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INDUSTRY-BASED ECONOMIC EDUCATION CURRICULUM 4.0 IN VOCATIONAL HIGH SCHOOLS

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ABSTRACT

Industry 4.0-based economic education in Vocational High Schools (SMK) aims to produce graduates who have skills that are in accordance with the demands of the job market. This journal article discusses the curriculum for Industry 4.0-based economic education in SMK, theoretical studies of Industry 4.0 and its influence on economic education, as well as the stages of curriculum implementation, obstacles in implementation, and solutions to overcome them. This article uses a descriptive method of analysis by collecting data from various sources and conducting qualitative analysis of the data. The results showed that the Industry 4.0-based economic education curriculum can provide excellence in preparing SMK students to become a workforce that is ready to face the challenges of Industry 4.0. However, there are obstacles in curriculum implementation, such as limited resources and lack of teacher knowledge in using technology. Solutions to overcome these obstacles include increasing resources, providing training to teachers, and optimizing the use of technology in learning. Therefore, the development of an Industry 4.0-based economic education curriculum in SMK needs to continue to be carried out by taking into account the challenges and needs of the job market.

Introduction

Economic education is one of the subjects that is considered important in preparing the younger generation as future leaders. However, with the development of Industry 4.0, the economic education curriculum is considered to need to be updated to suit the increasingly complex needs of the industry (Fitriyah & Ramadani, 2021).

Industry 4.0 has a major impact on changes in the industrial world, including in terms of the demand for a reliable workforce that can face the challenges of the digital era. Therefore, the economic education curriculum needs to be adapted to Industry 4.0 to create graduates who are ready to face the increasingly changing world of work (Prastowo, 2021).

Vocational High School (SMK) is an education level that prepares students to be ready to work in certain fields, including economics. Therefore, the curriculum of economic education in SMK needs to be updated to match the current demands of the industry (Ulya & Tohari, 2022).

Changes that occur in the industrial world, especially in the era of Industry 4.0, require changes in education. The economic education curriculum based on Industry 4.0 is expected to prepare graduates who are ready to compete in the digital era (Sabaruddin, 2022).

The economic education curriculum in SMK is currently still considered less relevant to industrial needs. This can be seen from the low number of public participation in the industrial world, which shows a mismatch between the educational curriculum and industry demands (Wardina, Jalinus, & Asnur, 2019).

In the era of Industry 4.0, the ability to master technology and utilize it becomes very important. Therefore, the economic education curriculum needs to include an introduction to technology and its use in the industrial world (Kurniawan, Noviyanti, & Arsil, 2019).

The curriculum of economic education in SMK needs to be directed so that students have skills that can be applied in industry. The Industry 4.0-based curriculum is expected to produce graduates who are ready to work in the increasingly complex field of economics (Nurjannah, 2022).

Changes in the industrial world require changes to the educational curriculum to prepare graduates who are ready to face the demands of the digital era. The economic education curriculum based on Industry 4.0 is expected to create graduates who have skills that meet industry needs.

One of the challenges in developing an Industry 4.0-based economic education curriculum in SMK is the limitation of human resources and technology. There needs to be a collaborative effort between the government, industry, and educational institutions so that the curriculum can be implemented effectively (Wibowo, 2019).

The curriculum for Industry 4.0-based economic education at SMK needs to include material on digital marketing, e-commerce, and data analytics which are trends in the industrial world today. This can help students to better understand and be ready to face the demands of the digital era (Akour & Alenezi, 2022).

The development of an Industry 4.0-based economic education curriculum in SMK needs to pay attention to sustainability aspects and consider the impact of industrial activities on the environment and society. This is to the vision and mission of sustainable development carried out by the government.

The curriculum for Industry 4.0-based economic education in SMK needs to include the development of soft skills, such as communication skills, teamwork, and leadership. This is important in preparing graduates who can adapt to change and compete in an increasingly complex world of work.

Industry 4.0 is a new industrial revolution concept, which focuses on digitalization and integration of information and communication technology in production and manufacturing. In Industry 4.0, production systems are developed by utilizing cyber-physical systems (CPS), big data, and artificial intelligence (AI) technology to create efficient, flexible, and customized production according to market needs. This allows for real-time and continuous connectivity between humans, machines, and production systems (Priyandana, Dibia, & Ujianti, 2021).

According to (Ilyas, Pilo, & Mahmud, 2022), Industry 4.0 is an industrial revolution based on information technology, where all production systems and processes are interconnected and can be accessed online. Meanwhile, Weder, et al. (2018) stated that

Industry 4.0 includes the integration of information technology and operational technology in the production process, which aims to create a production system that is flexible, efficient, and can adapt quickly to market changes (Karageorgou, 2022).

The influence of Industry 4.0 on Economic Education is very significant, considering that Industry 4.0 has a broad impact on the economic and industrial sectors. Economic Education needs to adapt to changes that occur in the Industrial 4.0 era to produce graduates who are competent and ready to face challenges in the digital era. According to Seifert, et al. (2018), the influence of Industry 4.0 on Economic Education can be seen from several aspects, namely:

1. Learning paradigm shift

   Industry 4.0 requires graduates who have high adaptability and innovation. Therefore, the learning approach to Economic Education needs to prioritize active, collaborative, and creative learning.

2. Technology integration in learning

   Economic Education needs to utilize information and communication technology in the learning process, such as the use of digital learning media and business simulations.

3. Curriculum development

   The Economic Education curriculum needs to be developed by considering aspects related to Industry 4.0, such as digital literacy, communication skills development, and understanding of data management.

4. Cooperation between Vocational High Schools and industry

   Vocational High Schools need to collaborate with industry to strengthen the Economic Education program based on Industry 4.0. This can be done through the development of internship programs, industrial visits, and research collaborations.

Research Methods

Research methodology with literature review with steps: (1) Initial Information Collection, namely by identifying and formulating research questions and research objectives to be achieved. (2) Literature Search, namely searching scientific literature in various databases such as academic journals, articles, books, and reports related to Industry 4.0-based curriculum and economic education. (3) Literature selection, namely reviewing abstracts and literature content to evaluate the relevance and quality of information, as well as selecting literature that supports the conceptual framework of research and helps answer research questions. (4) Literature Analysis, which groups literature into categories based on emerging themes, such as teaching strategies, digital competencies, and curriculum changes, and analyzes differences and similarities in approaches taken in literature. (5) Synthesis and Writing, namely summarizing findings from relevant literature to support the development of an Industry 4.0-based economic curriculum. and write a literature review section covering important concepts, successful teaching strategies, challenges faced, and implementation impacts. (6) Conclusions and Implications, i.e. inferring findings from the review literature and linking them back to the research question.

Results and Discussion

The results showed that the Industry-Based Economic Education Curriculum 4.0 can improve the quality of economic education in Vocational High Schools. The materials taught in the curriculum include an introduction to the basic concepts of Industry 4.0, the application of technology in economics, the development of digital skills, and the strengthening of soft skills.

The learning methods used in the Industry 4.0-Based Economic Education Curriculum include active, collaborative, and project-based learning. In this learning method, students are allowed to be directly involved in the learning process and develop the skills needed in the era of Industry 4.0.

Assessment in the Industry 4.0-Based Economic Education Curriculum uses various methods, such as written examinations, presentations, projects, and attitude assessments. These diverse assessment methods aim to measure not only students' knowledge but also the abilities, skills, and attitudes needed in the Industry 4.0 era.

Although there has been an improvement in the ability of students, there are still several obstacles in the implementation of the Industry 4.0-Based Economic Education curriculum that need to be overcome, such as lack of support from schools, lack of teaching staff who have competence in technology, and lack of access to adequate technology. Therefore, it is necessary to evaluate and improve continuously to ensure that the curriculum can provide maximum benefits for students and can prepare them well to face the challenges in the Industry 4.0 era.

Overall, the Industry 4.0-based Economic Education Curriculum has great potential to improve the quality of economic education in Vocational High Schools and prepare students well to face the challenges of the Industry 4.0 era.

The discussion of results of this study will discuss the findings obtained from research on the curriculum of Industry 4.0-based economic education in Vocational High Schools. The following is a discussion of the research results:

1. The Relevance of the Industry-Based Economic Education Curriculum 4.0

Research findings show that the Industry 4.0-based economic education curriculum has high relevance to the demands of today's job market. This can be seen from the new materials taught in the curriculum, such as big data, the Internet of Things, and augmented reality. In addition, the learning methods used are also more innovative and adjust to the characteristics of the current digital generation.

2. Improvement of students' skills

Research shows that the Industry 4.0-based economic education curriculum can improve students' skills in various aspects. Students are trained to be able to think critically, collaboratively, and creatively in solving problems. In addition, they are also trained to be able to access, process, and analyze information effectively.

3. Constraints in curriculum implementation

The research also identified several obstacles faced in the implementation of the Industry 4.0-based economic education curriculum in SMK. These obstacles include a

lack of adequate infrastructure and hardware, a shortage of educators trained in the use of technology, and a lack of support from school principals and the government.

4. Solutions to overcome obstacles

To overcome these obstacles, the study suggested several solutions, including improving adequate infrastructure and hardware, providing training and debriefing to educators on the use of technology, and providing support from school principals and the government in implementing the curriculum.

Overall, the findings of this study show that the Industry 4.0-based economic education curriculum has high relevance and can provide significant benefits in improving students' skills. However, its implementation is still faced with several obstacles that need to be overcome so that the curriculum can be run optimally and effectively.

In this study, the results obtained show that the Industry 4.0-Based Economic Education Curriculum has a significant influence on improving students' skills and knowledge. These results support the hypothesis proposed that the implementation of the Industry 4.0-Based Economic Education Curriculum will have a positive impact on students' ability to understand modern economic concepts.

Through this curriculum, students are introduced to the latest technologies and economic concepts that characterize Industry 4.0. Thus, students will become accustomed to using modern technology and develop the necessary skills in an increasingly connected and digital future work environment.

Improving students' skills and knowledge in the Industry 4.0-Based Economic Education Curriculum can be achieved through active, collaborative, and technology-promoting learning methods. In this curriculum, students are also allowed to learn from experiences in the field through internships or practical work in industry.

In the context of the proposed hypothesis, the results show that the Industry 4.0-Based Economic Education Curriculum can help students develop the skills and knowledge needed in the future work environment. Therefore, implementing this curriculum should be supported and expanded in all vocational secondary schools to produce a workforce ready and able to face the challenges of Industry 4.0.

Conclusion

The summary of the results shows that the Industry 4.0-Based Economic Education Curriculum in Vocational High Schools has the potential to improve the quality of education and prepare students to enter the increasingly complex world of work. The learning methods used, such as project-based learning and the use of digital technology, provide a learning experience that is more integrated and relevant to today's industrial world. However, there are several obstacles to implementing this curriculum, such as a lack of support from the school and difficulties in obtaining adequate technological resources.

However, the results of this study show that the hypothesis proposed previously cannot be fully confirmed, because other factors affect the success of the implementation

of this curriculum besides only the influence of Industry 4.0. Therefore, further research is needed to explore these factors and develop more appropriate strategies for implementing the Industry 4.0-Based Economic Education Curriculum in Vocational High Schools.

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