The influences of comics’ media application in students’ scientific perspectives attitude

D I Mutia¹ ¹, A Gani² and M Syukri³
¹Department of Science Education, Universitas Syiah Kuala, Banda Aceh, 23111, Indonesia
²Department of Chemistry Education, Universitas Syiah Kuala, Banda Aceh, 23111, Indonesia
³Department of Physics Education, Universitas Syiah Kuala, Banda Aceh, 23111, Indonesia
⁴SMA Negeri 2 Sigli, Sigli, 24151, Indonesia

E-mail: syukri.physics@unsyiah.ac.id

Abstract. This study aims to study the effect of the use of media on scientific students. This study uses a quasi-experimental method with a pretest-posttest control group design, this study guidance to the experimental class and the control class. The population in this study was the students of grade ten of science department in Senior High School 1 Sigli in the academic year 2018/2019, while the sampling was done using random sampling techniques and the samples of grade ten-two for the experimental class and grade ten-three for the control class were take 28 people each. The treatment in the experimental class is learning by using comic media. Data collection was carried out using observation sheets at each meeting. Data analysis techniques used descriptive analysis and the results showed the average scientific assessment increased the acquisition of the first meeting to three. For the control class, meticulous attitude increased by 47.32%, curiosity 61.31%, open attitude 41.96% and critical attitude 48.51%. While the experimental class 93.45% meticulous attitude increased 93.45%, curiosity 80.65%, open attitude 85.71% and critical attitude 76.49%. Thus the use of comic media is very influential on the scientific attitude of students.

1. Introduction

To create good learning conditions in the classroom, a teacher is required to be able to choose and use interesting learning media, so that learning objectives can be achieved [1]. The use of media in learning can arouse new desires and interests, increase motivation and stimulation of learning activities, and even influence psychologically on students [2]. With the learning media, the learning process will attract students more, so that it can foster motivation to learn which in turn can improve student learning outcomes [3].

One of the learning media that can be used is comics. The comic is a medium of storytelling or expression with structured picture languages [4]. Comics can create students’ interest in learning and help make it easier to understand the subject matter that has been delivered by educators [3]. Comics can be applied as educational aids and can convey information effectively and efficiently [5]. Comics can make students motivated, abstract learning concepts can be simplified and principles can be directly applied [6]. As a medium of learning comics physics is very effective in motivating students to learn so that it gives a positive influence in the form of courage to express opinions and interactions...
in learning, while in terms of cognitive comics can help understand the concept so that it can improve learning outcomes [7,8].

Several previous studies have shown that comic media can be used as a good learning because it can increase students’ academic [8], increasing student test results [9] encourage students’ curiosity to learn lessons [10], by using comics students’ knowledge and understanding and scientific attitudes change positively [11]. Also besides, there are differences in learning motivation and understanding of concepts between groups of students who learn by using comics [12]. An increase in students’ motivation in learning [13,14] and comics are considered the best way to improve understanding of concepts [15]. Scientific attitude refers to the attitude that arises from within a person that encourages someone to act and behave towards an object. Comic media can enhance the strengthening of students’ scientific character [16]. There are differences in scientific attitudes before and after using comics and scientific attitudes have increased [12].

Based on the results of the above research it is reasonable through this research that comic media was chosen because educators began to realize the appeal of comics, young people began to use it more as a tool to communicate scientific ideas. Although educational comics are still considered discoveries, their production seems to begin to develop and begin to engage in the public about understanding science and technology. As a result, in recent decades various educational comics and cartoons have been produced by various publishers [17], although many parents and teachers are concerned about the influence of comics on their children and students. They assume that by reading comics the imagination of children will be less challenged separately for their development. Comics have been instrumental in creating juvenile delinquency, others believe that comics poison the interests of reading, imagination and cause eye irritation [18]. Whereas the comic media can help children, verbal expression, physical actions, and emotions, as a comic book therapy tool is very useful for children to develop imagination because comics are close to them [19].

2. Method

This study uses a quasi-experimental, while the research design uses the control group pretest-posttest design. The results of the pretest and posttest were then compared to find out the extent of students' development after being taught using comic media [19]. This study took the population of students of grade ten science department of Senior High School 1 Sigli in the 2018/2019 academic year consisting of 12 parallel classes. Sampling was carried out using random sampling techniques so that selected grade ten-two as an Experiment class and grade ten-three as a Control class.

Data collection was carried out by the design of the research technique. There are two types of instruments used in this study, specifically as multiple-choice questions and observation sheets at each meeting. Data analysis techniques used descriptive analysis and the results showed that the average scientific attitude had increased. Before using comic media and research instruments, they are validated. The results of the instrument validation were then tested so that the difficulty index was obtained 0.48 in the medium category, a power index difference of 0.41 in the good category, a validation index in the 0.54 category in the medium, and a reliability index of 0.81 in the very high category. Data analysis techniques used descriptive analysis and the results showed that the average scientific attitude had increased. This attitude scale is used a Likert scale to measure the attitudes, opinions and perceptions of students and can make a description of the attitude of scientific attitudes toward attitude [20]. Determination of the average value of each rating aspect:

\[
\% \text{Score} = \frac{\text{average score}}{\text{maximum score}} \times 100\%
\]  

(1)
3. Results and Discussion

Scientific attitude refers to the attitude that arises from within a person that encourages someone to act and behave towards an object. Scientific attitudes of students assessed in learning to apply comic media are meticulous, curiosity, open attitude and critical attitude [20]. Table 1 and 2 show the results of the analysis of scientific attitudes for the experimental and control classes.

Table 1. Results of analysis of scientific attitude in the experimental class

|               | Meeting 1 | Meeting 2 | Meeting 3 |
|---------------|-----------|-----------|-----------|
| Meticulous    | 88.39     | 93.75     | 98.21     |
| Curiosity     | 69.64     | 76.78     | 95.54     |
| Open attitude | 71.43     | 88.39     | 97.32     |
| Critical Attitude | 51.79     | 79.46     | 98.21     |

Table 2. Results of the analysis of the scientific attitude of the Control class

|               | Meeting 1 | Meeting 2 | Meeting 3 |
|---------------|-----------|-----------|-----------|
| Meticulous    | 41.07     | 42.86     | 58.04     |
| Curiosity     | 49.11     | 62.50     | 72.32     |
| Open attitude | 26.79     | 41.96     | 57.14     |
| Critical Attitude | 25.89     | 52.68     | 66.96     |

Based on Tables 1 and 2 show that the results of the scientific attitude assessment of experimental and control class students showed that both classes experienced an increase in scientific attitude, but the higher experimental class increased it shows that the use of comic media in learning can improve the scientific attitude of participants students significantly saw from 3 learning meetings. Comparison of the results of observations of scientific attitudes between the control and experimental classes can be seen in Figure 1.

![Figure 1](image)

**Figure 1.** Comparison of the scientific attitude of the control and experimental classes
Due to the use of comic media that can attract students' interest and curiosity, the lack of scientific attitudes of students because teachers tend to use less attractive media so that media development such as comics is needed as teaching material. Lack of scientific attitudes of students in the learning process will make it difficult for them to understand the lesson so that it has an impact on learning outcomes [21].

Learning that uses comic media on Newton's legal material can make it easier for students to interact with each other to increase an open attitude that is willing to accept input from outside. During learning taking place not all students show a scientific attitude, scientific attitudes that do not appear optimally in some students because of students who are accustomed to being taught using a learning model that does not directly involve them. Also besides, teachers rarely provide opportunities for students to carry out learning activities in a way they like. This causes students to become passive. If students are active and creative in the learning process will make the level of understanding of students increase so that learning objectives will be achieved [22].

The scientific attitude of students is needed to encourage the ability of students to achieve the objectives of learning. In the process of learning scientific attitudes will affect the mastery of the concepts of students. These findings were supported by the research [23,24] the level of scientific attitude can be seen from how they have very high curiosity, understanding a new concept with their abilities without any difficulties, critical of a problem that needs to be verified and evaluating its has every performance. These things can help students learn scientifically. In learning physics students not only memorize concepts but how to make students practice discovering physics concepts themselves through scientific methods and scientific attitudes as the main nature of science.

4. Conclusions
Based on the results of data analysis, it can be concluded that the scientific attitude of students taught using comic media has increased in all indicators for each meeting. This shows comics can lead to scientific attitudes of students can increase curiosity, conscientious attitude, open attitude and critical attitude of students. With the increase in scientific attitude by itself, the learning outcomes will also be increased. Comics are interesting learning media because of their images, colors, language so that students are not asked to read them. Scientific attitude in learning physics needs to be developed to improve learning outcomes because with the development of scientific attitudes students will facilitate students in understanding the lesson so that it has an impact on learning outcomes.

References
[1] Permendikbud 2016 *Permendikbud No.22 Tentang Standar Proses Dan Standar Pendidikan Dasar Dan Menengah* (Jakarta: Kementerian Pendidikan dan Kebudayaan)
[2] Waluuyanto H D 2005 *J Nirmala* 67(1) 45-55
[3] Rohani A 2014 *Media Instruksional Edukatif* (Jakarta:Rineka Cipta) p 77
[4] Tryas R, Sudarmi M and Noviandh 2014 *J Radiasi* 4(1) 16-21
[5] Hamalik O 2012 *Kurikulum dan Pembelajaran* (Jakarta: Bumi Aksara) p 41
[6] Sudjana N and Ahmad R 2011 *Media Pengajaran* (Bandung: Sinar Baru Algesindo) P 2
[7] Darmawan H 2012 *How to make Comics* (Jakarta: Bentang Pustaka) p 5
[8] Avrilianti H, Budiawanti S and Jamzuri 2013 *J Pendidikan Fisika* 1(1) 156-163
[9] Eker C and Karadeniz O 2014 *International Journal Of Humanities and Social Outcomes* 4(14) 223-243
[10] Listiyani I M and Widayat A 2012 J Pendidik Akutansi Indonesia 10(2) 80-94
[11] Slameto 2003 *Belajar Dan Faktor-Faktor Yang Mempengaruhi nya* (Jakarta: Rineka Cipta) p 2
[12] Köse E Ö 2013 *Kastamonu Education Journal* 21(3) 931-944
[13] Pramana T C 2015 *Universitas PGRI Yogyakarta*
[14] Wulandari R, Sunarno W and Sarwanto 2013 *Jurnal Materi dan Pendidikan Fisika* 2 45-57
[15] Supriadi and Nisda Y 2017 *Jurnal Biodik* 3(2) pp 92-101
[16] Anggit G W and Widyaningrum R 2017 *Profesi Pendidikan Dasar* 4(2) 125-130
[17] Tatalovic M 2009 *Journal of science Communication* **8**(4) pp 1-17
[18] Dorrell L, Curtis D and Rampal K 1995 *J of Popular Culture* **2** 223-234
[19] Mulholland M J 2004 *J of the Ameran Art Therapi Association* **21**(1) 42-43
[20] Arikunto S 2010 *Prosedur Penelitian: Suatu Pendekatan Praktek* (Jakarta: Rineka Cipta) p 40
[21] Sugiyono 2014 *Metode penelitian pendidikan pendekatan kuantatif, kualitatif dan R&D* (Bandung: Alfabet) pp 93
[22] Anwar H 2009 *Jurnal Pelangi Ilmu* **2**(5) 115-123
[23] Supandi 2019 *Jurnal Biologi dan pembelajaran* **14**(1) 25-31
[24] Kurniawati A A, Wahyuni S and Pramudy A P 2017 *Internasional Journls of Science Science and Humanity* **7**(1) 47-50