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Evaluation of vocational education management in the era of the fourth industrial revolution and society 5.0 at SMKN 2 Pengasih

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ABSTRACT

The era of Industrial Revolution 4.0 and Society 5.0 has brought significant changes to various aspects of life, including the world of vocational education. Vocational education is increasingly crucial in this era, as the business and industrial sectors (DUDI) have a growing need for a skilled workforce equipped with skills relevant to industry demands. This study aims to investigate the extent to which vocational education is managed in the era of Industrial Revolution 4.0 and Society 5.0, particularly at SMK N 2 Pengasih. The research was conducted using qualitative methods, employing interviews as the primary data collection technique. The results of the research indicate that vocational education management at SMKN 2 Pengasih in the era of Industrial Revolution 4.0 and Society 5.0 has been fairly effective. However, there is still room for improvement, as several obstacles to its implementation persist.

Keywords: Industrial Revolution 4.0, Society 5.0, Vocational Education

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INTRODUCTION

The Fourth Industrial Revolution is a period characterized by rapid technological advancements in various aspects of life, including education. According to (Nastiti et al., 2022), the changes in the way we learn during this era are marked by the use of the internet, computers, and other devices such as LCD projections, software, and more (Budiharto et al., 2019). The impact of technological developments extends to changing demands and needs. These changes require us to acquire skills that align with these needs (Ismaya et al., 2021) meaning that skills must continually evolve with technological advancements (Doringin et al., 2020).

Nowadays, the way of life is increasingly oriented towards the era of Society 5.0, which is not only limited to the factor of technological usage but must also serve as a solution to solving social problems, aided by the integration of physical and virtual spaces (Skobelev et al., 2021). The concept of Society 5.0 is characterized by the presence of big data technology collected by the Internet of Things (IoT) (Hayashi et al., 2017) which is then transformed by Artificial Intelligence

(AI) (Özdemir & Hekim, 2018) to become something beneficial for improving the lives of the community (Rokhmah & Saputra, 2019). To establish such an integrated system, a strong foundation is needed, especially in the quality of human resources (Harun, 2020). This poses a challenge for the education sector to produce graduates with excellent human resources.

Significant changes in various aspects of life are the result of the Fourth Industrial Revolution and Society 5.0 era, including in the field of vocational education. Vocational education becomes increasingly important in this era because the industrial world requires skilled workers with relevant skills to meet industry needs (Utomo, 2021). In the rapidly evolving technological landscape, automation emerges as one of the potentials affecting various aspects of human life. This will alter the way humans engage in activities in terms of scale, scope, complexity, and the transformation from previous lifestyles (Yahya, 2018). Therefore, we are now challenged not only to be competent in a specific field but also to possess capabilities within that field. Capabilities refer to the flexibility and ability of an individual to adapt to developments in the future (Winangun, 2017).

(Wardina et al., 2019) disparities exist across various aspects, ranging from curriculum, infrastructure, educator quality, to the availability of technology in the learning process, and the cultivation of character to equip graduates with soft skills as expected by the industry (Fajar & Hartanto, 2019). Consequently, there is a mismatch between graduates and the needs of the industrial world (Irwanto, 2020) which serves as an indicator of a country's and sector's unpreparedness when entering the era of the Fourth Industrial Revolution and Society 5.0 (Rahmawati et al., 2021). (Misbah et al., 2020) state that graduate competencies are related to the labor market, focusing on comprehensive competence-based education (CCBE) that emphasizes what students should be able to do after completing their studies, framing these competencies as prerequisites for future professions. Therefore, collaboration between educational institutions and the business world is crucial (Palupi, 2015). In response to these issues, the evaluation of vocational education management becomes crucial to ensure that graduates from vocational education meet industry needs and provide meaningful benefits to society.

The evaluation of vocational education management should encompass various aspects outlined in the 8 National Education Standards katana(Raharjo, 2012) which are oriented towards the relevance of the Industrial Work Practices Program (DUDI). For example, education should be science-oriented, involve digital learning applications, adopt a student-centered approach, implement work-based learning types related to data literacy, technology literacy, and human literacy as sources of professional labor (Verawadina et al., 2019). Digitization in the industry for vocational education programs poses challenges in preparing students to become competent users of digital media (Kuper, 2020). New skills such as coding, big data, artificial intelligence, and others are expected to be possessed by students to develop products such as applications, artificial

intelligence, industrial product design, learning products, machinery, commodities, and more. These skills are requirements that the vocational education curriculum must fulfill to adapt to changing conditions, such as technological advancements and the needs of the job market. Therefore, curriculum development must align with the era of the Fourth Industrial Revolution and Society 5.0 to be more relevant (Verawadina et al., 2019).

METHOD

This research employs a qualitative research approach that provides detailed and in-depth explanations regarding the studied events. As cited from (Anggito et al., 2018) qualitative research is a data collection process in a natural setting aimed at interpreting occurring phenomena where the researcher acts as the key instrument. This study falls under the category of descriptive qualitative research. A naturalistic qualitative approach is utilized in this research. The goal of the naturalistic approach is to understand, describe, and gain in-depth insights into the evaluation of vocational education management in the era of the Fourth Industrial Revolution and Society 5.0, obtained through interviews conducted in the field. This research is conducted in collaboration with SMK Negeri 2 Pengasih and follows the field research category, with field notes serving as a source of data. The researcher selected a research location at Vocational High School 2 Pengasih, located on KRT Kertodiningrat Street, Margosari, Pengasih, Kulon Progo, Special Region of Yogyakarta 55652. The subject used in this study is the principal of SMKN 2 Pengasih. The data source in this study is obtained directly through original data sources, namely interviews. The informant chosen by the researcher is the principal of SMK Negeri 2 Pengasih.

The data collection technique in this study involves using the interview method. The interviews are conducted orally and face-to-face between the interviewer and the interviewee. In a study conducted by (Guidance & Counseling, 2016:154), it is explained that data obtained through interviews result from a question-and-answer exchange between the interviewer and the interviewee, utilizing auxiliary instruments such as recording devices to facilitate the researcher in obtaining information. Subsequently, all the conducted data is accurately documented. The interview activity is carried out with the principal of SMKN 2 Pengasih to gather the necessary data for this qualitative research. The purpose of these interviews is to obtain specific information about the management of vocational education in the era of the Fourth Industrial Revolution and Society 5.0.

RESULTS AND DISCUSSION

SMK Negeri 2 Pengasih is one of the Center of Excellence Vocational Schools (SMK Pusat Keunggulan) in the Special Region of Yogyakarta (DIY). As explained by the Minister of Education and Culture (Mendikbud) in (Lince, 2022) SMK Pusat Keunggulan is a program aimed

at producing graduates who can be optimally absorbed into the workforce or become entrepreneurs through a harmonious and comprehensive alignment of vocational education with the working world. Schools classified as SMK Pusat Keunggulan are expected to serve as references and initiate movements that encourage the improvement of the quality and performance of vocational schools in their vicinity. The enhancement of the quality and performance of vocational schools is inseparable from aspects of the National Education Standards (SNP), which include: Standard 1si, Process Standard, Graduation Competency Standard, Educator Standard, Facility and Infrastructure Standard, Education Management Standard, Financing Education Standard, and Education Assessment Standard.

The existence of the 8 National Education Standards applied in schools is interrelated, meaning that in efforts to enhance the quality and performance of a school, all the existing education standards must be maximized. Particularly in the era of the Fourth Industrial Revolution (Industry 4.0) and Society 5.0, there is an increasing demand for schools, especially vocational schools (SMK), to produce competent graduates with the capabilities to be maximally absorbed by the business and industrial world (DUDI). The implementation of the 8 National Standards (SNP) at SMKN 2 Pengasih can be elaborated as follows.

Content Standard

The implementation planning of the content standard for vocational education at SMKN 2 Pengasih is organized based on the existing programs and fields of expertise. The vocational programs available at this vocational school include: Mechanical Engineering, Automotive Engineering, Furniture Engineering, Construction and Property Engineering, Computer and Informatics Engineering, Electronic Engineering, Electrical Engineering, and Fine Arts. The provision of infrastructure supporting the learning process is adjusted according to the existing content standards. This is aimed at ensuring that infrastructure procurement is relevant to the expertise programs and the taught materials. The learning process at SMKN 2 Pengasih still follows the 2013 curriculum for 12th-grade students in the 2022 cohort, while 10th and 11th graders use the Merdeka curriculum.

Process Standard

In general, the implementation of the education process standard at SMKN 2 Pengasih has adhered to the vocational education content standard mentioned earlier. The impact of the pandemic and the advancements in technology in the era of the Fourth Industrial Revolution (Industry 4.0) and Society 5.0 has led to the emergence of new habits in education. This includes the implementation of online learning processes through available digital platforms. Additionally, a significant portion of the learning process is conducted offline through practical work or direct field activities.

Learning activities are conducted to support students' expertise in their respective fields. However, if these activities cannot be provided by the school, industrial practice is implemented. To support such activities, SMKN 2 Pengasih establishes Memorandums of Understanding (MOUs) with the industry. This serves as evidence that industrial practices are not merely requirements to complete studies but have specific targets that need to be achieved for the collaborating companies. Students can undergo internships or fieldwork practices in various locations to refine their competencies.

Challenges commonly encountered in the implementation of the learning process include students frequently being tardy, a lack of practical equipment entities leading to less effective practical work, and others. These challenges are interconnected among different educational standards, making the learning process at SMKN 2 Pengasih less than optimal.

Graduated Competency Standard

The graduated competency standard at SMKN 2 Pengasih is based on the formation of graduates with strong religious values, piety, and noble character. The cultivation of such character is supported by various activities, including religious observances, fostering femininity, and instilling good character within the school environment on a daily basis. In addition to the spiritual character formation, graduates of SMKN 2 Pengasih are also directed to become graduates with digital literacy. The implementation of learning with the concept of High Order Thinking Skills (HOTS) is believed to stimulate students to unleash creativity, allowing them to continuously innovate in this digitally driven era.

The competencies of SMKN 2 Pengasih graduates have also been classified according to the plans of each student. To achieve this, SMKN 2 Pengasih conducts mapping of students classified into three categories: those who intend to directly enter the industrial world, become entrepreneurs, or pursue higher education after graduation. This classification is not intended to determine classes, but rather to obtain data for guiding students based on their individual goals.

In the era of the Fourth Industrial Revolution (Industry 4.0) and Society 5.0, the competencies of graduates are demanded to align with the needs of the industry. In response to this, SMKN 2 Pengasih consistently strives to keep up with workplace trends or even stay ahead of what exists in the job market. Therefore, field observation activities and the enhancement of relationships with the industry are crucial. Numerous programs have been implemented at SMKN 2 Pengasih to enhance graduates' competencies according to the needs of the industrial world. These programs include industrial imitation programs, where activities in relevant industries are mimicked and then applied in the learning process. Additionally, there is a teaching factory program, demanding students to directly serve customers through a workshop under the auspices of SMKN 2 Pengasih. Certainly, these programs contribute to making the competencies of students at SMKN 2 Pengasih more relevant to the needs of the industrial world.

Educator Standard

The educator standard in the evaluation of vocational education management in the era of the Fourth Industrial Revolution (Industry 4.0) and Society 5.0 encompasses several crucial aspects, one of which is related to digital skills. In the era of Industry 4.0 and Society 5.0, digital skills become highly important. Therefore, the educator standard should consider and evaluate the extent to which vocational education institutions can equip learners with the necessary digital skills for the workforce.

In this regard, educators at SMKN 2 Pengasih have been and continue to strive for a digitally competent human resource. The improvement in achieving successful learning starts with teachers as the key component. This component is crucially important to enhance its competence so that it can access or use advanced facilities and infrastructure. SMKN 2 Pengasih endeavors to ensure that this component can provide education based on Information and Technology (IT). Therefore, for teachers who are not yet proficient in IT, the school provides activities that encourage the improvement of IT mastery through training on the use of effective learning media in the era of Industry 4.0 and Society 5.0.

Empowerment is also carried out through young teachers who can more easily learn the latest technology in this digital era. Because it is not an easy task for teachers who can be considered to be older to acquire proficient IT skills. Therefore, empowerment of these young teachers is undertaken to assist in conveying technology to older teachers who may face difficulties in mastering the use of technology. Essentially, educator standards should also consider and evaluate the extent to which the evaluation and quality assurance system applied by vocational education institutions. This ensures the quality of graduates and meets the needs of the industry. The evaluation and quality assurance system should be designed to measure students' achievements in attaining the competencies required in the workforce.

In addition to digital skills, social skills also become crucial in the era of the Fourth Industrial Revolution (Industry 4.0) and Society 5.0. This is because advancing technology allows humans to connect globally and collaborate virtually. Therefore, educator standards should consider and evaluate the extent to which vocational education institutions can equip learners with the social skills needed in an increasingly globally connected workforce.

Facilities and Infrastructure Standard

The facilities and infrastructure standard serves as a benchmark to support the enhancement of education quality through the improvement of existing facilities and infrastructure in schools. In the era of the Fourth Industrial Revolution (Industry 4.0) and Society 5.0, technology is advancing rapidly. Consequently, the facilities and infrastructure used in industries are expected to progress in line with these developments. Therefore, the facilities and infrastructure within educational

units are expected to continuously evolve to keep pace with the advancements in industrial facilities and infrastructure.

In response to the Fourth Industrial Revolution (Industry 4.0) and Society 5.0, SMKN 2 Pengasih is undertaking the development of facilities and infrastructure aligned with the demands of the workforce and industry. This is implemented through upgrading the existing facilities and infrastructure or acquiring new ones. The aim is to enable students to adapt their learning experiences in school to those in the field. The procurement of facilities and infrastructure at SMKN 2 Pengasih is planned for several years ahead, ensuring that the school remains up-to-date and, if possible, advances with developments in the industrial world.

With the existence of standards for facilities and infrastructure, the teaching and learning activities within the school environment can proceed smoothly, effectively, and efficiently. Therefore, SMKN 2 Pengasih maximizes the utilization of facilities and infrastructure through the establishment of a Teaching Factory that involves the industry. Students can engage in external work within the school, making optimal use of the facilities and infrastructure available.

Education Management Standard

The education management standard is one of the educational standards that encompasses provisions related to the planning, implementation, and supervision of educational activities from the level of individual educational units to the national level. This aims to achieve efficiency and effectiveness in the provision of education. In the era of Industry 4.0 and Society 5.0, which are digitally based, education management can be conducted digitally for easy accessibility.

In the education management standard based on the Fourth Industrial Revolution and Society 5.0 at SMKN 2 Pengasih, a digital-based school is implemented, where all information and data are digitally based, facilitating easy access for everyone. Education management is carried out by sharing various issues and inputs with other schools. This approach is considered the easiest way to collaborate and progress together, emphasizing collaboration over competition to be the best school. The focus is on how schools collectively manage education to make it better. Recognizing that each school has its strengths and weaknesses, the schools share experiences. The existence of collaboration forums among schools, held at the local or national level, serves as a platform for mutual assistance in addressing educational issues and finding solutions together.

Education Financing Standard

The Education Financing Standard (EFS) serves as a guideline for managing financial resources in the field of education. The evaluation of vocational education management in the era of Industry 4.0 and Society 5.0 can be conducted by considering various factors. In managing vocational education in this era, the EFS can be used as a guide to ensure effective and efficient financial resource management. In this context, the EFS must be adapted to the needs and developments in technology-based vocational education.

In SMKN 2 Pengasih, the applied financing standard is based on the existing needs, commonly referred to as the financing standard for each student. The financing standard for each student is calculated and then used as a reference for the school. The established standard per student is around Rp7,000,000.00/student per year.

This financing standard addresses the non-personal needs of students, focusing solely on school-related requirements. The financing standard includes considerations for students when they need practical materials, providing students with the opportunity to use equipment, and so forth. In essence, this standard also refers to the 8 existing education standards, allowing the school to detail the needs of students each year, as outlined in the School-Based Management Plan (RAPBS) related to the financing standards covered.

Several challenges have emerged in the financing management of SMKN 2 Pengasih. Some examples of these challenges include:

Incomplete Government Funding: The government has not been able to fully finance education, resulting in insufficient financial support from the government for various essential educational needs.

Diverse Socioeconomic Backgrounds of Students: Not all students come from middle to upper-class families, leading to the need for additional assistance or sharing of resources.

To address these challenges, the proposed solution involves seeking contributions from various sources, including parents, alumni, industries, and central government ministries. The expected assistance from the central government includes funding from the Special Allocation Fund (DAK), the School Operational Assistance Fund (BOS), and other forms of support.

Educational Assessment Standards

Based on Government Regulation No. 19 of 2005, Article 63, regarding Educational Assessment Standards, the assessment of education at the elementary and secondary education levels consists of: Assessment of Learning Outcomes by Educators: This involves the evaluation of students' learning outcomes conducted by the educators or teachers. Assessment of Learning Outcomes by Educational Institutions: The educational institutions, or schools, conduct assessments of students' learning outcomes. Assessment of Learning Outcomes by the Government: The government itself also performs assessments of students' learning outcomes.

For the higher education level, the assessment of education includes: Assessment of Learning Outcomes by Educators: This pertains to the evaluation of students' learning outcomes conducted by educators or professors. Assessment of Learning Outcomes by Higher Education Institutions: The higher education institutions themselves carry out assessments of students' learning outcomes.

At SMKN 2 Pengasih, the assessment is closely tied to the learning objectives, making the objectives, processes, and evaluation inseparable. What becomes the goal, what becomes the

learning process, and what is evaluated are interconnected. The assessment standards adhere to the Indonesian National Competency Standards (SKKNI), especially in vocational education assessed by LSPP 1. These standards are evaluated annually to meet the demands of the workforce, particularly in the Competency Test Materials (MUK).

The student assessment process at SMKN 2 Pengasih motivates teachers to focus on assessment and the creation of Higher-Order Thinking Skills (HOTS) questions. Teachers are encouraged to undergo competency development themselves, including learning from the working world through internships and workshops. The enhancement of teacher competencies is crucial, ensuring that teachers are more competent than their students. In the learning process, grades may not yet fully represent competence, but they serve as an expression of the students' competencies in line with SKKNI.

In the grade processing, several additional applications are utilized. When teachers input grades, information appears indicating which category the student falls into and whether they meet the Minimum Competency Criteria (KKM). If the criteria are not met, there is a remediation process, and within LSPP, there is a chance for remediation or retesting. If, after retesting, the student still does not meet the criteria, a review of the material they haven't mastered is conducted, followed by a retest. Thus, examinations become an integral part of SMKN 2 Pengasih in maintaining the competence of its students.

CONCLUSION

Based on the research conducted on the management of vocational education in the era of the 4.0 industrial revolution and society 5.0 at SMKN 2 Pengasih, the following conclusions can be drawn:

Integration with National Education Standards (SNP): The management of vocational education at SMKN 2 Pengasih has integrated the needs and challenges of the 4.0 industrial revolution and society 5.0, including the 8 aspects of the National Education Standards (SNP). This involves adjusting the curriculum to the evolving needs of the industry and technology.

Adapted Learning: SMKN 2 Pengasih has tailored its teaching approach to the characteristics of Generation Z and Alpha, who tend to be more active and visual learners. The curriculum has also been adjusted to meet technological needs and labor market requirements.

Professional Development of Educators: Continuous development of educators in skills and knowledge is ongoing to ensure they are well-equipped to teach and prepare students for the workforce.

Challenges and Obstacles: Despite positive steps, the management of education at SMKN 2 Pengasih still faces certain obstacles that can have an impact and lead to other challenges. These

obstacles, influenced by students, the environment, teachers, and administrative factors, are viewed as constructive challenges.

Continuous Evaluation: Continuous and sustainable evaluation of vocational education is necessary to ensure a significant contribution to the workforce and society. Regular updates and adjustments are essential to keep vocational education relevant in this ever-evolving era.

In conclusion, the management of vocational education at SMKN 2 Pengasih has taken positive strides. However, continuous efforts and ongoing adaptation are necessary to remain relevant and effective in the era of the 4.0 industrial revolution and society 5.0.

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