. These results support previous research that highlights that blended learning can increase student happiness and engagement, making it an effective approach in vocational education. Approximately 85% of students reported good opinions about hybrid learning, seeing increased engagement and motivation as the main advantages. These findings are in line with other studies that emphasize the beneficial effects of a blended learning environment on student happiness and engagement [21].

In addition, students indicated that the flexibility provided by hybrid learning allowed them to organize their study schedules more efficiently, which resulted in improved academic performance. Accessing online learning materials and engaging in interactive sessions enhances the personalized learning experience, which many students find beneficial for understanding complex topics. This is in line with the observations of Sudjimat & Permadi, (2019) who stated that a flexible learning environment can increase student motivation and.

Qualitative data were collected through focus group discussions and individual interviews with students, which provided in-depth insights into their experiences with hybrid learning. The students stated that the integration of online and face-to-face learning fostered a dynamic learning environment that accommodated different learning styles. Many students appreciated the opportunity to participate in collaborative projects and debates that fostered a sense of community and enriched their learning experience [22]. One student said, “Online classes allow me to review lectures at my own pace, while face-to-face sessions facilitate questions and interactions with peers and instructors.” This sentiment was echoed by several participants, indicating that the hybrid model adequately met their learning needs and preferences. In addition, students observed that the integration of technology in the classroom, including interactive applications and online resources, increased the engagement and relevance of their vocational training [19].

Despite the largely favorable opinion, students acknowledged certain issues related to the model. Some students reported challenges in adjusting to the online component,

especially for those with limited technology capabilities. This underlines the need for ongoing support and training to ensure that all students are fully engaged in hybrid learning experiences. In addition, some students believe that the balance between online and face-to-face learning can be improved, as they sometimes miss out on practical experiences that are very important in vocational education [23]. Educators emphasized the importance of addressing this issue to take advantage of hybrid learning methods. They highlighted the need for continuous professional development to equip educators with the competencies required to manage hybrid learning environments properly. This is in line with the findings of Kristiawan et al., (2021) who emphasized the importance of teacher competency in implementing effective learning approaches .

Students at SMK Negeri 7 Bandung generally viewed hybrid learning positively, recognizing its effectiveness in increasing engagement, motivation, and skill development. The integration of online and face-to-face learning has created a flexible and dynamic educational environment that accommodates different learning styles. Nevertheless, addressing issues related to technology adoption and maintaining a balanced instructional approach is essential for optimizing the hybrid learning experience. Further research should continue to examine the long-term effects of hybrid learning on student performance and identify methods to improve its effectiveness in vocational education.

4 Discussion

This study shows that hybrid learning significantly improves technical skills, soft skills, and student satisfaction at SMK Negeri 7 Bandung. The results of the analysis showed a 25% increase in technical skills and 30% in soft skills, such as communication and teamwork. In addition, 85% of students were satisfied with this learning model because of the flexibility and accessibility of better online materials. Although effective, this research has limitations, such as the sample's scope being limited to one school and potential bias in the student perception data. Further research needs to involve more schools and use long-term studies to assess the broader impact of hybrid learning. However, these findings provide valuable insights for educators and policymakers to optimize vocational learning strategies in Indonesia.

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