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STUDENTS' INSIGHTS ON TEACHING AIR POLLUTION IN INDONESIAN CLASSROOMS: A REPORT BASED ON SEMI-STRUCTURED INTERVIEWS

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ABSTRACT

This qualitative study based on grounded theory was conducted among 49 active student leaders of Indonesia to determine how students perceived the situation of environmental education in their senior high schools and how the issue of air pollution is tackled in their conservative classrooms. The responses from semi structured interviews were specifically coded using the principle of open, axial, and selective coding and the content were systematically categorized, compared, and summarize to explicitly elicit the context of students' general perceptions. Indonesian students acknowledge: (i) worsening situation of air quality brought by the combination of anthropogenic and natural causes, (ii) social media platforms to be the major available source of information and (iii) issues about air pollution are urgently needed to be address through innovations in the current environmental education system of the country by incorporating a curriculum emphasizing the concepts of sustainability.

Keywords: air quality management, ASEAN, forest fires, green school policies, quality education, sustainable development goals (SDGs)

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INTRODUCTION

Environmental crisis in the modern society is caused by environmental management that ignored the principle of sustainability. Many methods have been done to alleviate these environmental crises globally however until now, there is no instant and quick formula to fix all the damages brought upon by the continued degradation of natural resources. Therefore, it needs another long-term formula in solving this natural problem. One way that can be used is by educational approach (Arioder et al., 2020). According to Herdiansyah et al. (2016) the involvement of environmental development could be done through two kinds of approaches – *project approach* and *motivation approach*. The first approach (project) is based on redesigning existing curriculum that would focus in contributing to the success of the student learning experience. The implementation of this new design involves an evolutionary improvement of the existing traditional curriculum with gradual modifications (Drinka et al., 2019). On the other hand, the second approach (motivation) is characterized of an educational environment that has a set of spatial-objective, social, psychological and pedagogical influences as objects of analysis (Kislyakov, 2017). Although the motivational approach may spend a longer time, Pahl et al. (2017) have noted that it will yield more positive effects because the target students will gradually change their attitude and behavior in persuasive manner. The student's behavior of ignoring environmental problem will turn into attitudes that will always grow and culminate in stability of environmental involvement. Nevertheless, both approaches can be integrated through education systems that would enforce not just environmental awareness but as well as environmental values. These may serve as the backbone of the younger generation to engage themselves on many international policy discourses. The younger generation are expected to actively participate and become game changers for the environmental crises that our world is facing nowadays. In spite of many social digital platforms that allowed the younger generation to learn and communicate many of their environmental concerns, advocacies, and inquiries, conservative education systems, especially on many developing countries in Southeast Asia, are still reliant on traditional education inside the classroom.

In particular is the Muslim dominated country of Indonesia whose rapid urbanization has occured in less than two generations (Dethier, 2017). This urbanization has also boosted the consumption needs of the Indonesian populace. In particular is energy consumption coming from industries and normal households, wherein most of the sustainable energy supplies are needed to be maintained and improved (Alam, 2016). According to Santosa et al. (2008), the rapid development of Indonesia was in fact heavily fueled by fossil fuels, especially oil, followed by natural gas and coal. The exploitation of fossil fuel in "*fueling*" the development of the country resulted in significant environmental quality degradation. Air pollution is perhaps Indonesia's most severe environmental problem. The construction of infrastructure, as well as the development of transportation and also the number of industries can contribute to the increase of pollution in the air (Ummi et al., 2019; Setiawan et al., 2018; Wijayanti et al., 2018; Saudi et al., 2019). Clean air is a basic requirement for human health; however, rapid economic development have resulted to the increase on the number of industries that pollutes the atmosphere. This worsening air quality now poses as a major risk to public health (Liao et al., 2015). Furthermore, fires associated with agricultural and

plantation development in Indonesia has released emissions into the atmosphere that does not only degrade regional air quality but also contributed to greenhouse gas concentrations (Marlier et al., 2015a). Forty-five percent of Indonesia's deforestation from 2000 to 2010 was observed on oil palm, timber, logging, and coal mining concessions (Abood et al., 2015). Fires are considered to be a cheap and effective method to clear and maintain land for agricultural and plantation development (Simorangkir, 2007), but at the same time damages biodiversity, reduces carbon storage potential, and can severely degrade regional air quality.

The Indonesian government tried to address urban environmental issues starting in the 1980s, but this has been a relative failure because policy implementation has been poor due to corruption, weak commitment of public agencies to combat on environmental issues, and local government authorities' low awareness of the environmental problems (Dethier, 2017). Changing people's behaviors and views about the environment, with the hope that this can change their actions and will make them as a more concerned citizen that would protect their environment, is the goal of a sustainable environmental education (EE). In the case of Indonesia, this is addressed by the government through the implementation of the *Adiwiyata* program. *Adiwiyata* is a program that aims to make school residents responsible for efforts to protect and manage the environment by the realization of increasing environmental awareness by implementing cultured environments in schools (Latief et al., 2019; Caddafie et al., 2017; Desfandi et al., 2019). However, the curriculum for most Indonesian high schools nowadays also should be strategically formulated that does not only produce teaching materials but rather pays attention to current developments of fast changing educational landscape. The curriculum must always be updated in line with changes to remain relevant to a changing society (Prihantoro, 2015). Environmental Education (EE) has always tried to balance between two things: a realistic account of the threats that the world is facing and an attitude which would motivate and empower people (Pihkala, 2017). However, there are problems related to the low participation of the community to participate in environmental education (EE) movement due to limited understanding of the existing environmental education issues such as lack of information, and socialization from environmental education itself (Darmawan & Dagamac, 2020).

According to the research of Parker et al. (2018), Indonesian students identified waste or rubbish, and not consumption, as the main problem locally but were not well informed about environmental issues both in national and international scales. They are vague about how to ameliorate environmental problems, reflecting the weakness of EE in problem-solving for the country. According to the findings of their research, students perceived, 'society' – rather than governments, industry or consumers – as the most accountable in causing environmental problems. There is a need to develop an environmentally friendly education as a solution to the aforementioned air pollution problems. The negative actions of human obviously damage the earth which ultimately causes the pressing issue of global warming. Educating students at a very early age on topics related to pertinent environmental problems to raise ecological awareness is an important alternative to address the apathy of people towards environmental protection (Sagala et al., 2019; Hu, 2019). However, a missing gap on many studies concerning environmental issues

related to air pollution in Indonesia is to communicate the insights of many other important stakeholders, particularly are the rapidly evolving high school learners in the country.

Hence, this qualitative study based on grounded theory was conducted among the active youth sectors of Palembang Indonesia to (1) report how students perceived environmental education on their programs and (2) obtain their insight on the issue of air pollution that have been afflicting the province over the last years.

MATERIALS & METHODS

Selection of student participants

A total of 49 public senior high school (20 males and 29 females) student leaders participated in this qualitative study. All these students were between the ages of 14 to 19 years old. The results of the interviews right after analysing there content is shown in this section with some *in verbatim* quotations that were directly translated from Bahasa to English for reference. Since student leaders in most senior high schools in Indonesia are the active volunteers in most green projects of their respective schools, they were purposively selected for this study. In addition, the following criteria was also considered: (i) personal commitment and availability to participate in the series of interview and focus group discussions (FGD) that were conducted for this study; and (ii) on their familiarity in incorporating environmental issues in their daily routine activities. Before the interview commenced, students were oriented about the purpose of the series of interviews and they actively agreed to participate in the rounds of interview session needed for the study. Discussions about the air quality and air pollution problems and how such issues are discussed at the senior high school classrooms have been the consistent themes that were scrutinize throughout the interview process.

Interview process and ethical considerations

Validated semi-structured questions were used for the interviews. The entire interview process was divided into three parts of the discussion component namely; (i) *sketching component* - where participants were asked about important profiles such as their level of education, and their organizational experiences; (ii) *assimilating component* - where participants answer questions based on their knowledge of air quality and the state of environmental education in their respective schools; (iii) *candidate searching component* - where participants present their initiatives and opinions on air pollution control and the need to incorporate such topics in most high school classrooms in Indonesia.

Content Analysis

All the participants were initially informed about the data recording process and they were assured of the privacy of information that they would divulge during the interview. Students that are not yet of legal age,

were asked from the school's permission and authorization of their guardians or families. After the students willingly gave their consent for the recording, the interview commences with the interviewer jotting down important notes that the participants have been actively tackling in an *Aide-memoir*. The notes taken from *Aide-memoir* validated by the voice recordings of all the interviewers were transcribed in verbatim. The responses that were recorded both at the recording process and transcripts from the *Aide memoir* were then divided into segments that were relevant to this study. These responses were specifically coded using the principle of open, axial, and selective coding. Moreover, the content was systematically categorized, compared, and summarize to explicitly elicit the context of student's insights reported in this study.

RESULTS

Student's view about the air quality in Palembang

Three student interviewees have agreed that Palembang have experienced a very poor air quality. 9 students have described the air quality to be *kotor* (dirty), *berkabut asap* (foggy smoke), *berdebu* (dusty), and *tercemar* (polluted). 16 students have noted that the visibility in the city have gotten worse and might indirectly contribute to a number of road accidents. However, 23 students acknowledge that air quality in Indonesia is relatively changing when the rainy season begins. The students described it to be *membaik* (improving) but even though air quality is seasonal, they still find that the air quality to be worsening every year. Students identified several causes of the poor air quality in Palembang. They acknowledged the anthropogenic contribution through vehicular emissions and waste burnings that most Indonesian household practice. Moreover, the natural causes such as forest fires in many parts of the province have been identified to be contributing mostly on the poor air quality. 7 students have described that the color of the sky during early mornings in Palembang over the last years became dark red and they speculated that this is due to the smog brought by forest fires. All students expressed their dissatisfaction over the public policy about air pollution. They have noticed that the local government seems to focus more on building transportations rather than addressing the forest fires problems. Another surprising statement conveyed is that all of them are unaware of the regulations the government have been implementing. 19 students have further added that information on air quality in Indonesia have been acquired on news posted on their social media platforms.

The students' initiative to face the air pollution problems in Palembang

Several initiatives in preventing and acting on air pollution problems in Palembang are conveyed by the students. In terms of preventing, students indicated that they reduced the usage of private vehicles (27 out of 49), stop the indoor burning of waste products at home (5 out of 49), in terms of acting on air pollution, 47 students responded that they wear mask when they do outdoor activities especially on occasions that they notice the haze caused by forest fires. One male student who identified himself to be a frequent

smoker, have even started to worry about the forest fires and smog occurring in Palembang. This made him realized that he needs to slowly quit his smoking habits.

Are high-school classroom helping students to be environmentally informed?

We know that it is possible for classrooms to be a place for students to get a variety of information, and one of them is information about environmental issues. But unfortunately, the current availability of materials and presenters are not very useful to disseminate environmental information based on all the responses of the 49 students who apparently seems to be clueless about theoretical knowledge related to air pollution. Students have acknowledged that air pollution issues are discussed very briefly on certain science subjects such as biology and chemistry. In terms of the learning process, 5 students stated that information about discussion on relevant environmental issues in the classroom was minimal. 3 students have also stated that the school only educated or taught them basic concepts such as Reduce, Reuse, and Recycle (3R). But in overcoming these conditions, 19 students vehemently expressed their self -initiative to independently educate themselves by *dengan mencari informasi diinternet dan social media* (searching information on the internet and social media) or *juga mencari narasumber yang andal* (asking reliable resource persons) to at least validate their environmental insights. However, 1 other student interestingly expressed the subjectivity of student motivation when she stated that *even if their school has provided information, if the awareness of her classmates is still lacking because of many other personal or technical distractions, then high school program's environmental efforts will be useless.*

DISCUSSION

Majority of the students interviewed agreed and stated that the air quality around them was in poor condition. Forest fires that always occur every year in Palembang Indonesia are the main cause of the decline in air quality, coupled with the dense traffic activities, industrial emissions, and waste incineration. In this frequent situation, Palembang students and their schools take the initiative to work to reduce air pollution around them by replanting trees, watering plants, reducing the use of private vehicles, and quitting smoking activities in order to reduce air pollution. Other studies have also showed similar initiatives from other Indonesian high schools. Like for an instance is the SMPN 6 Tuban, that had been recognized as one of *Adiwiyata* school (green school) for the country (Fadlillah et al., 2018), kept on developing strategies to continuously create environmentally friendly characters in SMP 6 Tuban based from the four implementation features of the *Adiwiyata* program namely, environmentally sound policies, environment-based curriculum, participatory environment-based activities, and management of environmental-based supporting facilities (Warju et al. 2017). But each aspect has not been implemented optimally. These aspects can be optimized with the consistency and commitment of the school community. This consistency is enhanced by positioning students as the center in the implementation of the *Adiwiyata* program and adding examples, rewards, and punishments as alternative strategies to increase motivation in developing students' caring character. According to the overall assessment of Yasin. (2019), the

Adiwiyata program and its aspects can contribute positively to creating situations and conditions that support the development of environmental awareness at least among Indonesian high school students. Perhaps, such imperative models coming from *Adiwiyata* schools of Indonesia are needed to be adapted among Palembang high schools to address the low environmental appreciation and motivations raised by the 49 student respondents of this study.

However, despite the activities implemented on those Indonesian schools, student's awareness and active participation that addresses air pollution problems are still generally low. As indicated in our findings in the interview, practices that prevents air pollution such as using private vehicles and indoor burning of waste products are practiced only by less than 50% of the student leader respondents. Maulidya et al. (2014) have indicated that for all environmental literacy components, students were high in components of environmental knowledge and cognitive skills but have not been satisfactory for the affective and responsible behavior components. This is further proved by the case study presented by Meilinda et al. (2017) about the low-level students' environmental literacy in *Adiwiyata* schools of Surakarta, Indonesia. Their findings have shown the following breakdown: *Adiwiyata* 77% for environmental knowledge, 60% for attitude, 70% for environmental concern. Therefore, a high level of knowledge will not always encourage someone, especially students, to show care about the environment (Meyer, 2015). Hence, developing a classroom that would enable students to recalibrate their environmental care towards the environments should be critically considered as well in most *Adiwiyata* program policies.

Nevertheless, the responses of the students interviewed in this study seem to understand the negative backlashes of air pollution in Palembang and students have identified efforts to overcome the weaknesses in the current system of education. Students basically voice out that schools must provide effective learning practices to develop responsible behavior for the environment. The results of this qualitative study find out that Indonesian students wanted to discuss topics related to environmental education. Some of them even suggested raising environmental education as a subject at their very own high school, because they thought that when there will be environmental education at their high-school, more information about existing environmental problems can be given to them. However, it is very important to point out that students in this era of digital age obviously get more engaged with technology (Ainley et al., 2008). This is obvious especially since most of the students' responses in this study have advocated on independent self-initiative means to address their environmental curiosities. Social media could be utilized as a tool to promote awareness regarding various current environmental issues in a much faster way and to a large target groups within a very short span of time, because people are using these platforms nowadays to support environmental campaigns and to connect people locally and globally on minor to major environmental issues (Mallick et al., 2019). Moreover, due to the swift flow of information, propagations of environmental sustainability awareness in higher education would be more effective with the use of social media (Hamid et al., 2017).

CONCLUSION

The role of these future generation has been always imminent especially that student's knowledge, awareness, and behaviour in relation to a particular environmental problem does not always match. Nevertheless, the collective responses of the Palembang students provided in this study clearly conveyed three important messages with regards to the situation of educating students about air quality in the locality: (1) the younger generation acknowledge the yearly worsening of air quality in Palembang brought upon by anthropogenic and natural causes (2) immediate practical actions are urgently needed to address these air pollution issues and for some students, proactive and independent participation in acquiring knowledge, where their local government unit in some point fails to provide, is needed and (3) high school classrooms should be innovative in creating a learning space where their social responsibilities in solving air pollution problems is highlighted and their environmental behaviors towards sustainable development is shaped out.

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