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Research Article

Ecohistory: The Concept of Environmentally Learning and Disaster Mitigation to Realize Society 5.0

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Abstract.

This article discusses a new concept in history learning with a thematic history approach, namely environmental history. This concept is needed forlearning in schools in order to achieve several SDGs indicators, to welcome Society 5.0, and to meet the needs of learning innovation in the Merdeka Curriculum. This study uses qualitative research methods with data collection techniques through in-depth interviews, documentation, literature, and questionnaires. Data analysis was carried out by: (1) data reduction; (2) data presentation; and (3) data verification. The results of this study consist of theoretical basis for the implementation of thematic history learning in schools; the concept of Ecohistory and its relevance to the achievement of the SDGs to meet Society 5.0; and its implementation at school.

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1. INTRODUCTION

Nowadays, environment-based learning and disaster mitigation are important needs considering the many impacts caused by climate change and the low role of the education sector in the environmental awareness education process.[1]–[4]. The mandate of environmental education for sustainable living has become the obligation of all countries and is stated in the MDG's and SDG's. In the field of education, the Indonesian government responded by pouring it into the 2013 Curriculum which states that students are expected to be able to have a sense of sensitivity to the environment and play an active role in solving problems and protecting the environment by having a polite character.[3].

In order to realize environmentally sound learning for disaster mitigation, the government has established the Disaster Safe Education Unit (SPAB) and Disaster Alert

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School (SSB) programs as the real implementation of Law Number 24 of 2007 concerning Disaster Management and Regulation of the Head of the National Disaster Management Agency Number 04 of 2007 2012. Unfortunately, the program has not been implemented optimally[3], [5], [6]. Based on these problems, this research offers a new model in environmental education and disaster mitigation which is implemented in an integrated manner in the formal curriculum according to the request of Pillar Three of SPAB.[7].

The concept that will be applied to environmentally friendly learning and disaster mitigation in this study uses a transdisciplinary and participatory approach that is carried out in a comprehensive and multidisciplinary manner.[2], [8], [9]. If SPAB and SSB are usually carried out separately from existing subjects, then this learning is integrated into history subjects. This is done with the aim of providing innovation in host subjects as well as teaching students about the environment and disaster mitigation from a historical point of view. Their knowledge of environmental and climate change and its influence on human civilization, including adaptation and mitigation that has been carried out, is expected to be able to bring about changes in students' values, attitudes, and actions.

2. METHOD

The use of the method in this study is a qualitative method with interview data collection techniques, distributing questionnaires and studying documents or documentation[10]. Data collection activities were carried out through the distribution of questionnaires at random with the following techniques: purposive sampling, where the targeted respondents are teachers in the social sciences study group and students. The results of the questionnaire were used as the basis for conducting interviews and document studies to obtain more in-depth data. Document studies in question are teacher learning tools, student worksheets, and learning resources used. Meanwhile, the data analysis technique itself uses the Miles and Huberman model[11]whose stages are as follows: (1) Data reduction; (2) Data presentation; (3) Conclusion or verification.

3. RESULTS AND DISCUSSION

3.1. The Role of Education in Reaching Society 5.0

The concept of society 5.0 emerged after a very advanced technological shift in the industrial revolution 4.0. In the 5.0 era, humans had to implement this very advanced

technology into all economic, social, educational, political, and cultural activities. The opinion regarding the existence of society 5.0 was sparked by the Japanese Cabinet in 2016 through the 5th Science and Technology Basic Plan[12]. The essence of this thinking is the fulfillment of all community needs through the provision of adequate products and services while balancing themselves with developed technology[13], [14]. Japan as the originator country has the idea that the 5.0 community must be able to overcome all problems due to the many innovations during 4.0 by using them appropriately.
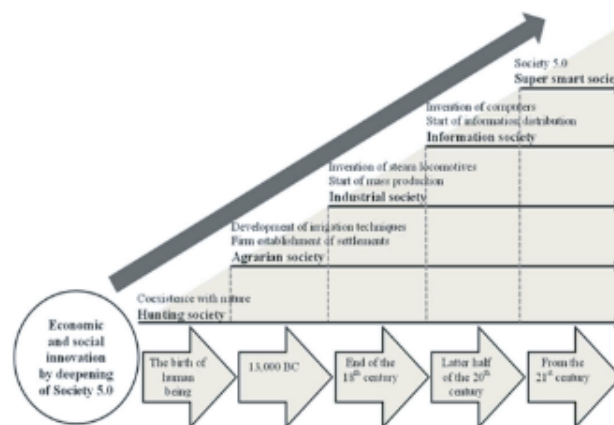

Figure 1: Concept of revolution from 1.0 to 5.0 [12].

Indonesia and other countries in general are still busy with the integration of society into 4.0 but have to be confronted again with a new revolution. This makes the community must be ready and appropriate in using and utilizing all existing technology. Indeed, the concept of society 5.0 comes from Japan and is analyzed based on the problems there. However, this can be adopted and modified according to the current and future needs of the Indonesian people.

In this case, education is an important factor in welcoming the new era of society 5.0. The existence of education will provide thorough preparation for the younger generation, especially as future community candidates. Education no longer teaches students to understand theory and apply it, but is already at the stage of how to integrate existing (virtual) technology to solve national and global problems. According to the basic plans in forming a 5.0 society, namely forming a young generation who has a high level of ability in the aspects of society and industry; society can manage and solve socio-economic problems in the global region; investment in human resources and scientific excellence; good administration program and develop in line with science [12]

If some of the plans above are related to education, a line is obtained that connects the concept of education with society 5.0. Education through a set of curricula and their supporting human beings must introduce and familiarize students with digitalization. Then students must also be printed as agents of change who have the ability to contribute in solving national and global problems. This can be done by forming the competence of students who have the ability, among others, skills in communicating with the community; the ability to think critically to examine and solve problems around them; have a sense of belonging and responsibility towards the natural and social environment; have the ability to integrate and collaborate with the global world[15].

The existence of the above competencies will provide fresh air for solving problems that exist in the world and global community. Education in Indonesia should focus on national and global problems and give students the freedom to think about ways to solve them through technology. However, this must be developed by sticking to the character values and wisdom possessed by the community. This is so that students do not lose their grip when they jump in and play a role in shaping society 5.0 and so that students have superior character. Generations that have superior characters will be able to control the future well in integrating the virtual and real worlds.

3.2. The Urgency of Environmentally Learning and Disaster Mitigation

Indonesia is an archipelagic country that has a strategic position in the economy and politics. However, in terms of geography, Indonesia has a position that is prone to natural disasters. Indonesia is located between the Indian and Pacific Oceans and is crossed by the equator. This has an impact on the existence of three climates, namely monsoon, monsoon, sea, and tropical. Based on latitude, Indonesia is located at 23.5 LU/LS which results in a longer hot climate. In addition, the Indonesian archipelago is in the path of the Pacific and Mediterranean circum mountains which has an impact on many volcanoes. Not only that, Indonesia is also a meeting point of three tectonic plates, namely the Indo-Australian plate, the Eurasian plate, and the Pacific plate, which causes frequent earthquakes and the potential for tsunamis.

The various factors above can cause natural disasters in the form of earthquakes, floods, tsunamis, volcanic eruptions, and disasters typical of tropical regions. Disaster is a phenomenon or event that threatens and disrupts people's lives, whether caused by non-natural, human, and natural causes to result in casualties, material losses, environmental damage, and human psychological impacts.(Law of the Republic of

Indonesia Number 24 of 2007 concerning Disaster Management, 2007). Each season has various kinds of disaster threats. For example, in the rainy season there is a risk of tornadoes and floods, while the dry season is in the form of fires and droughts. There are also disasters that do not depend on the seasons such as earthquakes, volcanic eruptions, and tsunamis.
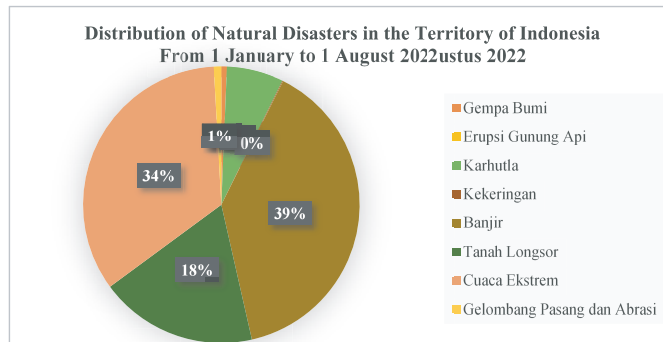

Figure 2: Distribution of Natural Disasters in the Territory of Indonesia From 1 January to 1 August 2022[17].

In general, every disaster has a different sign. This can be used as a reference for knowledge to prepare preventive measures before the phenomenon occurs[18]. In this case, disaster management is needed to minimize risks and losses when a disaster occurs. In disaster management activities, there are various stages, programs, and activities that must be carried out by local governments in reducing disaster risk[18]. One form of activity is disaster mitigation which is carried out during pre-disaster, during disaster, and post-disaster.

Mitigation means all actions that are sustainable and carried out to minimize disaster risk in the long term [18]. This is done so that the community avoids major losses after the disaster. Mitigation has several types, the first is structural by establishing facilities and infrastructure according to certain categories. The second is non-structured through various policies issued by the government.

One form of implementing non-structural disaster mitigation is through socialization and learning. This can be done by teaching from an early age through educational institutions. But in reality this is still lacking, and is only held in certain schools. Disaster mitigation education is regulated in the regulation policy of the Minister of Education and Culture Number 33 of 2019 concerning the Implementation of the SPAB (Disaster Safe Education Unit) Program. One form of the program is conducting education on prevention and management of the impact of disasters(Koswara et al., 2019:21). This is done by schools as educational units providing disaster preparedness simulations at least 1 time in 1 semester. In addition, this material is included in learning activities in the classroom (intracurricular), extracurricular, and co-curricular(Koswara et al., 2019).

Suarmika explained that there are three important aspects in implementing disaster mitigation strategies in education units, first is the empowerment of school institutions[20]. This aspect is carried out by conducting socialization and compiling standard procedures in dealing with disasters. The second is the integration of materials related to disaster mitigation in the curriculum. The application of this aspect can be done by applying it in geography or social studies subjects in disaster mitigation materials taught in class XI. Finally, the establishment of cooperation partners of various parties to support the implementation of Disaster Risk Reduction (DRR). This can be done by collaborating with related institutions in forming a disaster preparedness team.

This must be done side by side with students' thinking concepts based on environmental insight. Aspects of environmental insight are needed to provide sustainable development options by aligning natural and human resources. This step is taken so that human needs can be fulfilled optimally by utilizing nature without having to cause a disaster. Schools that apply environmentally friendly learning and disaster mitigation have several things that must be considered. First, schools in issuing policies must be based on disaster mitigation and the environment. This can be done by applying the concept of environmentally friendly schools and disaster mitigation (SWALIBA) to achieve sustainable development. The second is the existence of a curriculum based on disaster mitigation and the environment. This application can be done by teaching students to preserve the environment and how to cope with disasters. Third, developing various activities related to disaster mitigation and the environment with the active participation of all school members. This step can be realized by conducting simulation activities or forming a team that is aware of the environment and disasters. Finally, schools develop facilities and infrastructure to support the implementation of disaster mitigation and environmental education. This can be done by carrying out environmental conservation programs, interior planning, and providing disaster-ready tools Third, developing various activities related to disaster mitigation and the environment with the active participation of all school members. This step can be realized by conducting simulation activities or forming a team that is aware of the environment and disasters. Finally, schools develop facilities and infrastructure to support the implementation of disaster mitigation and environmental education. This can be done by carrying out environmental conservation programs, interior planning, and providing disaster-ready tools Third, developing various activities related to disaster mitigation and the environment with the active participation of all school members. This step can be realized by conducting simulation activities or forming a team that is aware of the environment and disasters. Finally, schools develop facilities and infrastructure to support the implementation of disaster mitigation and

environmental education. This can be done by carrying out environmental conservation programs, interior planning, and providing disaster-ready tools[19], [21].

Learning related to disaster materials and environmental insight at the school level is one way for students to understand and understand what to do if they are in a disaster zone.[22]. After learning, students will have an idea of what to do to prevent and cope with various disasters. According to Djali(in Efendi et al., 2022:101)By creating a strong and sustainable foundation, through the application of disaster mitigation materials in schools, it will have an impact on educated people who are aware of disasters.

3.3. The Concept of Environmentally Friendly Learning and Disaster Mitigation

History is the science of humans in the dimensions of time and place (space). Understanding the concept of space and time is a basic material that is taught in the first year of high school. This concept is a framework for analyzing historical events presented in the following years. Humans and space (environment) are two things that cannot be separated, humans have struggled hard to conquer them[24]. History proves that the human ability to conquer space (environment) is the main basis for the establishment of a civilization. Examples of the ability of the Egyptians to conquer the Nile or such as Karl Witfogel's analysis of a hydraulic society characterized by massive irrigation in Asia and its influence on political systems[25].

Recognizing the historical interaction between humans and space (environment) is expected to provide some important knowledge, among others, about how humans in the past managed to control the environment for sustainable living; disasters that occur in the process of the interaction (cause and effect); disaster mitigation that has been carried out both based on science and local wisdom; and how the environment is affected by human behavior so that changes occur today. The explanation of these interaction events must be based on the accompanying aspects (social, cultural, economic, political, psychological, and environmental) in order to be able to present events holistically from various perspectives and foster critical thinking skills on current environmental problems.[26]. The implementation of this approach in historical science is known as social-scientific, which is a type of history that is fundamentally different from narrative history[27].

While the implementation of this approach in education is known asSustainability Science, ESD Education for Sustainable Development (ESD), Education for Sustainability (EfS), Learning for Sustainable Futures, Socio-Scientific Issues (SSI)[2], [9], [28], [29].

Currently, environmentally friendly learning is needed for several reasons, among others, based on research results that the didactic approach to climate change education is largely ineffective in influencing students' attitudes and behavior; often they know climate change but do not know its causes and consequences; and basically they are the most affected parties who should be properly educated[30], [31].

The choice of environmental approach is inseparable from the phenomenon of climate change as a result of increasing concentrations of carbon dioxide gas and other gases in the atmosphere that cause the greenhouse gas effect. This change has a major impact on all living things and the balance of the earth's ecosystem. The things that are most often felt include natural disasters, weather inconsistencies, changes in the food chain, and food productivity[1]. Therefore, the issue of environment and climate change has become a focus for the United Nations since 2000 as stated in the MDG's. This issue is again the focus of the SDG's which must be achieved by 2030. Achieving this goal would not be possible without the participation of all countries and their people, including Indonesia. In the field of education, this form of participation is contained in the 2013 Curriculum which states that students are expected to be able to have a sense of sensitivity to the environment and play an active role in solving problems and protecting the environment by having a polite character.[3].

However, unfortunately the implementation of environmental education is not running optimally[2], [3]. The absence of clear technical guidelines and programs on the implementation of environmental education in the curriculum causes teachers to be creative in creating climate change mitigation and adaptation approaches and develop their capacity to respond with meaningful actions.[32]. Based on a study of 959 research on environmental education conducted by Monroe et al., it shows that this research focuses on two themes, namely relevant and meaningful information and active and interesting teaching methods.[33]. From these data, it is known that there are not many studies that have initiated the development of models and systems for supporting environmental-oriented learning and disaster mitigation that are integrated with the formal curriculum.

One of the optimizations of environmental education in the formal curriculum is through historical learning with environmental insight and disaster mitigation. This is also in order to support and implement government regulations and programs contained in Law Number 24 of 2007 concerning Disaster Management and Regulation of the Head of the National Disaster Management Agency Number 04 of 2012. In addition, this learning is in line with the Comprehensive Safe School program which initiated by UNISDR (United Nations International Strategy for Disaster Reduction).

References

[1] Makki MF, Ferrianta Y, Suslinawati R. "Impacts of climate change on productivity and efficiency of paddy farms: Empirical evidence on tidal swamp land in South Kalimantan Province–Indonesia." J Econ Sustain Dev. 2012;3(14):66–72.

[2] Anderson A. "Climate change education for mitigation and adaptation." J Educ Sustain Dev. 2012;6(2):191–206. doi: 10.1177/0973408212475199.

[3] Prihantoro CR. "The perspective of curriculum in Indonesia on environmental education." Int J Res Studs Educ. 2014;4(1):77–83. doi:10.5861/ijrse.2014.915.

[4] Hayudityas B. "Importance of implementation of disaster mitigation education in school to know student preparedness." J Informal Educ. 2020;1(2):94–102. [Online]. Available: http://repositorio.unan.edu.ni/2986/1/5624.pdf.

[5] Tyas RA, Pujianto P, Suyanta S. "Evaluation of the management of the disaster preparedness school program (SSB)." J Manage Account Educ. 2020;8(1):10–23. doi:10.21831/jamp.v8i1.28850.

[6] Amri A, Hanifa NR, Tebe Y, Lassa J, Pradipta GC, Furqon MR, et al. "National Evaluation of the Disaster Safe Education Unit Program," 2020.

[7] UNISDR. "Comprehensive Safe Schools," 2017.

[8] Rousell D, Cutter-Mackenzie-Knowles A. "A systematic review of climate change education: giving children and young people a 'voice' and a 'hand' in redressing climate change." Children Geogr. 2020;18(2):191–208. doi:10.1080/14733285.2019.1614532

[9] Parikesit, Withaningsih S. "The need for sustainability science education in Indonesia."AIP Conf Proc. 2018 ;2019(October 2018). doi: 10.1063/1.5061863

[10] Hero. Evaluation: Theory, model, methodology, standard, application and profession. Jakarta: Rajawali Press, 2016.

[11] Sugiyono. Educational research methods (quantitative, qualitative, and R&D approaches). Bandung: Alfabeta; 2015.

[12] Nair MM, Tyagi AK, Sreenath N. "The future with industry 4.0 at the core of society 5.0: Open issues, future opportunities and challenges." In 2021 International Conference on Computer Communication and Informatics (ICCCI); 2021. pp. 1–7.

[13] Purwanto MB, Devi D, Nuryani N. "Learning the disruptive era towards society 5.0." 2020.

[14] Handayani NNL, Muliastrini NKE. "Disruptive era learning towards society 5.0 Era (Basic Education Perspective Study)." In Proceedings of the IAHN-TP Palangka Raya National Seminar. 2020;1:1–14.

[15] Ambara IMY, Margunayasa IG, Kusmariyatni NN. "Development of collaborative learning tools for mathematics subjects on the topic of data processing for fifth graders of SD A. INTRODUCTION The development of learning in the industrial revolution era 4 . 0 synergizes with 21st century learning that demands d participants." 2019;9(September):112–122. doi:10.25273/pe.v9i2.4671.

[16] LAW OF THE REPUBLIC OF INDONESIA NUMBER 24 OF 2007 CONCERNING DISASTER MANAGEMENT. 2007.

[17] BNPB. "Distribution of natural disasters per January 1 - August 1, 2022." 2022. doi: https://gis.bnpb.go.id/arcgis/apps/sites/#/public/pages/bencana-besar-tahun- 2022.

[18] Juhadi, Herlina M. Disaster mitigation literacy education in schools. Kudus: PARIST PUBLISHER: Holy: PARIST PUBLISHER; 2020.

[19] Koswara A, et al. Disaster Resilient Education: Creating a Disaster Safe Education Unit in Indonesia. Jakarta: "Creating a Disaster-Safe Education Unit in Indonesia" DISASTER RESPONSIBLE EDUCATION NATIONAL SECRETARIAT DISASTER SAFE EDUCATION UNIT (SEKNAS SPAB): Jakarta: "Creating a Disaster-Safe Education Unit in Indonesia" TANGGUH NATIONAL SECRETARIAT EDUCATION UNIT, SPACEDICATION UNIT (SEKNASAMAN), 2019.

[20] Suarmika PE, Utama EG. "Disaster mitigation education in elementary schools (an ethnopedagogical analysis study)." J Educ Indonesian Basics - JPDI. 2017;2(2):18–24.

[21] Santoso AB, Setyaningsih W, Biqih D. "The role of teachers and students in school pioneering activities and natural disaster mitigation (SWALIBA)" In Social Science Forum. 2016;43(2):176–188.

[22] Suharini E, DL S, Kurniawan E. "Disaster learning for communities in flood-prone areas of the Beringin Watershed, Semarang City." In Social Science Forum. 2015;42(2):184–195.

[23] Efendi M, Nasruddin N, Karani S. "School participation in disaster resilient learning communities in wetland environments." J Educ Geogr - JPIG. 2022;7(2):97–109.

[24] Kelman I, Gaillard JC, Lewis J, Mercer J. "Learning from the history of disaster vulnerability and resilience research and practice for climate change." Nat Hazards. 2016;82(1):129–143. doi:10.1007/s11069-016-2294-0

[25] Karl W. The hydraulic civilizations. Routlegde, 2017.

[26] Djono D, Joebagio H, Abidin NF. "Integrative-multidimensional historical movement: Sartono Kartodirdjo's legacy for the philosophy of historical education towards society 5.0." Criksetra J Educ Sej. 2020;9(1):32–46. doi:10.36706/jc.v9i1.10258.

[27] Kartodirdjo S. Development culture in historical perspective. Yogyakarta: Gadjah-mada University Press; 1990.

[28] Ryan A, Cotton D. "Times of change: Shifting pedagogy and curricula for future sustainability." Sustain Univ Prog Prospect. 2013;151–167. doi: 10.4324/9780203101780.

[29] Genisa MU, Subali B, Djukri, Agussalim A, Habibi H. "Socio-scientific issues implementation as science learning material." Int J Eval Res Educ. 2020;9(2):311–317. doi:10.11591/ijere.v9i2.20530.

[30] Field E. "Climate change: Imagining, negotiating, and co-creating future(S) with children and youth." Curric Perspective. 2017;37(1):83–89. doi:10.1007/s41297-017-0013-y.

[31] Dewi RP, Khoirunisa N. "Middle school student's perception of climate change at Boyolali District, Indonesia." IOP Conf Ser Earth Environ Sci. 2018;200(1). doi:10.1088/1755-1315/200/1/012061.

[32] Stevenson RB, Nicholls J, Whitehouse H. "What is climate change education?" Curric Perspective. 2017;37(1):67–71. doi:10.1007/s41297-017-0015-9.

[33] Monroe MC, Plate RR, Oxarart A, Bowers A, Chaves WA. "Identifying effective climate change education strategies: A systematic review of the research,"environment. Educ Res. 2019;25(6):791–812. doi:10.1080/13504622.2017.1360842.