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An Analysis of Vocational High School Students' Ecological Intelligence in Coping With The Impacts of Climate Change on The Socio-Economic Life of The Poor

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ABSTRACT

Climate changes bring about a lot of impacts to people all at over the world. However, the impacts of climate change will be even worse if it occurs and is felt by the poor who are in nature vulnerable to various disasters such as flood, drought, landslide etc. This article aims at exploring students' ecological intelligence and critical awareness on the impacts of climate change towards socio-economic aspects of the poor communities. This study is under the research paradigm of descriptive-qualitative, which aims at systematically describing facts and characteristics of the studied subjects objectively. The data was collected in-depth interview method and organized using the inductive reasoning principles, which then generated an organized theory on the basis of such assumptions, which finally placed as a reliable hypothesis to be examined. The discussion over climate change is traceable from the ecological competence that argues climate change remains a controversial issue and is urgently addressed, for it affects the survival of human life on earth. In this study, it is argued that the climate change may not merely caused by natural factors, but humans' life activities as well. Therefore, the ecological competence is highly needed to examine the occuring climate changes, especially within the socio-economic life of the poor.

Keywords:
Climate Change, Socio-Economic Life, The Poor, Ecological Intelligence.

INTRODUCTION

Global change is defined as a definite and total environmental change, including climate change, changes in air layer conditions, geographic conditions, and in ecological systems. The impact of climate change has now been felt by people both living in villages and cities. Yet even though self-actualization is reflected in people's awareness of the impacts of climate change that are still very low. Climate change is one of the greatest challenges faced by humans, rising temperatures to weather changes exacerbating the risks of unprecedented natural disasters or triggers for new disasters, affecting the underclasses who are deemed the most vulnerable to experience and needing much time to normalize the situation. This is due to the weakening economic sector, the theoretical and conceptual lack of knowledge in managing the ecological and social phenomena in facing the worst impacts of climate change and natural disasters (HEKS 2010: 4). The lack of informational knowledge of global circumstances, lack of concern towards environmental awareness, and low creative and communicative socialization of experts to the community is a new problem on climate change.

Climate change poses a major threat to human survival, especially for developing countries, such as Indonesia. The main threat of climate change to the people of Indonesia, especially suffered by lower economic class (poor). Whereas areas that are still heavily dependent on their high geographic conditions are severely disadvantaged, excessive temperature increases can affect the sources of food security, health, water supply and livelihoods at the lower-class (poor) society. Many of them rely on agriculture, fisheries, plantations, all of which are heavily determined by how climate conditions are friendly to them. On the other hand, it causes turmoil on economic and food stability. The high harvest failure in various regions resulted in the policy of importing food on a large scale. Moreover,

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the advantages and disadvantages of water supply are becoming ambivalent from the effects of climate change. Heavy rainfall and floods worsen sanitation systems in densely populated cities, causing communities prone to infectious diseases.

The above aforementioned facts as described by the Intergovernmmental Panel on Climate Change (IPCC) which points out climate change as the occurring changes on climate over time, let it be due to the natural factors as well as the direct impacts of human activities. In addition, the United Nations Framework Convention on Climate Change (in Mercy Corp Indonesia, 2107: 6-9) emphasized that climate change binds directly or indirectly to human activities changing the Earth's atmospheric position which further results to observable climate variations changes which are comparable over a period of time. Thus, understanding on the public ecology should continue be pursued at the lower levels of society, so that at some certain points the situation can renew their perceptions of the way the surrounding environment is being managed independently and be able to find an alternative handling due to rapid and appropriate environmental changes. Surely, such a perception should further be pursued through various approaches and concrete actions in a sustainable way at various levels of society. This is undertaken in the hope that the community will be able to independently explore various environmental phenomena that always experience developmental changes from year to year.

The results of contemporary researches on society, among others, were conducted by the Intergovernmental Panel on Climate Change (IPCC) and dozens of research bodies in the G-8 (developed countries) and G-20 (20 major economies) concluded that the increase in earth surface temperature, environmental degradation and depletion of natural resources caused by human activities throughout history, therefore, on a global scale, the exploitation of the more intensive natural resources in various regions of the world is done by industrial societies which likely have lack on ecological competence and intelligence (Supriatna, 2016: 87).

The community's awareness, especially as the object of this study is the learners towards of climate change which have certain impact on all life aspects, especially the socio-economic situation of the low. Therefore, emphasizing students' awareness on the impact of climate change needs to be built as early as possible for preventive action of the shortcoming problems in their life environment and in the education. Because Education according to Taqiyuddin (in Sasmitatias & Kuswanto, 2018) is an aware and planned action to make students actively develop their potency to have spiritual strength, self-control, personality, intelligence, well-behaved, and skills for themselves, society, nations, and country. In this study, we can see hight school students' awareness of the of SMK Negeri Jatipuro hight school at Karanganyar Regency, Indonesia, especially of those who in Technical light vehicle Engineering majors, the impact of climate change on socio-economic life of the poor, through indicators of ecological intelligence. On the basis of such statements, this study additionally aims to explore students' awareness towards climate change affecting the economic and social aspects of the poor.

METHOD

This study was designed under the qualitative descriptive method. Qualitative methods according to Creswell (in Raco, 2010: 10-20) defined as an approach or exploration and understanding of central symptoms, by interviewing participants in general and rather broad. to find out the extent to which students' understanding of the impact of climate change on socio-economic life of the poor. Students are encouraged to identify issues of climate change through ecological skills to seek their ecological intelligence awareness. Thus, this will sort of create students' awareness in preserving and

maintaining life balance in order to find alternative solutions to environmental problems, including the impacts of climate change (Muhaimin, 2015: 15).

According to Sekaran and Bogie (in Fazzlurrahman, Wijayanti, & Witjaksono, 2018) population is a group of people, activities, or something that caught the attention of researchers to investigate. The research people or subject in this study limited to students studying in the high school of SMK N Jatipuro of Karanganyar in Technical light vehicle Engineering majors, Central Java on academic year of 2018/2019. The research subjects examined 38 students of grade X majoring TKR, these subjects were specifically consist of 35 male students and 3 female students, with an average age of around 16 years old. The method used in collecting the data was in-depth interviewing method related to students' skills or their ecological awareness.

RESULT AND DISCUSSION

Results of the Study

To cope with the research problems, this study focuses on anwering of "how are the students' ecological intelligence on climate change towards the socio-economic aspects of the poor in their environments?, will be carefully explained in the results and discussion of the study. The results of in-depth interviews conducted to students of grade X of TKR major, Jatipuro Vocational School on the basis of the students' ecological intelligence level, it is found that the students have a sufficient level of ecological intelligence. They have been able to understand the ecological problems although not all form of the problems. According to the results of interviews with several students of grade X oinf TKR major, in which more or less recently students had been taught on local wisdom which potentially stimulates the ecological intelligence. For that reason, students already have sufficient competence related to environmental or ecological issues occur in their surrounding environment. Students understand that the environmental problems in each regional area differ depending on the existing local geographical conditions. Whereas the environmental problems related to the impacts of climate change in students' sense of locality are more likely to be in the agricultural sphere. Similarly, this encourages in an explanation explored by a number of students referred to as respondents (interview, Monday, 08/13/2018), as follows table 1:

Table 1. Explanation Explored by A Number of Students Referred to as Respondents

Resource person (respondents)		Statements
1.	Student A	''When the dry season comes, the water supply decreases, due to lack of rainfall, even though many rice fields need water supply to water the rice fields. For that reason, many farmers have to pay debts to supply farming equipment, in addition to that, they are still thinking about their daily needs, moreover, in case there is an occuring crop failure"
2.	Student B	"climate change during the rainy season in my district has led many farmers suffering losses due to rice fields or submerged crops caused by high rainfall. That is why, the harvest which should be on time becomes delayed".
3.	Student C	"due to climate change drastically became the main cause of landslides in the Tawangmangu area, which is a highland area"

Students realize that many environmental problems have been triggered by global warming, greenhouse effect, depletion of the ozone layer, etc. which synergically may influence the socio-

economic life of the community, especially the poor. The level of ecological intelligence examined on students of grade XA majoring TKR in SMK N Jatipuro was illustrated in Watsiqotul's scientific work from the results of development research, more specifically on the pretest the results which gained 63.08% and by the posttest results has increased into 89.48%. Definitely after having accomplished the action, therefore, the results from the pretest up unti the postest, it increased by 26.40%.

As illustrated in UNDP (2007: 10) , it is stated that people's lives that are essentially their lives are already difficult and then become increasingly difficult because of the added burden of climate change, with increasingly demanding costs, for example farmers who use hybrid varieties demand water availability when rain does not fall so they owe and at harvest most of the proceeds must be used to repay the debt. Farmers living in high places tend to experience fear and anxiety when the layers of soil they plant with various crops declining due to erosion.

In this study, students' awareness ecological was studied in accordance with several recognizing indicators on ecological intelligence which particularly referred to Hines et al. (cited in Muhaimin, 2015) in his book "Global Issues and Environment Education", emphasizes that the formation of knowledge on environmental issues being applied in real terms is aimed at acting to cope with the occuring environmental problems by identifying the four main elements addressed in ecological competencies, among others are: 1) Knowledge of environmental issues, 2) Knowledge of specific action strategies to be applied to environmental issues, 3) Ability to act on environmental issues, and 4) Having quality in addressing and attitude of good personality.

The results of in in-depth interviews to students of class X SMK Jatipuro about ecological intelligence terkait climate change impact analysis on the socio-economic life of the poor are done by referring to the indicators on above, as follows:

1. The knowledge of environmental issues

   The Knowledge of environmental issues specially the impacts of climate change on the socio-economic of the poor, such as students enough to know how climate change issues are causing losses to socio-economic conditions of the community, such as the lack of competitiveness in terms of food costs of the poor and the vulnerability of illness and death as a consequence. Students' knowledge of natural change comes from various references and knowledge around their environment.

2. Knowledge of action oriented strategies toward environmental issues

   The action oriented strategic knowledge applied by the government has so far been proved to have not shown its widespread impact in overcoming the impacts of climate change suffered by the poor. However, individually students have done little things to safeguard and protect the environment from the effects of climate change. As well as some of the things that indicate student behavior, some of them reduce the use of spray perfume (spray) in order to maintain the thin layer of ozone due to the danger of spray from perfume bottles. Even on other environmental issues, students seem to be wiser in disposing of trash in its place, turning off the water so as not to be wasted, etc.

3. Students' competence to act on environmental issues

   Students' responses to their ecological sensitivity on the environment, especially climate change. This can be done through students' efforts in studying the impact of climate change, especially on the poor. Besides that, most of the students of X class of TKR majors in SMK Jatipuro even other class of students come from economic poor or sufficient families in fulfilling their daily life. This then makes them enthusiastic about learning and understanding the issues that occur around their environment. In addition, if this is understood based on the background

of the TKR students, they increasingly understand that pollution and problems caused by vehicles both private and public (transportation means) contribute to various natural damage likewise; air pollution, the effects of car glass, and so forth. Then students' awareness of environmental issues, especially the impact of climate change on the poor, will increase and are expected to be able to find new breakthroughs as a response to the crisis.

4. Having excellent quality in addressing the situation and attitude of good personality

   In addressing environmental issues, students become more wise in maintaining and managing the natural environment. Just as students become active in finding solutions to be able to avoid the emergence of environmental problems, especially social change for the poor. Thus, it is necessary to master the material on insight and knowledge that enables them to comprehensively comprehend the impact of social change and prevent the possible greater damage. In this case, ecological intelligence is needed to increase students' awareness of the environment and related issues.

Discussion

Based on the above understanding, it can be argued that students are agents of change that must be equipped with knowledge of environmental issues, especially climate change. Because students are part of society, so will be the successor of generation in maintaining environmental sustainability. So that students should be educated and guided to apply more sensitive to nature or the environment around. In addition, students' knowledge of environmental issues, especially climate change, is expected to be able to find alternative solutions as an effort to overcome climate change, which will impact on the survival of human life, especially lower-income of society. As according to Supriatna (2016) argues that ecological intelligence is urgently important to be developed in the learning process because school graduates will act as: 1) agent of change in society, that is agents in developing behavior of people who have knowledge, insight, attitude and behavior that uphold sustainability or sustainability, 2) agents that have awareness of natural resource constraints and global warming issues and 3) agents capable of applying ecological intelligence or ecopedagosis learning applications in their actual lives.

Based on the results of the overall study, it was found that ecological intelligence in the cognitive and affective aspects of class X students in the TKR majors showed that, in general students had understood ecological issues related to knowledge about climate change, such as the causes of climate change, the effects of climate change, and predictions of climate change issues. Basically they realize that issues related to global warming, depletion of ozone, greenhouse effect and so on are the causes of climate change, but that knowledge is still relatively minimal if it is related to the problems faced by the poor and also alternative solutions to the impacts of climate change. Thus, there is further instruction and understanding of efforts to address or solve the impacts of climate change.

On the basis of the obtained findings illustrated above, this was further strengthened by a research results obtained by Nasution & Manurang (2016: 142-143) whose have argued that the students' level of ecological ability was categorized as good with elaboration namely; in evaluating ecological intelligence and knowledge in the level of ecological intelligence of high school students based on local wisdom in using the mangrove forests found in Jaring Halus Village, Sicanggang sub-district, Langkat Regency is categorized as good.

CONCLUSION

Climate change is one of the greatest challenges faced by humans, rising temperatures and changing weather patterns exacerbating the risks of existing natural disasters or triggering new disasters, resulting in deep suffering, especially for the poor, this is because they economically very weak, as well as the lack of environmental and social capacity to face the consequences of climate change and natural disasters.

In general, students already understand the ecological issues related to knowledge about climate change, such as the causes of climate change, its impacts, and predictions on climate change issues. They are aware that issues of global warming, the depletion of ozone, the greenhouse effect and so on are the causes of climate change. The impact will further complicate the lives of poor people. Thus it can be concluded that students' awareness of ecological intelligence on the impact of climate change is good enough.

SUGGESTIONS

The changing circumstances of the environment have resulted in socioeconomic inequalities in society, this continues to inhibit capital growth due to the high price of food, water and energy flows, resulting in poorer communities and increasingly feeling the burden of their livelihoods. Strategic and sustainable efforts are needed in different layers to cope with the effects of widespread climate change. Nation Focal Point within the framework of the United Nations climate change convention, or united nations framework convention on climate change (UNFCCC) facilitates climate change programs and processes that have been undertaken by various government sectors and stakeholders. Given climate change has local and international levels of dimensions, coordination and synergy continues to be strengthened by the Ministry of Environment and Forestry with the National Development Agency and the Ministry of Finance in the context of climate change, national development and budget. Added to the efforts of the Foreign Ministry in the international negotiations on environmental issues at the global level.

This study reflects a number implications, especially for overcoming climate change. First of all, it is suggested to the government to implement more sustainable and equitable development, in addition to willingly demonstrate to the public on the dangers of climate change. Whereas in the realm of education, the Ministry of Education and Culture should emphasize in applying the ecological sources to interdisciplinary lessons. Of course, teachers are also expected to be able to reconstruct subject matter, which is more inclined to facilitating students in increasing their ecological intelligence to cope with the impacts of climate change. Teachers are supposed to be able to introduce more about the living local wisdom partly as the substantial material in the lessons taught in establishing the students' ecological intelligence. Understanding climate change as a very serious threat, similarly UNDP (2007: 18) argues that the best way in adapting to climate change is through switching to more sustainable forms of development, learning to live in ways that are more respectful of the natural surroundings and the balance and sustainability of ecosystems. Therefore, these efforts can also be used as protection for the environment.

REFERENCES

Fazzlurrahman, H. Wijayanti, T.D. & Witjaksono, D.A. (2018). A measurement of performance: Student involvement in organization and campus environment. *International Journal of Educational Research Review (IJERE), 3 (*4): 13

HEKS. (2010). Media Partisipatif Untuk (Mengurangi) Resiko Perubahan Iklim Dan Untuk (Menanggulangi) Bencana, Mengintegrasikan Pengurangan Resiko Perubahan Iklim Dan Bencana Ke Dalam Proyek-Proyek Pembangunan Masyarakat. Papper online, Edisi 5 Maret, 4. https://brotfueralle.ch/content/uploads/2017/07/CLiDR-Indo_Vers5_12-2010.pdf

Mercy Corp Indonesia (2107). Panduan Penyusunan Kajian Risiko Iklim Climate Risk Assessment (CRA). Jakarta Selatan: Mercy Corps Indonesia.

Muhaimin (2015). Membangun Kecerdasan Ekologis (Model Pendidikan Untuk Meningkatkan Kompetensi Ekologis). Bandung: Alfabeta.

Muhaimin (2015). Implementasi Model Pembelajaran Berbasis Masalah Lokal Dalam Mengembangkan Kompetensi Ekologis Pada Pembelajaran IPS. Jurnal Sosio Didaktika: Social Science Education Journal, 2 (1), 15.

Nasution, D.Q. & Manurung, S.B. (2016) Analisis Kecerdasan Ekologis Berbasis Kearifan Lokal pada Siswa SMA di Desa Jaring Halus, Kecamatam Sicanggang dalam Pemanfaatan Dan Pelestarian Hutan Mangrove. Jurnal Pendidikan Biologi, 5 (3): 142-143.

Raco, J.R. (2010). Metode Penelitian Kualitatif (Jenis, Karakteristik Dan Keunggulannya). Jakarta: PT. Gramedia Widiasarana Indonesia (Grasindo).

Sasmitatias, F. & Kuswanto, H. (2018). The development of science learning device based on serukam local culture to improve students' analytical skill. *International Journal of Educational Research Review (IJERE),* 3 (3): 59

Supriatna, N. (2016). Ecopedagogy (Membangun Kecerdasan Ekologi dalam pembelajaran IPS). Bandung: Remaja Roesdakarya.

UNDP/United Nations Development Programe Indonesia (2007). Sisi Lain Perubahan Iklim, Mengapa Indonesia Harus Beradaptasi Untuk Melindungi Rakyat Miskinnya. Jakarta: UNDP Indonesia Country Office.

Watsiqotul, M. (2018). *Pengembangan Bahan Ajar Pembelajaran Sejarah Lokal Tradisi Wahyu Kliyu Berbasis Guided Inquiry Untuk Meningkatkan Kecerdasan Ekologi Siswa SMK Negeri Jatipuro Karanganyar*. Surakarta: Universitas Sebelas Maret.