

The Urgency of Science Comic Based on Local Culture in Forming Elementary School Character of Environmental Care and Awareness

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Abstract: Meaningful learning is not only able to strengthen students' cognitive but also forming a strong and discerning characters. Ironically, there are some studies, showing that 45% of millennial generations are ignorant and unconcerned about their surrounding issues. This shows that the current learning process still needs improvement and renewal. This article aims to outline how important the science comic based on local wisdom in forming the environmental care and awareness character. This type of research is a qualitative descriptive which use interview techniques, questionnaires, observations, and documentation. The validity test in this study uses a triangulation method that is descriptively-qualitatively analyzed. The results showed that the lack of learning media usage causes a low understanding of environmental care and awareness concept which is impacted on the lacking of environmental care and awareness character in students. The conclusion of this research is that science comic media based on local wisdom is needed to form the character of environmental care and awareness. Science comic can strengthen the concept of environmental care and awareness according to the development of elementary school students, while local wisdom in the form of punakawan puppets used as animated characters can provide good role models as well as forming the environmental care and awareness character. Moreover, there are no studies that study the concepts of science comic in association with local wisdom to form the character of environmental care and awareness in elementary school students.

Keywords: *environmental care, local culture, science comic*

INTRODUCTION

Humans and nature have a dependency and beneficial relationship (Moreno, Acero & Rodriguez, 13) It means if one of them has problems, it will greatly affect each other. Humans as the main actors in the term of nature utilization, certainly have an obligation to maintain, preserve and prevent damage to nature. This character is often called environmental care and awareness. It is an attitude and action which try to prevent damage to the natural environment and a development of efforts to repair natural damage that has already occurred (Kementerian Pendidikan Nasional, 11).

Ironically, Indonesia is currently facing an environmental crisis. This can be seen from the various area damages that occurred from different regions in Indonesia. According to the report of World Resources Institute, Indonesia is on ranked 6th as the world's largest carbon emission country with total carbon emissions of 2.053 billion tons. Based on IUCN Redlist data, there were 127 species of plants and 76 species of animals in Indonesia exist on the Critically Endangered category (Critical). The Blacksmith Institute and the Swiss Green Cross inserted the Citarum River in "Top Ten Toxic Threats in 2013. Wanabuliandari (21).

The wider, according to data from NASA, available on Global Forest Watch, Brazil had 39% more fires between January and August 2019 than in the same period in 2018 (Weisse & Ruiz, 22). The Arctic is warming twice as fast as the rest of the world. Melting permafrost releases methane, a greenhouse gas 28 times more potent than carbon dioxide. Researchers recently

found that melting permafrost and changes in surface reflectivity in the Arctic will cause \$67 trillion of economic losses, even if countries follow through on their current emissions-reduction pledges, Levin (12).

Even more concerning, based on the results of Suryadi's research (20). It shows that 45% of millennial generation have ignorant or careless behavior, the research is reinforced by Soga & Gaston (19) whose statement is that the last few decades that people around the world and especially children who have lacking interaction with nature are increasing. If this problem of environmental care and awareness character is not resolved immediately, it will cause an impact on economic losses reaching billions of dollars and also cause natural disasters that damage biodiversity, Rasyid (15).

According to Erdogan & Oszoy (8), the first thing to do to form the character of environmental care and awareness is to study about the knowledge related to the natural environment, from its benefits to the effects of nature damage to life. This statement is reinforced by the statement of Robotom (17) which states that education is considered effective because there is a learning process that reinforces the concept of environmental care and awareness to students. So the students can improve the ability to think critically about nature issues.

One of the efforts to strengthen the concept of environmental care and awareness is through the use of learning media which is according to Riyana (16) will arouse learning motivation and present a concrete and realistic basic concept. While Hamalik (Arsyad, 4) revealed that, "In addition to arousing student motivation and interest, learning media can also help students improving comprehension, presenting data attractively and reliably, facilitating data interpretation, and condensing the information." Learning media can also increase high-order thinking skills because there are several problems that can stimulate a question in students, which is according to Afandi & Sajidan (1), questions can broaden thought and encouraging more complex high-order thinking processes.

This research is focused on how important science comic based on local wisdom in strengthening the concept of environmental care and awareness so that it can form a character of environmental care and awareness for students in elementary schools.

RESEARCH METHODS

The type of research is a qualitative research. It is a research that produces descriptive about situation learning and character of environmental care and awareness. The Aims is to identify how far science comic media based on local wisdom are needed to form the character of environmental care and awareness. Data collection is using interview techniques, questionnaires, observations, and documentation. Data collected and analyzed include: (1) the media that have been used, (2) the learning process about environmental care and awareness, (3) problems faced during learning about environmental care and awareness, and (4) identification of the character of environmental care and awareness in students. The validity test in this study uses the triangulation method, with descriptive-qualitative data analysis. The research subjects were three teachers and sixty-one grade IV students who were selected and considered to represent various views on the character of environmental care and awareness at school.

RESULTS AND DISCUSSION

Theoretical Aspect

"The selection of media that is adjusted to the objectives, material, and abilities and characteristics of students, will greatly support the learning process and outcomes (Daryanto,6)." The opinion is supported by the results of the research from Sangsawang (18) which found that students will have a meaningful learning if the media used in the learning process is in sync with the needs and characteristics of students.

One of the characteristics of students at the elementary school based on cognitive theory by Piaget (Desmita, 7), elementary school student's thinking stage is in concrete installation phase (concrete operational thinking). Operations are logical relationships between concepts or scheme. While concrete is a mental activity that focuses on real and concrete objects and events so students haven't been able to think abstractly.

Referring to these characteristics, the use of science comics is considered effective because according to Jee and Anggoro (10), Science comics make scientific concepts and principles more concrete because it can describe, illustrate and clarify a scientific object that cannot be seen and displayed directly in real life. Furthermore, science comic is a form of cartoon that portrays a story containing the concept of science, thus creating a learning process that is more relevant, easy to learn, easy to remember and describes the real situation way better (Arroio, 3).

Another interesting thing from science comics according to Hands, Shaw, Gibson, & Miller (9) is it proves that comics have succeeded in influencing students' concern about environmental issues. It is because in science comics there are elements of animated characters and stories which teach lessons to students in dealing a real life. Based on these facts, the need for science comics combined with animated characters in form of Indonesian local wisdom, not only introduces the original culture of Indonesia contain good behaviors and character to students.

Puppet characters which is suitable for elementary school students are *punakawan*, because *punakawan* is cheerful group with typical humor which can breakdown the atmosphere (Ayuna, 5). The most important thing is *punakawan* can teach good character to students, according to the opinion of Prayoga (Nurrahma & Naryaningsih, 14) which says that this character is often used as a symbol of an ideal figure who has a humble nature, likes to help others, not greedy, sincerely doing things, decreasing eating and sleeping, and practice other good practices. Furthermore, according to the literature published on the Northern Illinois University website for the Southeast Asia region (Yusuf & Darmawan, 23), *Punakawan* is a distinctive character in Indonesian puppets, their character indicates a variety of roles, such as the knight's advisors, entertainers, social critics, clowns even the source of truth and policy.

Zamzami & Subiyantoro (24) added that *punakawan*'s behaviors and character contain virtue values and they are such a good guiding figures in puppets, it means teachers or advisors from puppets so that their character and behaviour can be emulated and at the same time can form the characteristics of students. So student can learn from their good and appropriate character, as well as fostering knowledge about Indonesian culture, also elevating the original culture of Indonesia to be better known to the community.

The following are the figures of the *punakawan* and their characters (Ayuna, 15): (1) Semar, described as a patient and wise figure, Semar's head and view facing upward, describing human life so they always remember the Almighty, (2) Gareng, who has a short stature and always looks down, this indicates caution, even though he is well prospered, but he must remain vigilant, his eyes squint which indicates that Gareng does not want to see things that invite evil,

his hands are curved, this illustrates not depriving others of their rights, (c) Petruk, a person who can nurture, conceal problems, a good listener, and always bring benefits to others, and (d) Bagong, depicted as having a short body, fat body, but wide eyes and mouth, which describes his presumptuous yet honest and powerful nature. Bagong often do things in a hurry. Bagong attitude teaches us to always think twice about things we are gonna do.



Figure 1. Illustration of Punakawan Puppets

Questionnaire

The analysis from the questionnaires that have been answered by students, through several questions that refer to the character of environmental care and awareness according to the Kementerian Pendidikan Nasional (11) 4th – 6th grades namely: (1) cleaning the toilet, (2) cleaning the trash can, (3) clean the school environment, (d) adorning classrooms and schools with plants, (4) participating in school ground maintenance activities, and (5) participating in keeping school environment cleanliness. The following questionnaire questions are asked to students:

Table 1. Questionnaire Questions

No.	Question	Answer	
		Yes	No
1.	Do you flush the toilet after using it?		
2.	Did you turn off the lavatory tub after it is filled by water?		
3.	Do you use soap after going to toilet?		
4.	Do you clean the trash can if its full?		
5.	Do you do the class picket?		
6.	Do you run do a cleaning communitsschool service?		
7.	Do you take care of plants at school?		
8.	Did you pick plants at school		
9.	Do you rebukefriends who damage plants?		
10.	Do you throw trash in its place?		
11.	Do you pick up a scattered trash?		
12.	Do you rebuke a friend who polute the environment?		
13.	Do you prefer to go on trip to village than to the city		
14.	Do you prefer doing sport than playing phone		
15.	Do you take care of your pets		

Data questionnaire, can be measured using the equation:

$$\bar{x} = \frac{\sum x}{n} \times 100$$

Information

:x : average

$\sum x$: total number of "yes" from students

n: number of question

Here are the results of the average of environmental care and awareness character:

Table 2. The Average of Environmental Care and Awareness Character

No.	School Name	Environmental Care and Awareness Character Average	
			Result
1.	SDN 04 Kebak		90
2.	SDN 04 Bejen		71
3.	SDN 01 Gaum		50
Average			70,3

From these results, it can be concluded that the environmental care and awareness character in fourth grade students is not as expected and still requires reinforcement and guidance. It's proven that environmental care and awareness character in SDN 04 Kebak with 11 students produced an average result of 90, then it in namely SDN 04 Bejen with 22 students, resulting in a declining average result from 90 to 71, then it tested at SDN 01 Gaum with 28 students, resulting in a very declining average from 71 to 50. So Environmental care and awareness character average result from three school is 70,3.

The lack of environmental care and awareness character will impact on the bad maintained surrounding which led to uncomfortable environment for student to learn. If the scope within the student's environment is not accustomed to care and aware to the environment, so it is feared that the result of Suryadi's research which is 45% in showing of millennial generation ignorant behavior will increase and will absolutely has an impact to make a greater and massive disaster.

The following are the bad maintained surrounding which led to uncomfortable environment for student to learn



Figure 2. Uncomfortable Environment for Student to Learn

Observation

The analysis from document it was found that the average odd and even end of semester assessment results on the theme of environmental care and awareness is not as expected.

Table 3. Average The Result Of Odd and Even Semester

The Theme Of Environmental Care and Awareness			
No.	School Name	Average The Result Of Odd Semester	Average The Result Of Even Semester
1.	SDN 04 Kebak	80	80
2.	SDN 04 Bejen	80	78
3.	SDN 01 Gaum	72	58,2
Average		78	72

from these results, it can be concluded that there is no increase in understanding of the concept of environmental care and awareness, even in SDN 01 Gaum has decreased very sharply.

A poor understanding of environmental care and awareness concept at the three elementary school shows a poor critical thinking skill on the environmental issues. Even though, we know 21st century education system prioritize 4C which is (1) *Communication* (2) *Collaboration*, (3) *Critical Thinking and problem solving*, and (4) *Creative and Innovative*.(Apandi, 2). If this issues remain unresolved, it is feared that the millennial generation will be ignorant which will threatened the environmental sustainability.

Interview

Based on the results of interviews with teachers and students about (1) the media that have been used, (2) the learning process about environmental care and awareness, (3) the obstacles encountered during the learning process about environmental care and awareness, (4) the use of local wisdom as learning media, the results of the three teachers, it found, that the media used were only limited to two-dimensional picture without any implementation of good character that could be absorbed, even the teachers only relied on textbooks so that it make the classroom’s situation boring, so that it could affect learning motivation, while for the use of local wisdom as learning media, the teachers said they have never made and used it before. The following are the learning medias used in elementary schools.

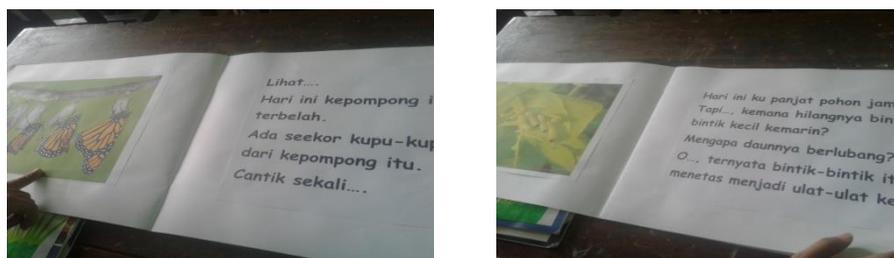


Figure 3. Bigbook Medias

The results of interviews with students who have high, medium and low abilities show that sometimes teachers use LCD to display the images related to environment, but mostly the teachers only use books so that students often get bored and sleepy when learning in class. Regarding the use of local wisdom such as puppet as a learning media, students claim to have never known it and are very enthusiastic if the teachers use science comics based on local wisdom as a learning media. The following are the books students used in elementary schools.



Figure 4. Books Students

CONCLUSION

The results showed that teachers did not maximize the usage of learning media and only focused to the handbooks, so the students have lower understanding of environmental care and awareness concept which led to the weak character of environmental care and awareness. Furthermore the studies show that 45% of the current millennial generation had a tendency to be ignorant so that it is feared that this situation could threaten the preservation of nature in the future. So, *science comic* based on local wisdom is needed as an effort to form the character of environmental care and awareness because science comic can strengthen the concept of environmental care and awareness which is suitable for the development stage of elementary school students, while local wisdom in the form of *punakawan* puppets used as animated characters in this study can provide role models to be wise, careful, being aware and care to the environment. Furthermore, both teachers and students have never used science comic media based on local wisdom, apart from that there has been no research that study whether the two concepts have connection on developing the environmental care and awareness character, so this research is a new research.

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