

## Evaluation of Competency Standards for Vocational High School Graduates in the Era of Industrial Revolution 4.0

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### ABSTRACT

In the rapidly evolving landscape of the Fourth Industrial Revolution, it is imperative to assess the readiness and competencies of vocational high school graduates. This evaluation is crucial to ensure that these graduates are equipped with the skills and knowledge necessary to meet the demands of modern industries. The study, which uses a descriptive qualitative method, evaluates Vocational High School graduates' competency standards in the Fourth Industrial Revolution era, particularly at State Vocational High Schools in Godean, Yogyakarta. The data analysis technique employed in this study involves qualitative methods, specifically thematic analysis, to identify and analyze critical themes and patterns related to the competencies and employment experiences of the graduates. Data were collected through interviews and observations of SMK graduates who have been employed or are currently seeking employment. The research findings indicate that the percentage of graduates who successfully obtain jobs related to their field of study or relevant is less than 40%. The main factor causing this is graduates' lack of interest or motivation to seek employment in Yogyakarta. Many graduates prefer to pursue job opportunities in other cities with lower competitiveness. Additionally, there is still a lack of willingness to develop themselves and improve the skills needed in the modern industry. It is crucial for graduates to understand the importance of continuous learning and self-development in the Fourth Industrial Revolution. In conclusion, organizing job fairs is recommended to facilitate graduates' entry into the industrial world by providing opportunities for direct interaction with industry representatives and access to diverse job vacancies. These efforts require close cooperation between local governments, educational institutions, and the industry to emphasize the importance of self-development and skills.

## 1. INTRODUCTION

The Fourth Industrial Revolution marks a significant shift in technological paradigms, creating waves of innovation that affect nearly every aspect of human life (Long et al., 2022). In this era, technology is applied to enhance efficiency in industrial production processes and create new markets with the latest technology (Trachuk & Linder, 2020). The most striking impact of the Fourth Industrial Revolution can be felt in various fields, including education. The field of education has become one of the most affected by these changes (Bestoon Othman,

2021). This sector faces new challenges and opportunities like never before due to the adoption of technology in learning and teaching. The Fourth Industrial Revolution changed how students learn, teachers teach, and educational institutions operate (Popović, 2020), (Gleason, 2018). Technological breakthroughs such as Artificial Intelligence (AI), machine learning, virtual reality (VR), and augmented reality (AR) have fundamentally transformed the educational landscape. Technology in education has opened the door to more personalized, interactive, and individually focused learning (Schmid et al., 2023). With the adoption of online learning platforms and educational applications, students can now access course materials anywhere and anytime according to their needs. Teachers can also leverage technology to design more engaging and interactive learning experiences, enabling them to adapt to diverse learning styles (Das et al., 2023). However, the Fourth Industrial Revolution also poses challenges for the field of education. The lack of technological access in some regions or social groups can exacerbate educational disparities. Furthermore, rapid technological changes also demand that teachers and educational institutions continually update their skills to remain relevant in delivering effective teaching (Grassini, 2023). Thus, the Fourth Industrial Revolution changed how we work and produce and altered our learning and teaching. It is crucial for the education system to continuously adapt to these technological changes to ensure that students receive education that meets the demands of the times (Malik, 2018), (Haleem et al., 2022), preparing them to be part of an increasingly connected and digitally changing society (Mardiana, 2020).

The digital transformation brings profound changes in how we perceive and understand work. In this era, jobs are no longer confined to the physical scope of factories or offices; they are also involved in the growing digital domain. (Charles et al., 2022), (Poláková et al., 2023). Automation and the use of digital technology have altered the way humans work. (Maor, 2018), integrating systems allow machines and connected devices to communicate and operate automatically. Furthermore, the structure of jobs has changed significantly due to the Fourth Industrial Revolution. Many tasks previously performed manually can now be executed by automated systems or intelligent technologies, leading to a decrease in demand for routine jobs and an increase in demand for new skills related to information technology, data analysis, and system management. In this context, the competencies required in the workplace have also substantially changed. (Blanka et al., 2022). The ability to adapt to new technologies, understand and utilize digital tools, and critical thinking and problem-solving skills have become more important than ever. Interpersonal skills and the ability to work in teams have also become valuable assets in facing the digitally connected work environment. (Vuchkovski et al., 2023). Thus, the Fourth Industrial Revolution changed how we work and influenced the essence of work itself. A profound understanding of these changes is crucial for individuals and organizations to keep up with and leverage the opportunities offered by this digital era.

Using opportunities in the digital era has become the main focus of vocational schools in preparing the workforce with skills that meet the needs of the industry and job market. (Yizhen Huang et al., 2022), (Suharno et al., 2014). Unlike general education, which emphasizes theoretical mastery and academic knowledge, vocational education focuses on developing practical skills that can be directly applied in the workplace. (Ismara et al., 2020). Students receive intensive training in engineering, information technology, graphic design, health, tourism, and many more through specially designed curricula according to their chosen majors. Vocational education also provides students with real-world practical experience through industry internships or fieldwork. (Nurwasilatusaniah et al., 2021), (Furtasan et al., 2023). This enables students to apply the skills they have learned in the classroom in actual work situations, allowing them to develop a deeper understanding of the demands and dynamics of the workplace. The learning approach in vocational education also tends to be more practice-oriented, emphasizing practical projects, simulations, and hands-on exercises. (Dahalan et al., 2023). This allows students to learn actively and be directly involved in developing the skills necessary for success in the workplace. Thus, vocational education at the vocational school level prepares the younger generation to enter the workforce with relevant and competent skills. (Setiyawami et al., 2020), (Wagiran et al., 2023). Through a practical and industry-oriented approach, vocational education helps bridge the gap between the education sector and the job market. It significantly contributes to meeting the evolving workforce needs in the era of globalization and technology.

Addressing the evolving workforce needs in the era of globalization and technology has become a significant concern regarding the quality of graduates from Vocational High Schools amidst discussions on education in the Fourth Industrial Revolution era. With the advancement of technology and changes in the workforce, the demands for the quality of graduates are also increasing. One of the main challenges is the gap between the skills possessed by the graduates and the evolving industry needs.

In the Fourth Industrial Revolution era, industries and job markets undergo significant transformations. (Sima et al., 2020). Technological advancements such as Artificial Intelligence (AI), automation, big data, and the Internet of Things (IoT) have fundamentally changed the work landscape. Industries now require workers with traditional technical skills who can quickly adapt to technological changes. (*Technology*, 2015), demonstrate problem-solving abilities (Yahya & Iskandar, 2017), think creatively (van Laar et al., 2020) (Blanka et al., 2022), and collaborate effectively (Li, 2022), (Zirar et al., 2023).

However, many graduates still encounter challenges in meeting the requirements set by the increasingly sophisticated industrial world. Some contributing factors include a lack of access to modern technology in schools. (McDiarmid & Zhao, 2023), curricula that are not fully aligned with industry needs (Mian et al., 2020) and limitations in practical training relevant to

the latest technological developments (Ray, 2023). Additionally, the low motivation and interest of students in learning technical skills also influence the quality of the graduates.

Various efforts involving cooperation between the government, schools, industries, and stakeholders are needed to address this issue. (Mulholland, 2018). There is a need for increased investment in infrastructure and educational resources to ensure better access to modern technology in vocational high schools. Curricula and teaching methods need refinement to align more closely with industry needs. (Chikasha et al., 2020)The quality of practical training and internships in the industry needs improvement.

Furthermore, there needs to be increased awareness and motivation among students about the importance of developing technical skills relevant to the current times. (Puspitarini & Hanif, 2019). Character education should also be emphasized to foster a resilient, adaptive, and innovation-oriented mindset in facing challenges in the era of the Fourth Industrial Revolution. (Heriyanto et al., 2019). With comprehensive and collaborative efforts, it is hoped that the quality of vocational high school graduates can be enhanced to meet the demands of the times, enabling them to compete and contribute effectively in an increasingly complex and dynamic job market.

This research evaluated how the implementation of Graduates Competency Standards in public vocational high schools in Godean Yogyakarta is conducted, the issues encountered, the efforts made by the schools, and the collaboration with the industry. The results of this research are expected to be utilized as input for the development and enhancement of Graduates Competency Standards in public vocational high schools in Godean, Yogyakarta.

## **2. METHODS**

This research adopts a qualitative case study approach, utilizing interview and direct observation methods at the State Vocational High Schools in Godean, Yogyakarta, as the primary focus. The research subjects consist of representatives from the curriculum field, student affairs field, and school alumni. The study took place from February to May 2023. The number of participants in this study is 95 respondents. The interview method was used to gather perspectives and direct experiences from stakeholders. In contrast, direct observation was conducted better to understand the dynamics and situations within the school environment. A qualitative approach was chosen to enable in-depth exploration of complex and contextual phenomena in the educational context. Ethical considerations included obtaining informed consent from all participants, ensuring the confidentiality and anonymity of participants' information, and conducting the research with integrity and respect for all individuals involved. Ethical approval was sought and obtained from the relevant institutional review boards. The results were analyzed using thematic analysis, which involved identifying, analyzing, and reporting patterns (themes) within the data. This method facilitated a detailed

examination of the participants' experiences and perspectives, allowing for a comprehensive understanding of the issues. Coding was employed systematically to categorize and organize the data into meaningful themes and sub-themes. This process involved an iterative review of the interview transcripts and observation notes to ensure that all relevant information was captured and accurately represented. Coding enabled the researchers to draw connections between different data pieces and develop a coherent narrative of the findings. Using case study methods allows researchers to study specific cases in depth, thus providing richer insights and a better understanding of the challenges the State Vocational High Schools face. Thus, this research is expected to make a meaningful contribution to improving the quality of education in these schools and provide relevant recommendations for developing graduate competency standards.

### **3. RESULTS AND DISCUSSION**

Based on the observations conducted at the State Vocational High Schools, the implemented Graduates Competency Standards align with national standards derived from the Merdeka Curriculum and the Indonesian National Qualifications Framework (KKNI). KKNI reflects the quality and identity of the Indonesian nation in terms of the national education system, job training system, and national equivalency assessment system. These systems enable Indonesia to cultivate human resources based on the learning achievements of every Indonesian worker, fostering quality outcomes and contributions in their respective fields of work.

In addition to developing Graduates Competency Standards based on the Indonesian National Qualifications Framework, the State Vocational High Schools also collaborate with partners and the Business/Industry World to formulate these standards. This collaboration aims to ensure that the produced competency standards meet the needs of the business world or industry and can address all challenges in the era of the 4.0 industrial revolution. Furthermore, the State Vocational High Schools conduct Certification Examinations through the Competency Certification Institution for graduating students, aiming to guarantee that the graduates meet the standards expected by the business world or industry.

The implementation of graduate competency standards in facing the challenges of the Fourth Industrial Revolution at State Vocational High Schools (SMK) has been successful, as evidenced by the data obtained in the field. State Vocational High Schools boast adequate facilities and infrastructure, particularly in the fashion sector, which already adhere to National Vocational Competency Standards (NSPK) and industry-standard facilities, enabling them to meet the requirements for best practices and industry standards. Moreover, State Vocational High Schools have forged partnerships with the industry, enabling them to comprehend industry requirements and adjust the curriculum accordingly. Consequently, the

competencies possessed by graduates of State Vocational High Schools can be considered to meet the required standards.

**Table 1.** Distribution of Graduates Working in Related Fields

Category	Percentage
Working in fields related to their majors	Below 40%
Not working in fields related to their majors	Above 60%

However, based on the respondents (table 1), the percentage of graduates working in fields related to their majors or chosen fields of study is still below 40%. This is concerning because although students or graduates are deemed to possess competencies, their alignment with the obtained job fields remains low. Representatives from the student affairs field and alumni stated that this is attributed to limited job vacancies, mainly due to intense competition in industries in the Yogyakarta area, which is favored by many, resulting in stiff competition. Additionally, graduates' low interest in jobs in other cities with lower competitiveness is also a contributing factor, sometimes influenced by internal factors such as family influence. Many parents or guardians restrict their children from working outside the city, ultimately affecting the job choices made by graduates.

The industry-based School Curriculum has implemented the learning process and curriculum structure according to content standards, aiming to achieve the Graduate's Competency Standards (SKL) and the expected graduate profiles. The school supports curriculum implementation with the participation of the Business and Industrial World (DUDI) and conducts various activities to meet SKL standards. Students can express themselves according to their interests and talents through extracurricular activities. Religious activities are also conducted to motivate students and instill noble character.

Students who lack sufficient motivation tend to be less motivated to learn and achieve their full potential. Addressing this obstacle requires a holistic approach involving cooperation between the school, family, and community to enhance student motivation. Additionally, further identification of factors influencing student motivation is needed, along with providing appropriate guidance and support to help them discover and develop more substantial interests and willingness to learn. Thus, it is hoped that students can overcome these obstacles and achieve better academic performance.

**Table 2.** Obstacles to Student Motivation

Obstacle	Percentage
Students not showing strong motivation	33%
Lack of understanding of the importance of education	12%
Lack of support in the environment	40%
Inability to overcome challenges in the learning process	35%

Besides motivational factors (Table 2), another obstacle arises from the maturity level that some students do not fully develop. The maturity referred to encompasses various aspects, such as responsibility, independence, and the ability to manage time and emotions effectively. Students who are still emotionally and socially immature tend to have difficulty developing competencies relevant to their fields of study. They may struggle to overcome challenges and obstacles in the learning process and lack awareness of the importance of studying seriously and consistently.

This immaturity can be reflected in students' behavior, such as a lack of discipline, inability to take responsibility for school tasks, and lack of seriousness in facing exams and evaluations. This, of course, can hinder their progress in deepening competencies relevant to their fields of study. To address this obstacle, an approach that considers aspects of students' personal development is needed, including character building and increasing awareness of the importance of mature attitudes and behaviors in the learning process. Thus, it is hoped that students can overcome these obstacles and enhance their ability to delve deeper into competencies relevant to their respective fields of study.

**Table 3.** Considerations for Job Offers Outside the City

Aspect	Details	Percentage
Main obstacle	Availability of job offers outside the city	25%
Considerations	<ul style="list-style-type: none"> <li>• Distance from parents of family</li> <li>• Economic factors (cost of living in a new location)</li> </ul>	10%
Potential Appeal	<ul style="list-style-type: none"> <li>• Increase income</li> <li>• Achieve career success</li> </ul>	20%
Challenges	<ul style="list-style-type: none"> <li>• Emotional challenges due to physical distance from family</li> <li>• Readiness to live independently</li> <li>• Weighing job opportunities against cost of living</li> </ul>	10%
Barriers to Decision-Making	<ul style="list-style-type: none"> <li>• Planning and decision-making complexities</li> <li>• Dependence on financial support from families</li> </ul>	15%

The next obstacle that may be encountered is the availability of job offers outside the city (Table 3). This is a consideration due to the distance from parents or family and economic factors. Working outside the city may seem appealing for some students to increase income or achieve career success. However, this decision also involves various considerations, especially from social and economic perspectives. The physical distance from parents or family can be emotionally challenging for students, especially if they are not yet ready to live independently or face challenges alone. Additionally, economically, some students may need to weigh the job opportunities available outside the city against the cost of living they would incur in a new location. This could pose a barrier to planning and decision-making for students, mainly if they still depend on financial support from their families. Therefore, job offers outside the city are not only opportunities but also obstacles that need to be carefully considered by students and their families. Before making such significant decisions, They must evaluate

various aspects, including their impact on family relationships, financial circumstances, and overall preparedness.

The final obstacle that graduates aspiring to pursue further studies abroad may encounter is the financial constraints of their parents. For many graduates, the dream of pursuing higher education abroad can be an exciting prospect, but financial limitations often hinder it. The educational process abroad typically entails significant expenses, including tuition fees, living costs, accommodation, and other daily expenses in that country. Financing their child's advanced education abroad can burden parents with limited financial means, leading to considerable financial concerns and stress for the family. Moreover, constrained financial resources can restrict the choice of study programs or universities available to the graduates. Nonetheless, many graduates are determined to surmount this obstacle by seeking scholarships, financial aid programs, or part-time employment to cover their study expenses overseas. They may also explore alternative options such as educational loans or seeking assistance from specific institutions or organizations that provide financial aid to deserving yet financially disadvantaged students. With determination, diligence, and support from various stakeholders, including parents, it is hoped that this financial hurdle will not deter promising graduates from realizing their aspirations of pursuing higher education abroad. The percentage is shown in table 4.

**Table 4.** Obstacles and Considerations for Job Offers Outside the City and Further Studies Abroad

Aspect	Details	Percentage
Main Obstacle	Availability of job offers outside the city	20%
Considerations	<ul style="list-style-type: none"> <li>• Distance from parents or family</li> <li>• Economic factors (cost of living in a new location)</li> </ul>	5% 10%
Potential Appeal	<ul style="list-style-type: none"> <li>• Increase income</li> <li>• Achieve career success</li> </ul>	15% 10%
Challenges	<ul style="list-style-type: none"> <li>• Emotional challenges due to physical distance from family</li> <li>• Readiness to live independently</li> <li>• Weighing job opportunities against cost of living</li> </ul>	5% 5% 10%
Barriers to Decision-Making	<ul style="list-style-type: none"> <li>• Planning and decision-making complexities</li> <li>• Dependence on financial support from families</li> </ul>	5% 5%
Necessary Evaluations	<ul style="list-style-type: none"> <li>• Impact on family relationships</li> <li>• Financial circumstance</li> <li>• Overall preparedness for significant life changes</li> </ul>	5% 10% 5%
Additional Obstacle	Financial constraints for studies abroad	20%

The school has made significant efforts to assist vocational high school graduates in integrating into the industrial world, addressing several critical obstacles highlighted in the study, stated as follows:

**a. Job Fairs as a Key Initiative**



One of the most concrete steps taken by the school is the regular organization of job fairs. These events serve as crucial platforms for graduates, facilitating their entry into the industrial world. By inviting various local and national companies and industries, job fairs allow graduates to interact directly with company representatives. This direct interaction allows graduates to gain insights into job requirements and apply for positions on the spot. Such events are instrumental in bridging the gap between education and employment, helping to alleviate the initial barriers graduates might face when seeking jobs.

**b. Dissemination of Job Vacancies**

In addition to job fairs, the school has implemented a proactive approach to disseminating information about job vacancies. Information is regularly updated and shared through multiple channels, including notice boards, the school's website, and social media platforms. This comprehensive dissemination strategy ensures that graduates can access a wide range of job opportunities, increasing their chances of finding positions that align with their skills and interests. By keeping graduates informed about available job opportunities, the school helps them stay prepared and motivated in their job search.

**c. Addressing Financial Constraints for Further Studies Abroad**

Another critical area of focus is the financial constraints that graduates face when aspiring to pursue further studies abroad. Many graduates view higher education abroad as a pathway to more significant opportunities, but financial limitations often hinder this aspiration. The school recognizes this challenge and encourages graduates to explore various financial aid options such as scholarships, financial aid programs, part-time employment, educational loans, and assistance from institutions or organizations that support financially disadvantaged students. By providing guidance and support in navigating these financial options, the school aims to make higher education abroad a viable goal for more graduates.

**d. Holistic Approach to Enhancing Student Motivation**

The school also addresses the issue of student motivation, which is crucial for academic and career success. Recognizing that lack of motivation can stem from various factors, the school adopts a holistic approach that involves cooperation between the school, family, and community. Efforts include providing appropriate guidance and support to help students develop more vital interests and a willingness to learn. By fostering a supportive environment, the school aims to enhance student motivation, which is essential for overcoming academic challenges and achieving better performance.

**e. Comparison with Previous Research**

The results of this study are consistent with findings from previous research by Abdul Razak et al. (2022), which highlighted the importance of career guidance programs and direct industry engagement in enhancing employment outcomes for vocational school graduates. Abdul Razak et al. noted that regular interaction with industry professionals and access to up-

to-date job information significantly improved graduates' readiness and confidence when entering the job market. Similarly, our findings underscore the effectiveness of job fairs and proactive information dissemination in reducing unemployment rates among graduates. Both studies emphasize the need for ongoing support and collaboration between educational institutions, industries, and the community to successfully navigate the Fourth Industrial Revolution's challenges.

#### 4. CONCLUSION

It can be concluded that the State Vocational High School in Godean Yogyakarta has implemented Graduates Competency Standards by national standards and the Indonesian National Qualifications Framework (KKNl). In addition, the State Vocational High School has also made efforts to ensure that the Graduate's Competency Standards produced align with the needs of the business/industry world and implemented Certification Examinations by the Competency Certification Institution for graduating students. However, the percentage of graduates working in fields related to their majors is less than 40% due to external factors such as limited job vacancies and intense competition in the Yogyakarta area, as well as internal factors such as graduates' low interest in seeking jobs in other cities with lower competitiveness and many parents/guardians restricting their children from working outside the city.

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