

# Education Program 4.0 In The Making Indonesia 4.0 Roadmap And Its Implementation At Muhammadiyah Junior High School Of Ajibarang Indonesia

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## **Abstract.**

*The As a result of the implementation of the Fourth Industrial Revolution, the world of education is being impacted by the application of technology across all aspects of learning in schools. One of the government's efforts to bring Indonesian life into line with the pace of technological advancement is the initiative Making Indonesia 4.0 (4.0 Indonesia). Education 4.0 in Indonesia is one of the initiatives aimed at transforming Indonesia into a 4.0 society. Education 4.0 in Indonesia is a program that was developed to improve the quality of education by incorporating technology into its activities, particularly in the classroom. We hope to learn about the 4.0 education program in Indonesia and the challenges it faces. We also hope to learn about how 4.0 education can be implemented in schools, specifically at Muhammadiyah Junior High School of Ajibarang, through this training. The participants in this training activity are all teachers from junior high schools in Banyumas Regency who are participating in this training activity. The participants in this training were 36 teachers from Muhammadiyah Junior High School of Ajibarang, who served as a model. Specifically, there are four stages to this training method: the presentation stage, peer teacher stage, class observation stage, and final performance evaluation stage. The culmination of this training is the completion of education 4.0 at Muhammadiyah Junior High School of Ajibarang, which consists of three main steps, namely the development of an e-learning platform, the holding of an innovation workshop, and the participation of school and industry. According to the organizers, this activity will serve as an alternative to solving problems related to the implementation of education 4.0 at Muhammadiyah Junior High School of Ajibarang in an effort to develop a roadmap for Indonesia's transition to the Fourth Industrial Revolution*

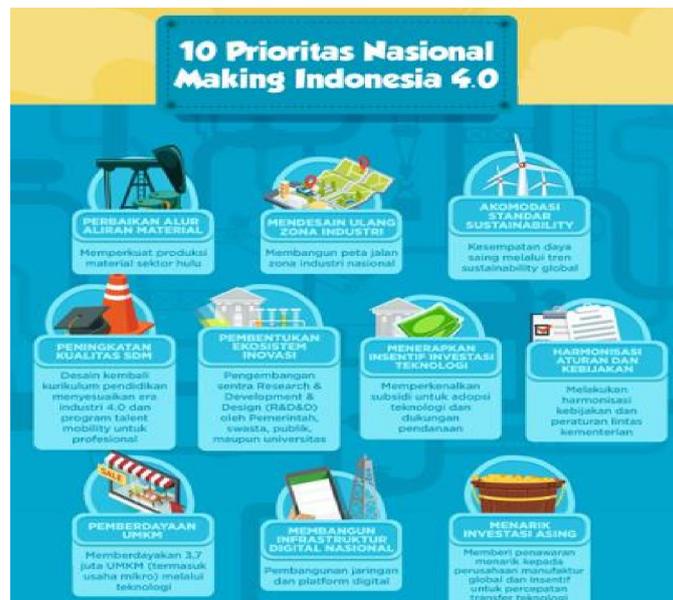
**Keywords:** Education 4.0, e-learning platform, Indonesia 4.0 roadmap, innovation workshop, school-industry engagement

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## **I. INTRODUCTION**

Since 2016, the World Economic Forum (WEF) has promoted the concept of the Fourth Industrial Revolution (R.I. 4.0) [1]. The implementation of R.I. 4.0 has had a significant impact on the world's ability to apply technology from all elements of one's existence [2]. Among these is the application of technology in the field of education. Who in Indonesian education, on the other hand, has been successful in implementing R.I. this 4.0? Fortunately, the Indonesian government has developed a program called the "Making Indonesia 4.0" masterpiece blueprint, which began in 2018 and is intended to provide an answer to this topic. This was done in order to catch up with other countries, like as Malaysia and Singapore, in terms of technology. Indonesia's program, which consists of ten programs, one of which is the enhancement of Human Resources (HR), was launched in January [3].

Sukartono [4] asserts that human resources are the most important capital for improving the quality of life in Indonesia in the context of Making Indonesia 4.0. For the simple reason that Indonesia has human resources to transform the paradigm of past education into education that is closely tied to technological advancements and advances [5]. In accordance with Figure 1, increasing the overall quality of Indonesia's human resources is a major priority. Indonesia's 4.0 education initiative is aimed at increasing the overall quality of the country's people resources. The improvement of human resources can be accomplished by altering the mindset of educators in Indonesia, developing a technology-based curriculum, or providing a variety of programs to improve the quality of human resources in the field of technology, such as the talent mobility program for professionals in Indonesia [6].



**Fig 1.** The Priority of Making Indonesia 4.0

As a result, education 4.0 is a method of improving the quality of education by incorporating technology into its operations in the classroom [7]. It is envisaged that the transformation in education 4.0 in Indonesia, where the learning process is based on technology, will result in the production of human resources who are capable of functioning in the twenty-first century. However, it is widely acknowledged that ensuring the success of the 4.0 education program in Indonesia would undoubtedly be a difficult task for many parties, particularly the government and educational institutions themselves [8]. The government must collaborate with educational institutions in order to implement the 4.0 education program, as well as to provide the necessary facilities and infrastructure to facilitate the program's implementation. As a result, the implementation of education 4.0 can go smoothly and efficiently. In Indonesia, the government and educational institutions share the same level of responsibility and accountability when it comes to establishing a digital environment on school and university campuses [9].

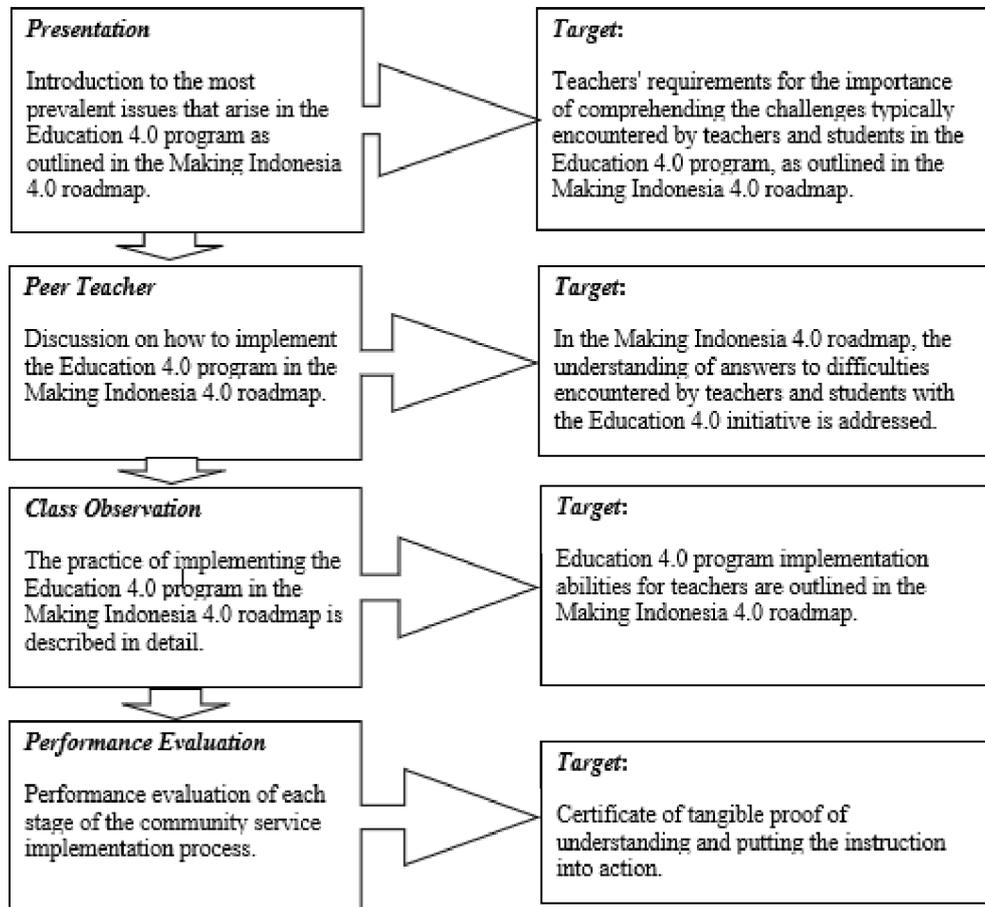
Several barriers exist for governments and educational institutions in implementing the Education 4.0 program, including: 1) an education system and culture that does not produce significant results [10]; 2) most educators and students expressed dissatisfaction with the platforms or learning media used in online learning [11]; and 3) many students do not succeed in exams due to unstable internet connections [12]. So far, various exchanges that have been carried out by teachers with students in online learning at school and at home have only been able to give communication via video conference and instant messages, according to Pratidhina [13]. This is hampered by a lack of understanding among instructors and students about the aspects of communication technology, which in turn reduces the efficiency of online learning at home. Besides that, according to Goh and Abdul-Wahab [14], the Indonesian government is having difficulties in identifying an appropriate platform for each and every school and educational unit in the country. This is due to the fact that each region in Indonesia has its own culture and set of traditions. Because of this, the selection of platforms that can be used at the same time in Indonesia is fraught with difficulties. As a result, the government recommends schools to select their own platform that is deemed the most appropriate for their needs.

Furthermore, the issue that education units in Indonesia confront in implementing education 4.0 is to use and follow learning methods that are compatible with the technology that is being used. Meeting the demands of technology in learning allows for greater flexibility in the selection and application of relevant educational techniques. However, if the facilities and infrastructure owned are insufficient, the flexibility to choose facilities and infrastructure in accordance with the applicable learning technology does not create a positive push for learning advancement [15]. Additionally, budgetary changes and the allocation of additional funding for the implementation of effective learning technologies are utilized as roadblocks for educational institutions. Consequently, learning technology is changing in a less efficient way as a result of

this. Based on the issues raised above, the authors believe that education units need to be aware of the consequences of education 4.0 and how it will affect students in school settings. According to Donald [1], schools must implement education 4.0 as soon as possible due to the urgency of the situation.

## II. METHODS

The method used in this activity is depicted in the following figure 2.



**Fig 2.** The Community Service Activity Methods

Firstly, presentation: At this level, all that has been accomplished is the introduction of challenges that are regularly encountered in the Education 4.0 Program as outlined in the Making Indonesia 4.0 roadmap. The presentation will also include specific examples of other programs that have been implemented in other schools, as well as questions and answers from the audience.

Secondly, through implementing the Education 4.0 program in the Making Indonesia 4.0 roadmap at Muhammadiyah Junior High School of Ajibarang, a conversation process will be carried out between students and teachers. The participation of all leaders (Principal, Deputy Principal, IT Team, and a number of teachers) is necessary in this peer teaching or peer discussion exercise. During this session, participants will discuss and offer examples of how the Education 4.0 initiative has been implemented at Muhammadiyah Junior High School of Ajibarang.

Subsequently, at the next step, teachers participate in a class-observation program that includes the practice of implementing the Education 4.0 program, which is part of the Making Indonesia 4.0 roadmap. In order to determine how far teachers have progressed towards the Education 4.0 program at Muhammadiyah Junior High School of Ajibarang as a result of implementing the Science and Technology for the Community program, the following survey was conducted.

Lastly, performance evaluation, which is a performance evaluation of each stage of the implementation of community training programs. The evaluation process is completed at the end of the process in order to draw conclusions from the implementation of this course.

### III. RESULT AND DISCUSSION

#### *Presentation*

The training and application of the 4.0 education program at Muhammadiyah Junior High School of Ajibarang began with presentations from the resource personnel involved in the project. During this activity, various concepts were explained, including the following: Indonesian Education 4.0 includes three components: 1) Education 4.0 in Indonesia, 2) Educational Policy Direction in the Digital Age, and 3) Education 4.0 in the classroom. It can be explained in a brief manner based on some of these explanations and in accordance with the source material.

#### *Education 4.0 in Indonesia*

Education 4.0 in Indonesia begins with the recognition of the significance of developing a system of education 4.0 in Indonesia that is capable of influencing changes in education in Indonesia as well as Indonesia's global competitiveness. The necessity of education 4.0 in Indonesia, according to Donald [1], is an obligation for education in Indonesia to be applied in schools (see Figure 3). The following are some of the factors that contribute to the urgency of Indonesia's 4.0 education system digitization program:

#### *The industry Has Made the Transition to Digital*

In the age of R.I. 4.0, education programs in Indonesia have the potential to serve as the foundation for the development of the education industry in the digital age. This evolution has the potential to transform education into the foundation for digital industrial transformations that may be applied in the classroom. This has a positive impact on transforming education in Indonesia, as well as on mutually beneficial interaction with the industrial world in order to bring about change in the direction of digitalization.



**Fig 3.** The Urgency of Education 4.0 in Indonesia

This major issue is the driving force behind the need for education 4.0 to be implemented in schools as soon as possible. Furthermore, improving the overall quality of human resources is the most important factor in resolving these issues. Human resources with strong credentials in the development of a digital industry trend can help to establish a favorable technical environment for policymakers in the field of higher education. As a result, the implementation of education 4.0 in Indonesia can be achieved in collaboration with the stakeholders who benefit from these educational services. Furthermore, the implementation of education 4.0 in Indonesia creates a favorable environment for students to become more familiar with technology and to work together to integrate it into the world of Indonesian education.

#### *Global Competition is Becoming more Intense*

According to Lukita et al. [12], the digital era has emerged as a global determinant of change in every aspect of human life since its inception in 2016. This is one of the factors that has contributed to the creation of education 4.0 in Indonesia. Improving the overall quality of technology is also a precondition for the establishment of education 4.0 on a worldwide scale. Work experts who are able to use these changes in education and competition in a healthy manner are in high demand throughout the world. Global competition in the area of educational technology is becoming increasingly popular. As a result of the adoption of education 4.0 in schools, Indonesia will be able to strive to catch up and avoid delays in the preparation of digital technology experts. As a result, technical advancements and Indonesia's global economic market will enable the country to compete with other countries in the future. As part of the discussion of this topic, there

are queries from participants, who inquire as to what are the qualities of education 4.0 in Indonesia that allow it to compete with other countries (Figure 4).



**Fig 4.** The Discussion Session with Training Participants

*Education Policy in the Digital Age: Where Are We Going?*

There are two key factors to consider when determining the path of education policy in Indonesia during this Digital Age, they are: 1) the use of e-learning platforms for learning; and 2) the interaction of schools and industry.

First and foremost, in order to implement education 4.0 in schools, it is necessary to incorporate e-learning into all key learning activities. It has been shown that the use of e-learning in major learning has a positive impact on overall improvements in learning, which is the most important ability that students possess. This will result in the development of fundamental learning habits, which can then be assessed for credibility. Major learning can be accomplished through e-learning, which can make it easier for students to discuss learning materials and theories given by educators in the classroom. This process of deliberation can be carried either individually or in groups. This is due to the fact that the e-learning platform facilitates both solitary and group learning. Figure 5 illustrates the above-mentioned explanation in greater detail.



**Fig 5.** The School Digitization System that Facilitates Online Learning

Second, collaboration between the worlds of education and industry serves as the foundation for the development of school-industry engagement in its various forms. There must be a relationship between educational production and demand in the industrial world for this partnership process to work. So that the subsequent cooperation is actually based on need and results in mutual success for all parties involved. School-industry engagement programs, for example, are already on the curriculum agenda in industrialized countries and are carried out on a regular basis throughout the school year in these countries. As a result, this collaboration process must be included in the curriculum of Indonesian schools in order for collaboration to be formed in a systematic and measurable manner on a consistent and ongoing basis. Several issues need to be addressed, including how students in Indonesia are able to contribute positively to their country's progress in the industrialized world, among others. As a result, education 4.0 can be regarded as an intentional attempt by Indonesia to address the requirements of the population while also enhancing the quality of human resources in order to accomplish the Golden Indonesia 2045 vision.

### *Implementation of Education 4.0 in Schools*

The presentation of the material to the last resource person included information on how to implement education in schools, and in specifically, how the strategies that must be implemented by Muhammadiyah Junior High School of Ajibarang in order to implement education 4.0 should be carried out by the school. The two images below show how the process of implementing education 4.0 in school.

Firstly, *innovation workshop*. All educational institutions, including schools and universities, are expected to make modifications to innovation workshops to ensure that they are appropriate for their students' learning needs. This commencement became the beginning of the birth of many exceptional concepts and ideas originating from the imaginations of young people in the following years. This 4.0 education program has a positive impact and is a breath of fresh air for all students and stakeholders who are working together to develop innovations that are in accordance with market requirements.

Secondly, *demographic Bonus for years 2030-2040*. In addition, the demographic benefit that Indonesia would receive from 2030 to 2040 is a source of concern in the implementation of education 4.0 in Indonesia. Following Lawrence and colleagues (2019), this is a severe problem in Indonesia since the country's limited commercial fields are unable to keep up with the vast number of company requirements. As a result, providing high-quality human resources who are also dependable in terms of technology is an attractive proposition for service consumers in the industrial sector. Another point to mention is that the population of productive age is now capable of competing with people all around the world. As a result, the achievement of high quality in the workplace serves as a yardstick for the success of education 4.0 in Indonesia.

As a result, education 4.0 is a critical issue that must be addressed immediately, with no room for delay in its implementation. Education 4.0 will have a favorable impact on the overall quality of education in Indonesia in the future, as will the introduction of new technologies in the country. Indonesia can train students who are "literate" in technology through the implementation of this 4.0 education program, enabling them to become technology-savvy professionals in the near future.

#### *The Peer-Teacher*

The peer-teacher stage is the stage in which participants of the training group discuss their experiences with the resource individuals. Introducing and reinvigorating schools, particularly Muhammadiyah Junior High School of Ajibarang, about what is contained in the Education 4.0 program to reach Indonesia Gold 2045 and what is also included in the Making Indonesia 4.0 roadmap is the goal of the peer-teacher implementation session. In the hopes of improving the preparation and implementation of the Education 4.0 program, Muhammadiyah Junior High School of Ajibarang will receive this training. In order for students to be better equipped to confront global issues in the future, the following steps should be taken. Education 4.0 can also be used and benefited by educators, as well as the general community surrounding Muhammadiyah Junior High School of Ajibarang, which can be found in the vicinity of the school. It is envisaged that instructors would obtain a thorough awareness of the preparations and infrastructure that support the Education 4.0 program, as well as a thorough understanding of the Making Indonesia 4.0 Roadmap, which is particularly important in the field of education.

#### *The Class-Observation*

The class-observation stage is the step in which the process is carried out after the training has been completed. The resource persons conducted a class observation to see some of the results that had been gained by Muhammadiyah Junior High School of Ajibarang as a result of the training that had been conducted. For Muhammadiyah Junior High School of Ajibarang, some of these trainings result in outcomes that may be broken down into three categories. At the first, *e-learning platform*, it is the application of e-learning in major learning that is the first step toward entering the world of education 2.0. It is decided on which major learning will be used to prepare all learning in the application of technology in the classroom. This is done in order for students to become comfortable with technology in the classroom and to be able to become the driving force behind the shift away from traditional learning to digital learning. It has also been developed in accordance with the requirements of the market and the industrial world, which places a greater emphasis on technology as a means of accelerating the production process and resulting in higher-quality

products. Consequently, the establishment of an e-learning platform is a prerequisite for Muhammadiyah Junior High School of Ajibarang in order to develop the facilities and infrastructure necessary to generate digital learning that is competitive with other forms of digital learning.

The most important step that must be taken is to prepare the facilities and infrastructure, as well as the basic necessities and supporting variables, in order for e-learning to be successful. Developing curricular adjustments that are technology-friendly should be prioritized in order to develop e-learning that is ready to use and can be followed by all instructors and students at Muhammadiyah Junior High School of Ajibarang. According to expectations, completion of digital curriculum will be able to assist schools in establishing a 4.0 education environment. Subsequently, at the second, *innovation workshop*, the world of education requires both schools and universities to provide innovation workshops that are user-friendly and simple to grasp by all instructors and students. It is possible to achieve the completion of innovation in learning from this point forward. Students' output based on technological expertise, as well as satisfying market needs as the primary goal for successful learning in the classroom are some of the innovations that Muhammadiyah Junior High School of Ajibarang can implement. Consequently, everything in the learning and education system 4.0 is technology-based, and the Muhammadiyah Ajibarang Middle School will be required to digitize all student activities and outputs in the near future.

Thirdly, *school-industry engagement*, in order for students to integrate themselves into the market as the primary goal of their future job hunt, the entire education market must present them with opportunities to do so. For example, in industrialized countries, partnership initiatives between education and industry are already incorporated into the educational system through the use of curriculum. So, the worlds of industry and education merge together in Indonesia, creating a singular entity that cannot exist in a foreign context. Both must be clearly apparent and manifest in the curriculum that is developed. Student exchange, student internships, and student field work lectures at service supply companies are all expected to be part of a school's annual agenda and must be incorporated in the school's curriculum. A good impact on the realization of education 4.0 in Indonesia has resulted from this. Muhammadiyah Junior High School of Ajibarang must map themselves with the industrial world, which is their market share, in order to be able to collaborate with other schools and businesses to foster positive school-industry relationships. To increase quality and competitiveness when competing with foreign parties, Muhammadiyah Junior High School of Ajibarang must collaborate with foreign parties, in this case with a number of overseas agencies, in order to improve quality and competitiveness. Students should be exposed to the implementation of this through participation in school-industry partnerships.

#### *Performance Evaluation*

After the class-observation procedure has been completed, the performance evaluation is carried out. In this program, there are three primary things that are evaluated: the e-learning platform, the innovation workshop, and the participation of schools and industry participants. The three stages that Muhammadiyah Junior High School of Ajibarang must take are a barometer for the success of the implementation of education 4.0 in schools. A performance review is necessary in order to be able to map out what will be the most significant areas to focus on in order to prepare for the overall implementation of the Education 4.0 initiative.

#### **IV. CONCLUSION**

In conclusion, through dedication to teachers at Muhammadiyah Junior High School of Ajibarang through education 4.0 training in Indonesia and its application at Muhammadiyah Junior High School of Ajibarang as an alternative in fulfilling technology-based learning in a better and more innovative classroom, it can be concluded that it is possible to do so. There is a teacher in the class. The findings revealed that 1) teachers' interest in learning the skills necessary to implement 4.0 education in schools, 2) teachers' understanding of 4.0 education in Indonesia and its application in schools, and 3) improving teacher skills in the strategies that must be implemented in order to implement 4.0 education programs at Muhammadiyah Junior High School of Ajibarang were all found to be significant.

As for future activities, it is suggested that service activities for teachers at Muhammadiyah Junior High School of Ajibarang through the adoption of education 4.0 in schools can be implemented in the short term to benefit teachers at the school. In order for the effects of this training to be felt by all residents of Muhammadiyah Junior High School of Ajibarang, it is necessary that the program be repeated. In addition, it has been suggested that the use of technology in learning is a requirement that cannot be avoided by schools in order to teach educators and students about the significance of technology in today's digital age.

## V. ACKNOWLEDGMENTS

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## REFERENCES

- [1] Donald, D. "The Education 4.0 Revolution," *J. Basic Educ.*, vol. 4, no. 1, pp. 3–18, 2020.
- [2] Alakrash, H. M. and Razak, N. A. "Education and the fourth industrial revolution: Lessons from COVID-19," *Comput. Mater. Contin.*, vol. 70, no. 1, pp. 951–962, 2021, doi: 10.32604/cmc.2022.014288.
- [3] Hariharasudan, A. and Kot, S. "A scoping review on Digital English and Education 4.0 for Industry 4.0," *Soc. Sci.*, vol. 7, no. 11, 2018, doi: 10.3390/socsci7110227.
- [4] Sukartono, "Revolusi Industri 4.0 dan Dampaknya terhadap Pendidikan di Indonesia," *FIP PGSD Univ. Muhammadiyah Surakarta*, vol. 2, no. 4, pp. 1–21, 2018.
- [5] Airlangga, H. "Making Indonesia," *J. Paedagogi*, pp. 1–8, 2019, doi: 10.7591/9781501719370.
- [6] Aisjah, A. S. "Penyusunan capaian pembelajaran," *J. Penelit. Pendidik.*, vol. 4, no. 2, pp. 27–40, 2018.
- [7] de S. Oliveira K. K. and de Souza, R. A. C. "Digital Transformation towards Education 4.0," *Informatics Educ.*, vol. 3, no. 5, pp. 4–16, 2021, doi: 10.15388/infedu.2022.13.
- [8] Genkin, L. Valenta, and Yarom, "May the Fourth Be With You: Creating Education 4.0," *J. Learn. Dev.*, vol. 6, no. 2, pp. 845–858, 2017, doi: 10.1145/3133956.3134029.
- [9] Lawrence F, Ching, L. F. and Abdullah, "Strengths and Weaknesses of Education 4.0 in the Higher Education Institution," *Int. J. Innov. Technol. Explor. Eng.*, vol. 9, no. 2S3, pp. 511–519, 2019, doi: 10.35940/ijitee.b1122.1292s319.
- [10] Heriyanto, D., Sator, A., Komariah, and Suryana, "Character education in the era of industrial revolution 4.0 and its relevance to the high school learning transformation process," *Utop. y Prax. Latinoam.*, vol. 24, no. Extra5, pp. 327–340, 2019.
- [11] Avalos, F., Tellez, and Navarro, S. "Learning about the effectiveness of teacher education: a Chilean study," *Perspect. Educ.*, vol. 28, no. 4, pp. 11–21, 2010.
- [12] Lukita, C., Suwandi, E. P., Harahap, U., Rahardja, and Nas, "Curriculum 4.0: Adoption of Industry Era 4.0 as Assessment of Higher Education Quality," *IJCCS (Indonesian J. Comput. Cybern. Syst.)*, vol. 14, no. 3, p. 297, 2020, doi: 10.22146/ijccs.57321.
- [13] Pratidhina, E., "Education 4.0: Pergeseran pendidikan sebagai konsekuensi revolusi industri 4.0," *Humanika*, vol. 20, no. 1, pp. 1–12, 2020, doi: 10.21831/hum.v20i1.29290.
- [14] Goh P. S. C., and Abdul-Wahab, "Paradigms to drive higher education 4.0," *Int. J. Learn. Teach. Educ. Res.*, vol. 19, no. 1, pp. 159–171, 2020, doi: 10.26803/ijlter.19.1.9.
- [15] Himmetoglu, D., Aydog, and Bayrak, "Education 4.0: Defining The Teacher, The Student, And The School Manager Aspects Of The Revolution," *Turkish Online J. Distance Educ.*, vol. 21, no. July, pp. 12–28, 2021, doi: 10.17718/TOJDE.770896.