



## The Influence of Science Comic Based Character Education on Understanding the Concept and Students' Environmental Caring Attitude on Global Warming Material

Eka Lailatul Munawwaroh<sup>1✉</sup>, Bambang Priyono<sup>1</sup>, Margareta Rahayuningsih<sup>2</sup>

Biology Department, FMIPA, Universitas Negeri Semarang, Indonesia

### Info Article

History Article:  
Received: April 2018  
Accepted : Juli 2018  
Published:  
Agustus 2018

Keywords:  
*Science comic;*  
*environmental concern;*  
*understanding of*  
*concepts*

### Abstract

The objective of the study was to determine the effect of the *science comic* based character education on understanding the concept and students' environmental caring attitude to the material of global warming. Type research *true experimental design* with *posttest-only control design*. The research population was the students of class VII of SMP Negeri 1 Mungkid. The sample was taken by *purposive sampling* technique consist of class VII H a control class and class VII G an experiment class. The result of the research showed that the study of the students of Class VII of SMP Negeri 1 Mungkid on global warming material reaches completeness equal to 71.42%. The attitude of environmental care of students of Class VII of SMP Negeri 1 Mungkid after using *science comic* media on global warming material is in the category of very care and care. The implementation of science learning of global warming material of students of Class VII of SMP Negeri 1 Mungkid is done well by 95%. This is supported by the responses of teachers and students who respond well to learning using the science-based *science comic* media character applied to global warming materials. Based on the results of the study concluded that learning using *science comic* media based on character education applied to global warming material positively influence the understanding of concept and attitude of environment care of students SMP Negeri 1 Mungkid.

© 2018 Universitas Negeri Semarang

✉ Correspondence:  
Gedung D6 Lt.1 Jl Raya Sekaran Gunungpati Semarang  
E-mail: [lailaeka88@gmail.com](mailto:lailaeka88@gmail.com)

p-ISSN 2252-6579  
e-ISSN 2540-833X

## INTRODUCTION

Learning media is a tool or educational tool that can be used as an intermediary in the learning process to enhance effectiveness and efficiency in achieving teaching objectives. In Biology learning, there are some abstract materials that require learning media to facilitate the delivery of material. The use of media can enhance the quality of the learning process that can ultimately improve the quality of learning outcomes of learners (Sanaky, 2013).

Science subjects especially biology is one of the subjects close to everyday life. One of the goals of biology subjects is to raise awareness of environmental sustainability. The material of global warming in biology lessons has an important role in instilling cognitive aspect and attitude related to environmental problems, so that in learning global warming related to environmental care and environmental preservation should be not only as a concept and knowledge, but how to make students apply in everyday life the values embodied in the concept. Environmental caring attitude should be instilled by the teacher when the learning takes place in the classroom that begins by making educational media based on character education, especially the environmental caring character. The process of cultivating an environmental caring attitude other than done by the teacher through learning in the classroom, must also be supported by the environmental conditions in the school, home and student residence environment.

Based on observations and interviews with teachers and students, teaching and learning activities in science subjects in SMP Negeri 1 Mungkid show that the material of global warming is a material that is taught to students of SMP class VII in even semester with the concept that is difficult to be understood by students, the reason is because global warming is a material that studies about processes that occur in nature that cannot be observed directly by students so that the concept of the material of global warming seems abstract and difficult to understand, and there are still 50% of students with grades under the KKM that is less than 80 on test of global warming chapter of class VII of academic year 2016/2017.

Global warming material is a very important material because it is a global environmental problem that is considered close to the daily life of students, in addition to problems arising from global warming is often felt in everyday life. In this chapter students are required to understand the concept because the subject matter on the subject of global warming is the basic concept of students to understand the concepts in subsequent chapters. Difficulty in understanding makes students choose to memorize in learning the concept. According to Silberman (2009) learning is not a way to memorize, because real learning will not happen without the opportunity to discuss, make questions, practice and even teach others, so that teachers are required to be able to carry out contextual learning through the integration of effective learning media and efficient that can improve the understanding of concepts and student learning outcomes after doing teaching and learning activities.

Further information based on observations in SMP Negeri 1 Mungkid global warming material learning generally use textbook lessons, presentation media made by teachers and student worksheet. Although many variations of learning media have been used, some of them have weaknesses, such as making students less interested, quick to feel bored and less motivated to learn, as most junior high school students often face written learning rather than visualization, so there is still a need to add alternative learning media which is more innovative and able to improve students' motivation and learning outcomes, such as *science comic*. The effectiveness of learning through visual media can be seen when students learn (read) the pictorial text. Pictures, symbols, or visual symbols can inspire students' emotions and attitudes (Wulandari, 2017). In addition, learning also has not been accompanied by values of environmental care so that students' awareness of the environment is still low. This is evidenced by the garbage that is still scattered around the around the school buildings, plants that have not been well maintained, waste of energy use, and lack of awareness of

the students to dispose of waste in place. Therefore, it is necessary to plant the values of environmental care to students who are integrated in the learning media.

One of approach used is science-based learning media based on character education. It is an innovation of science material made in the form of comics and inserted moral values as an effort to instill character education, especially environmental cares in it. Comics is a form of media that contains the presentation of the story with a funny drawing series (Daryanto, 2010). The comic has a compact storyline with its realistic and interesting personality, so it's easy to understand. The advantages of *science comic* based on character of caring with environment is the delivery of material packed in the form of a picture story with funny cartoon characters are fun and inserted moral values as an effort to instill character education, especially environmental cares.

This is consistent with the characteristics of junior high school students who like to cartoon and have a great curiosity with fun and fun things. The use of comic media as a source of learning can increase interest, motivation, and learning outcomes according to research (Cho, 2012). Comics as a learning resource can motivate and increase the knowledge of learners (Waluyanto, 2005). The comics also have the following advantages: (1) providing positive experiences, increasing motivation and participation in learning, (2) enhancing social competence and cooperation; (3) improving learning outcomes; (4) enhancing learning transfer and supporting interaction; and (5) accommodate student learning styles (Van Wyk, 2011).

## RESEARCH METHOD

This type of research is true experimental design with posttest-only control design the population in this research is the sevent grade students of SMP Negeri 1 Mungkid in academic Year 2016/2017 with sample of two classes namely class VII H as a control class and class VII G as an experimental class. Sampling using purposive sampling technique. The independent variables in this study were *science comic*-based character education while understanding the concept and attitude of caring environment as dependent variable.

The data in this study were collected through test methods, questionnaires, observations and documentation. The data taken include primary and secondary data. Primary data consisted of posttest value data measured using 30 item multiple choice test instrument and data of students 'environmental cares score obtained by filling out the psychology scale of students' environmental caring attitude, while secondary data included student activity data, student responses, and teacher responses.

## RESULT AND DISCUSSION

### Understanding the Concept of Students

Understanding of concept in this research is obtained from cognitive learning result taken from posttest. The influence of learning using *science comic* based character education on conceptualization can be shown by experimental class posttest value which is higher than control class determined by t test. Before calculating t test, normality test and homogeneity test are performed.

Mastery Learning of control and experiment class students is obtained from the value of posttest obtained by the students. The result of the analysis shows that 71.42% of students belong to the category of completion (obtaining posttest value  $\geq 80$ ), so that it can be said that *science comic* learning media based on character education is suitable to be applied in learning of global warming material (Table 1).

**Table 1** Mastery learning

Experimental Class	
Numbers of students	28
Complete	20
Uncomplete	8
Completeness (%)	71,42

Based on the data in Table 4 it is known that the sig. (2- tailed)  $<0,05$  is 0,020 so  $H_0$  is rejected. The result shows that the mean posttest value between the experiment class and control class is significantly different, so it can be stated that there are significant differences in learning outcomes (conceptual understanding) between the experimental class and the control class. The difference in learning outcomes arises because of differences in the treatment that is given to the experimental class and control class and is caused by several factors.

First, the *science comic* of global warming has a simple and pleasing presentation. This is seen when the learning process takes place, students feel happy in following the learning process and supported also by Hadi (2008) in his research stating that during learning using *science comic* media students showed a positive response in following the learning, students feel happy with the way learning is done, they feel the learning is more relaxed (not tense), they can work with their group mates, and they better understand the questions presented in comic form.

*Secondly*, by using instructional media such as *science comic* of global warming in the study of global warming material made interesting in the form of combinations of pictures, texts, movements and animations such as the picture of flood events, melting of polar ice, landslides, drought, the disappearance of ice glacier was able to make students motivated and aroused students' interest. Students tend to be more active, especially in reading and understanding lessons. It was evident from the spirit and enthusiasm of students during the process of learning to teach the material of global warming took place.

*Third*, the *science comic* of global warming has a storyline that allows students to understand the message delivered in the *science comic*. It can be seen that by using *science comic* of global warming of students more easily understand the concept of global warming materials so that student learning outcomes for the better. This is evident when the teacher invites the students to read the learning materials first, then the teacher asks the students to explain their reading results, the students really read and understand well and many of them can explain correctly. Relating to the value of instructional media, Sudjana (2008) argues that with the media can enlarge interest and interest of students to learn, besides media can also lay the basis for the development of learning so that learning result steadily increase. The more students read the learning material, the students 'understanding of the lesson will be higher, it means the students' difficulties in learning the material is reduced.

*Fourth*, the *science comic* of global warming is a pictorial story that has an interesting drawing illustration, making students not bored and want to read it to completion. In relation to students' incompatibility with textbooks, the use of *science comic* media for global warming can be another alternative to the cultivation of values both academic and non-academic. Gradually when the child is fond of reading, then slowly need to be prepared transition from reading comics to love reading books.

The main goal is to use the *science comic* of global warming during the learning process: to enable students to understand the concept of global warming material that is still considered to be complex and abstract, such as the description of the causes of global warming, such as natural disasters and extreme weather caused by global warming, the occurrence of global warming, the effects of global warming and the concept of the greenhouse effect. *Science comic* of global warming

presents it with simple and easy to understand, because it is accompanied by pictures and examples related to global warming materials so as to make students more focus and concentration during the learning process. The existence of *science comic* advocacy media of global warming as a medium of learning will greatly assist teachers in implementing teaching and learning process and help students in understanding the concept of global warming material more easily so that student learning outcomes on global warming materials to be better.

The low level of science learning achievement, especially on the concept of global warming material, does not mean because students do not have the ability to achieve it, but because it is less precise way of delivering the material during the learning process. Therefore, preferably in science learning, especially on the concept of global warming materials implemented using the media, as well as *science comic* of global warming. *Science comic* of global warming with simple presentation and supportive illustration of images will make it easier for students to understand the material that is presented, the existence of *science comic* directing the students' attention to concentrate on the content of the students represented in the *science comic* media, so that learning by using *science comic* media can be effective in learning process and bring positive influence for students.

According to Retyaningsih (2012) understanding of the concept of the material that has been studied can emerge if the ongoing learning allows the students to receive and understand the teaching messages conveyed by the teacher well, so it takes the learning media to stimulate and motivate students to learn and understand what is delivered teachers, as Hamalik puts it by Arsyad (2008) in his book that the use of learning media in teaching and learning can generate new desires and interests, generate motivation and stimulation of learning activities, and even bring psychological influences on students.

Student's learning completeness for the experimental class is obtained from the posttest score, with student's classical completeness criteria based on KKM standard in SMP Negeri 1 Mungkid that is the final value of  $\geq 80$ . Based on data analysis, shows that from 28 students in the experimental class as many as 20 students get the value of  $\geq 80$ , thus most of the experimental class students have complete learning that is equal to 71.42%. This shows that the use of *science comic* based character education on learning of global warming material in SMP Negeri 1 Mungkid has positive effect on students' learning result, because it reaches indicator that is 70% of students complete. Based on the data analysis also shows that from 28 students in the experimental class as many as 8 students get the value of  $\leq 80$ , thus a small percentage of experimental class students have not studied 28.58%.

This is caused by several factors seen in terms of material mastery, students cannot master the subject matter given, in terms of psychological and mental students lack skills and have a low level of intelligence, in terms of emotional students I'm interested in the work school, and lazy and do not want to learn, and in terms of time available students can not complete the assigned tasks on time (takes a lot of time).

### **Students' Environmental Caring Attitude**

The results of the students' awareness score on the environment are obtained from self-assessment and observer's assessment. Analysis of the results of students' caring scores indicates students' level of concern for the environment in the more experimental class with very caring criteria compared to the control class Table 2.

**Table 2** The result of students' environmental caring attitude on experimental and control group class

Percentage	Criteria	Class Experiment	(%)	Class Control	(%)
85% - 100%	Very Care	10 Students	36%	4 Students	14%
70% - 84%	Care	18 Students	64%	21 Students	75%
55% - 69%	Care Enough	-		3 Students	11%

The students' level of environmental awareness in the experimental class is on the criteria of care and care which is 36% and 64%. In the control class, students meet three criteria that are very care, care, and care enough with the percentage of students in a row that is equal to 14%, 75%, and 11%. This shows that the use of *science comic* based character education on learning global material in SMP Negeri 1 Mungkid has a positive effect on students' caring attitude.

Differences in environmental cares between the experimental class and the control class are due to differences in the learning process between the experimental class and the control class. In the experimental class, the learning process takes place using *science comic* global warming based education of environmental caring character, in it contains several learning stages that must be done by the students, contains environmental education, such as the invitation to always keep the environment to avoid heating global and an invitation to limit the emissions of carbon dioxide (CO<sub>2</sub>), because the energy from the fossil fuels we are using today generates a lot of exhaust gas in the form of CO<sub>2</sub>, (listed in *Science comics* page 8-10) and examples of environmental problems, such as extreme weather changes, unpredictable rainfall patterns and causing floods, so that learning centers on students and students actively in learning activities.

The variety of learning used in control group class is relatively little. The lessons that take place in the student control class rely solely on the direction and explanation of the teacher by utilizing the power point slide media on global warming materials and the BSE IPA packet books available at the school. This causes students to be less active in learning and attitudes less concerned about the environment in learning activities as well as in their daily lives.

Global warming learning that instills environmental cares in harmony with Khusniyati's (2012) opinion, that science subjects must implement the values of character in it, one of which is the attitude of environmental care. This opinion is supported by Setiawan (2008) which states that the teaching of biology by teachers should enable the development of understanding of concepts, attitudes, and increase students' interest in biology lessons. It is intended that the value of attitudes that enter into the learning can be embedded well to students who will eventually form a good character.

### Student Activity

Student activity data in two classes studied was obtained from the observation by using observation sheet of student activity during follow learning activity Table 3.

**Table 3** Observation result using *science comic* based character education on global warming material

Class	Mean Score (%)	Criteria
Experiment	81	Active
Control	68	Active Enough

The average percentage of student activity scores in the experimental class shows that the student activity during the learning using the *science comic* media based on character education is on active criteria with percentage as much as 81%. This shows that the use of *science comic* based character education on learning of global warming material in SMP Negeri 1 Mungkid has positive

effect because it reaches indicator that is 75% active student. Unlike the case with the control class that shows the percentage of student activity as much as 68% or on the criteria is quite active.

The high score of student activity on the experimental class is caused by the active participation of the students during the lesson. Students are active in expressing the idea of the questions / problems given by the teacher, one of which questions about what causes the occurrence of global warming events. Unlike the experimental class that is in the active activity criteria, the average score of student learning activity in the control class is 68% indicates the criterion is quite active Table 2. This is due to differences in media usage during the learning process. The control class uses a power point slide media and a BSE IPA packet book or media used in everyday learning.

The result is that students are less active in terms of opinions or ideas due to lack of innovative learning media applied during the learning process, so that students feel bored and lack of enthusiasm during the lesson. In addition, students often do not pay attention to the teacher during the learning process takes place, so when teachers ask students, only a few students are able to answer questions from teachers. Positive effects on learning outcomes generated through the use of *science comic* based character education in the experimental class is supported by student activities during the learning process. Active student activity can affect the achievement of student learning outcomes because during the learning process students become active in asking and expressing ideas. This is in accordance with opinion (Park, 2012) High activity owned by a person or discussion group will affect the intrinsic motivation in students, the higher the motivation of students in learning, the student learning outcomes will increase.

## CONCLUSION

Based on the results of research can be concluded that the learning using *science comic* media based on character education on global warming matter has a positive effect on learning outcomes and attitudes of environmental care students of grade VII SMP Negeri 1 Mungkid.

## REFERENCES

- Cho, H. 2012. Using of comics to increase interest and motivation. Simposium disajikan pada *12th International Congress on Mathematical Education Program*. COEX Seoul Korea 8-15 Juli 2012. A-J.
- Daryanto. 2010. *Media Pembelajaran*. Yogyakarta: Gava Media.
- Hadi, S. 2008. "*Pembelajaran Konsep Pecahan Menggunakan Media Komik Dengan Strategi Bermain Peran Pada Siswa SD Kelas VI Semen Gresik*", Hal. 6. Dalam [http://www.puslitjaknov.org/data/file/2008/makalah\\_peserta57 Syaiful%20Hadi pdf](http://www.puslitjaknov.org/data/file/2008/makalah_peserta57%20Syaiful%20Hadi.pdf), diakses 6 Agustus 2017.
- Khusniyati, M. 2012. Pendidikan Karakter melalui Pembelajaran IPA. *Jurnal Pendidikan IPA Indonesia*, 1 (2): 204-210.
- Park, H. 2012. Relationship between motivation and student's activity on educational game. *International Journal of Grid and Distributed Computing* 5(1): 101-114
- Retnaningsih, L., Bambang, P., & Margareta, R. 2012. Keefektifsn Media Spesimen dengan Metode Two Stay-Two Stray pada Materi Arthropoda. *Journal of Biology Education* 1(3).
- Sanaky, AH.H. 2013. *Media Pembelajaran Interaktif-Inovatif*. Yogyakarta: Kaukaba Dipantara.
- Setiawan, I.G.A.N., 2008. Penerapan Pengajaran Kontekstual Berbasis Masalah untuk Meningkatkan Hasil Belajar Biologi Siswa Kelas X2 SMA Laboratorium Singaraja. *Jurnal Penelitian dan Pengembangan Pendidikan*. 2(1):42-59.
- Silberman, M.L. 2009. *Active Learning: 101 Strategi Pembelajaran Aktif*. Translated by Sarjuli, A. Ammar, Sutrisno, Z.A. Ahmad, & Muqowin. Jogjakarta: Pustaka Insan Madani.
- Sudjana, Nana. 2008. *Penilaian Hasil Proses Belajar Mengajar*. Bandung: Remaja Rosdakarya.
- Wulandari., Priyantini, W., & Ning, S. 2017. Pengembangan Suplemen Bahan Ajar Biologi Berbasis Riset Identifikasi Bakteri untuk Siswa SMA. *Jurnal Pendidikan IPA Indonesia* 6(2):158.
- VanWyk M. 2011. The use of cartoons as a teaching tool to enhance student learning in economics education. *Journal Social Science* 26 (2): 117-130.
- Waluyanto, H.D. 2005. Komik Sebagai Media Komunikasi Visual Pembelajaran. *Jurnal Nirmana: Vol7 No 1 Januari: 45-55*. Jakarta: Universitas Kristen Petra.