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IOP Conf. Series: Journal of Physics: Conf. Series **1241** (2019) 012028 doi:10.1088/1742-6596/1241/1/012028

Implementation of environmental care character education value on biology subject through adiwiyata

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Abstract. SMAN 2 Banguntapan is a school that implements character education and the concept of Adiwiyata where the program is a solution to environmental problems to realize the generation responsible for environmental management and support sustainable development. The purpose of this research are: To know and measure the implementation of the value of environmental care character education on biology subject through the concept of adiwiyata manifested in the form of attitude. Data collection techniques and instruments: interview, observation, open and closed questionnaire and document study. Validity test: Triangulation, Member checks, and Correlation between item statement scores and total construct scores. Reliability test: One shot – Cronbach's Alpha. Data analysis: Miles and Huberman, and Likert scale data processing. The results: Implementation of the value of environmental care character education on biological lessons through the concept of adiwiyata integrated in indoor and outdoor learning activities, but in its implementation there are still deficiencies and need to be improved. Then, the value of environmental care education is shown through the attitude of students can be said to be good with a percentage of 76.26% where the results show good quality.

1. Introduction

Urgency which is an important discussion in various countries, including in Indonesia lately is the global environmental crisis, namely the crisis of environmental pollution (water, soil, air), damage (forests, soil, ozone layer), extinction of energy resources, minerals, and biodiversity, endangered natural sustainability, unbalanced ecosystems, global climate change, and others. This crisis is a very serious and become real threat to human life. The root of the problem is the error of the human paradigm towards him, nature and human relations with nature and the low value of caring for nature and the surrounding environment so that effort can be done, including by starting to improve the paradigm and awareness through education [1] especially character education and environmental education. Further efforts in handling the global environmental crisis, Indonesia incorporates the principles of sustainable development or SDGs into national development planning through education, namely in point 4 "Quality of good education" through Education for Sustainable Development or Education for Sustainable Development (EfSD) which allows every human being to acquire the knowledge, skills, attitudes and values needed to build a sustainable future [2]. The realization of the government program which shows that Indonesia is committed to implementing EfSD is through the Adiwiyata School program which is a joint decision of the Minister of Environment and the Minister of National Education in the form of

programs implemented at the primary and secondary education levels [3]. This effort was also supported in Nawacita at the 8th point "Revolutionizing the character of the nation through structuring the national education curriculum" where the curriculum can slowly improve the character of the nation [4], and one of the national character that raised is the value of caring for the environment [5]. By striving to realize the nation's Nawacita, this is also evidence of optimizing education through the Sustainable Development (SDGs) system.

Adiwiyata is a program of socialization of environmental awareness as well as an appreciation of education units that reach certain stages that have high qualifications in environmental care and responsibility in environmental management through good school governance to support sustainable development [6]. However, seeing the facts in the field there are still problems like the existence of garbage, the environment which sometimes has not been consistently maintained properly, found tools and electronic objects that are still alive after school hours. This is what proves that the existence of the Adiwiyata program/concept in school has not been able to fully guarantee an increase in awareness and concern for the environment among students.

However, Adiwiyata has not been successfully implemented due to several factors, including students who still do not understand the concept of environmentally sound schools, some of which are still not concerned with environmental conditions, lack of community participation, and lack of enthusiasm in the implementation of environmental education among teacher and school staff [7]. And the implementation of Adiwiyata is also not going well due to lack of communication between the school and the program responsible, human resources, student changes every new school year, students' socio-economic conditions and educator care then has an impact on the difficulty of forming behavior in character education for students' environmental care [8].

One of the schools that received the Adiwiyata Mandiri title was SMA Negeri 2 Banguntapan Bantul. Researchers consider it important to conduct an in-depth analysis of the implementation of character education through the Adiwiyata program/concept. Researchers will look at the value side of one character education that is closely related to the concept of adiwiyata, namely the value of character education for environmental care through biology because in this subject that can be linked to the concept of adiwiyata. In addition, biology learning based on the concept of adiwiyata is conveyed by bringing environmental-oriented messages to students. Researchers also measure the value of character education on environmental care of students which is manifested in attitudes. The attitude of this character determines the environment and is important for every human being [9] This research also expected to find out about problems, constraints, obstacles and solutions to the problems found in implementing these character values so that schools can be more optimal in developing the character values of environmental care, especially through biology subjects using the concept of adiwiyata (schools with environmental culture).

2. Research Methods

This research is a mixed research type with descriptive qualitative and quantitative approach. The research was conducted from January till March 2018 in SMAN 2 Banguntapan in Glondong, Wirokerten, Banguntapan, Bantul, D.I.Yogyakarta.

2.1. Subject of Research

The sampling technique used in this research was Purposive Sampling Technique, so that the subjects obtained from this study were shown in the table as follows: Principal 1 person, Deputy principal (curriculum field 1 person, student affair 1 person, public relation 1 person, facilities and infrastructure 1 person), Chief executive of adiwiyata 1 person, Biology teacher 1 person and student of XI MIPA 4 clasess (total: 125 person).

2.2. Data, Instruments and Data Collection Techniques

Data collection was carried out with participatory observation techniques, semi-structured interviews, questionnaires and documentation studies. The instruments used guidelines for observation and

interviews, next for non-test instruments in the form of questionnaires, consisting of: 1). Open instrument, which is the instrument in the answer, students are free to express answers 2). Closed instrument, which contains statements that are used to measure attitudes where the answer is no "wrong or right", but is "positive and negative", and uses a Likert Scale which is arranged in the form of a statement followed by a response that shows level [10].

Table 1. Likert Scale

Statement			
Positive	Value	Negative	Value
Always	4	Always	1
Often	3	Often	2
Sometimes	2	Sometimes	3
Never	1	Never	4

2.3. Instrument Validity and Reliability

2.3.1. Validity

Data collected from observation, semi-structured interviews and document studies were tested for data validity using triangulation techniques, which included: 1) source triangulation, 2) triangulation of data collection techniques, and 3) time triangulation [11]. Next, member check were done. Then for data obtained from closed questionnaires that used a Likert scale, the validity is measured by looking for a correlation between the score of the question item and the total construct score. Significance determines by comparing the value r count with the r value of the degree of freedom (df) = n – k , with alpha of 0.05. If r counts for each question item is positive and greater for r table, then the question item is said to be valid.

2.3.2. *Reliability*

This test is used in a closed questionnaire with one shot measurement, namely measure the correlation between the answers of statement items, that was used Cronbach's Alpha formula. Cornbach's Alpha is a measure of reliability that has a value of 0 –1. A construct/variable is said to be reliable if it gives the value of Cronbach Alpha > 0.70, [12].

2.4. Data analysis technique

The analysis used for data obtained from observations, interviews, open questionnaires and document studies is qualitative data analysis of Miles and Huberman. The stages of analysis include: 1. Data Collection (data collection), 2. Data Reduction, 3. Data Display 4. Conclusions drawing / Verifying [14], and the analysis for the data obtained from the closed questionnaire, namely by processing Likert scale data, the data were analyzed by calculating the average answers based on scoring each answer from the respondent who then the data was percentage. The following is the formula to determine the percentage of results from the respondents' questionnaire.

$\% = \frac{n}{N}$ x 100%

% = Percentage sought; n = Value obtained; and N = Number of all values

Then the percentage that has been obtained is categorized through the following table.

Table 2. Percentage Description

Percentage Range	Quality
≥ 76 %	Good
56% - 75%	Sufficient
≤ 55%	Low/Less

Next, the data that has been analyzed is interpreted in descriptive or narrative form.

3. Results and Discussion

3.1. Implementation of Environmental Care Character Education Values on Biology Subjects through the Concept of Adiwiyata at SMA Negeri 2 Banguntapan Bantul

3.1.1. Implementation of Character Education in School Curriculum and Culture

The observation's result on the components of the implementation of the environment-based curriculum, when KTSP was still applied in SMAN 2 Banguntapan, there were special subjects regarding learning about environmental protection and management. However, after the introduction of a new curriculum, namely the 2013 Curriculum (K13), the subjects of environmental education are merged and integrated into other main subjects, so that the environmental value is not reduced.

3.1.2. Implementation of Character Education in Learning Biology Subjects in Schools Character

Learning is done by arranging learning methods that actively involve students through models, approaches, methods, and strategies in biology learning. This learning is developed through an integration approach with an infusion method in the Biology subject through a strategy of learning activities indoor and outdoor. The implementation through outdoor learning (outdoor) [15], is carried out by utilizing learning media in the form of environment as a biology learning laboratory. Learning is realized by processing waste in the environment, observation and direct observation of biological objects that exist in the school environment, in addition to objects, students also learn about ecosystems and the interaction of living things that can be found in the school environment in accordance with the concept of biology. Next, learning is done based on the steps that have been formulated through syllabus and Learning Implementation Plans (RPP) and the material that is integrated focuses on biodiversity, ecosystem and changes in environmental impacts. The process of integrating character education into learning can be done through subject matter, teaching materials, processes and media selection in learning [16]. Learning is done by forming a study group that aims to increase student participation and the communication process can be formed more effectively. Students are actively involved with assignments, both independent assignments and project assignments carried out in groups. Then producing real work related to the preservation of environmental functions, preventing environmental pollution and destruction through learning biology. Next, monitoring and evaluation.

The following are 3 basic competencies in biology subjects that researchers observe in implementation of the values of environmental care character education, namely:

1). Basic Competence 3.2 concerning "Biodiversity (Genes, Types and Ecosystems) in Indonesia", in this material the teacher gives instructions to students to bring several different types of plants to study together in school. The teacher also invited students to compare these types with those in the school environment with the intention of utilizing the school environment as a natural or biological laboratory to see firsthand objects from living things studied in biology subjects. In addition, students outside school hours are instructed to visit natural places and zoos to observe for themselves how diversity exists. Students are invited to discuss environmental issues related to biodiversity, flora and fauna of Indonesia, so that a sense of caring for the environment can be planted, then becoming accustomed and slowly forming a character caring about love for the environment.

2). Basic Competencies 3.9 concerning "Ecology: ecosystems, energy flow, biogeochemical cycles and interactions in ecosystems", learning is carried out with paper media then children can develop their

creativity by originating in outdoor learning, observing ecosystems and things that can be seen in nature and the environment. The value of character education in environmental care began to be disbursed by teachers in learning and on the sidelines of explanation about the complex life of living things in the environment, from those with the lowest trophic level to the highest.

3). Basic Competencies 3.10 concerning "Environmental Change and its Impact on Life", students are invited to recognize existing environmental issue issues, see in the surroundings what short-term and long-term changes can be observed, then stimulate to discuss responses regarding solutions to existing problems.

Based on the data collected through observation or direct observation, interviews and documentation studies, it can be recognized that the implementation of environmental education character values to biology subjects through adiwiyata program at SMA Negeri 2 Banguntapan Bantul is in accordance with the concept of Adiwiyata as it should, through the 4 basic components of adiwiyata and has been integrated indoor and outdoor, but still needs to be improved in innovation or new faces in the media used during biology learning.

The implementation is also inseparable from obstacles. The problem faced is that there are still attitudes of students who seem not to care about the environment because there are component of the RPP that has not been integrated with the concept of environmental education. The solution is to get around with never getting bored to always remind and motivate students to always care about the environment so that biology learning seems more interesting and integrated with nature.

3. 2. The value of character education cares for students on biology subject through the concept of Adiwiyata (environmentally sound) at SMA Negeri 2 Banguntapan which is manifested in attitude through open and closed questionnaires

3. 2. 1. Open Questionnaire

In the knowledge and information of students in the adiwiya concept related to the adiwiyata program and the implementation process at SMA Negeri 2 Banguntapan, students as a whole have been aware of the program or adiwiyata concept applied by the school. Students are very supportive of this program, because they can familiarize themselves with individuals who care about the environment. But in the implementation process, there are still some school residents who have not implemented or instilled a sense of care for the environment. The participation of students in the implementation namely by following the school and outside schools that are related to the environment.

Students in implementing environmental character character education and values that are integrated in biology subjects, especially in environmental materials, namely through the activities of using and utilizing biological object objects that exist in schools as learning materials and media, as well as the school environment as a source of learning is more fun than just in the classroom because biology learning uses an in-depth environmental approach. The value of character education cares about the environment that participants get and applies to the material or Basic Competencies (KD) 3.2. "Biodiversity at Various Levels (Genes, Types and Ecosystems) in Indonesia", students can find out which groups of plants and types of plants that are in school so they can know how to maintain them, can learn about the existing biodiversity, have a love and want to keep various flora and fauna including saving animals that need help, planting trees for environmental sustainability. In the material or Basic Competencies (KD) 3.9, "Ecology: Ecosystems, Energy Flow, Biogeochemical Cycle and Interaction in Ecosystems", students learn about values to keep the environment to remain beautiful, knowing organisms that live in the environment or in various ecosystems so that students can understand how events occur in nature and the surrounding environment and maintain an attitude so as not to damage the ecosystem by changing or disrupting the sustainability of the system in it. In the material or Basic Competency (KD) 3.10. "Environmental Changes and the its Impact on Life", students have a sense of value to always maintain and preserve the environment, knowing how the impacts that occur due to changes that occur in the environment, so that learners gain insight and knowledge to minimize, avoid self and anticipate from actions that can damage the environment, in addition to making efforts not to pollute the environment, pay attention to the types of waste and how they are discharged, so that they are not disposed of anywhere. Students can also increase self-awareness of the environment, use natural

wealth as needed / not excessive so that the natural condition remains stable and there are no ecological disasters.

3. 2. 2. Questionnaire closed

In this study the developed attitude/behavior statement items include the material: (1) NEP (New Ecological Paradigm), (2) Biodiversity at various levels of life, (3) Ecology: Ecosystems, energy flows, cycle of biogeochemistry and interactions in ecosystems, (4) Changes in the Environment and the Impact on Life

In the measurement phase of validity, namely by conducting correlations between scores of questions (indicators) with total construct scores or variables obtained the results of empirical validity and reliability tests. Based on the results of the empirical validity test, it is known that of the 45 items used, 38 statements were considered valid. Then using the results of the 38 items of the statement, a significance test was performed by comparing r count (the results of the Correlated Item-Total Correlation column) with the results of r table calculations for degree of freedom (df) = n-2, where n is the number of samples. with total respondents = 125, obtained df = 125 - 2 = 123 and in this study, the significant level used was a significant level of 5%, so that it can be seen from the guidelines of degrees of freedom (df) with (123; 0,05) obtained r table value of 0.1478, so that the results obtained from 38 items of statements contained in the questionnaire, all can be declared valid. Through the calculation, the reliability coefficient value obtained from 38 statements through the Cronbach's Alpha formula is 0.885 and based on the criteria of the Cronbach's Alpha formula, a construct is said to be reliable if it gives the value of Cronbach Alpha > 0.70, so it can be said that of the 38 items on the questionnaire, all can be declared reliable. Reliability testing with the Cronbach Alpha method shows that the reliability of the instrument is categorized as good.

After testing the validity and reliability, the results of the closed questionnaire were analyzed using descriptive statistics. The result obtained for the first and second material are as follows:

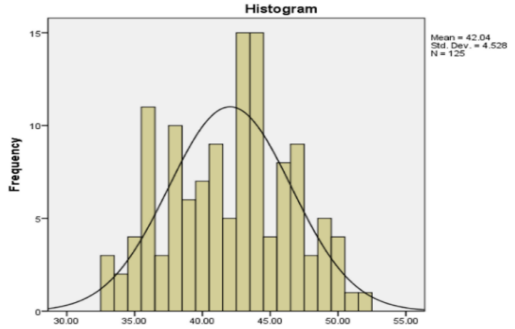

Figure 1. Histogram of the NEP (New Ecological Paradigm)

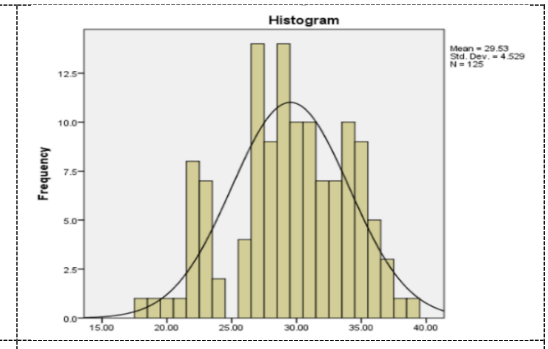

Figure 2. Histogram of "Biodiversity at Various Levels of Life"

1. NEP (New Ecological Paradigm)

The “NEP" is the first material used in closed questionnaire, and this instrument from Dunlap [17] was designed to identify five dimensions of ecology [18], namely, balance of nature, limits to growth, anti-exemptionalism, anti-anthropocentrism and eco-crisis which modified by the researcher in accordance with the measurement objectives in the study. Based on Figure 1, it is known that respondents (students) provide an average rating in measurements on a range of 3-4 scale. Then analyzed with the above calculations and obtained results of 80.85%. These results are then interpreted in descriptive form using the range of values found in table 2. That the percentage range of ≥ 76% shows good quality. This means that students can be categorized as good in having an understanding of the environmental science paradigm.

2. Biodiversity at various levels of life

Based on Figure 2, obtained the average results of 125 respondents amounted to 29.53 so that if divided by 10 statement items, then obtained the average scale is 2.953 it means that students are in the

"Sometimes" range and "Often" in carrying out attitudes that reflect the value of environmental care character education related to biodiversity material in biology subjects.

After the first and second material, followed by analysis on the third and fourth material then the following results are obtained:

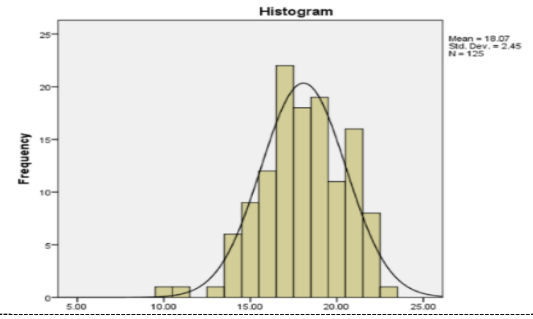

Figure 3. Histogram of "Ecology: ecosystems, energy flow, biogeochemical cycles and interactions in ecosystems".

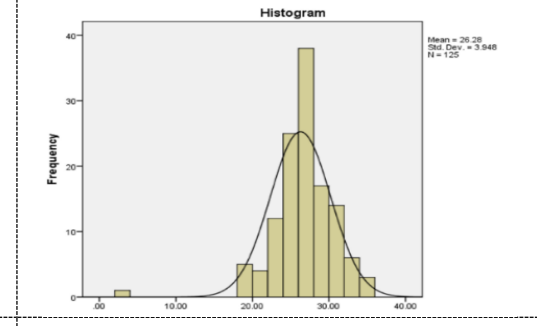

Figure 4. Histogram of "Environmental Change and Its Impact on Life".

3. Ecology: Ecosystems, energy flows, cycle of biogeochemistry and interactions in ecosystems

Based on Figure 3, also obtained the average value of the total score of 18.07, then divided by 6 statement items on a valid questionnaire and obtained 3.012, which shows the scale of "Frequent" attitude. This indicates that students are already on the frequency of often doing attitudes that reflect the value of environmental care character education.

4. Environmental Change and its Impact on Life

Based on Figure 4, the average total score is 26.28 then divided by 9 statement items on a valid questionnaire, and obtained a value of 2.92. This number is on a 2-3 scale. This indicates that students are already in the range of "sometimes" and "often" actions that reflect the value of environmental care character education on material related to the Environmental changes and its impact on life.

After getting the score on each material, the results of the analysis of all material are obtained as follows.

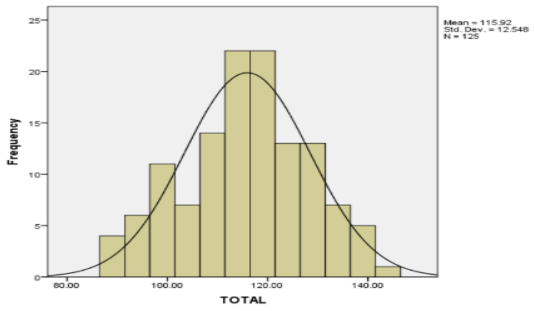

Figure 5. Histogram results of the entire environmental material

From the Figure 5, an average value is 115.92 for the results of the response of students to the closed questionnaire measuring the value of character education for environmental care in biology subjects. So if the average value is divided by 38 items of statements contained in the questionnaire, 3.05 results are obtained, this shows that as a whole the students have taken actions that reflect the value of environmentally caring character education on a "frequent" scale. Then, with the same formula, a percentage of 76.26% are obtained, and included in the percentage range ≥ 76% which showed good quality. This shows that the students can already be said to be good in reflecting the value of character education caring for the environment through attitude.

4. Conclusions

1. The implementation of environmental character education values in biological subjects through adiwiyata concept at SMA Negeri 2 Banguntapan is in accordance with the Adiwiyata concept through 4 basic components of adiwiyata and has been integrated in the learning, especially in Basic Competencies (KD) which contain environmental material. Implementation is well implemented, but needs to be improved again related to innovation media or new faces in the methods and media used during biology learning.
2. The value of character education cares for students on the biology subject through the concept of adiwiyata in SMA 2 Banguntapan which is realized in the form of attitude can be categorized as good. This is evidenced by the results of the measurement instrument based on 125 students of class XI MIPA who have participated in or studied environmental material on biology subjects that show results that tend to be "frequent" in carrying out attitudes that reflect the value of environmental care character education.

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Acknowledgement

I would like to express my gratitude to my advisors and all those who has participated in the writing of this paper. I would also like to thank SMAN 2 Banguntapan Bantul which has given permission to conduct this research.