



The Influence of Comic Media on Students' Concept Understanding on Chemical Bonding Materials

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Abstract

Research is motivated by the lack of understanding of students on chemical bonding material so that it has an impact on low learning outcomes and the use of effective learning media has not been utilized optimally. This study aims to determine the effect of comic media on students' understanding of concepts. This research is a mixed method. The research subjects of SMA Muhammadiyah 1 Sumenep class X IPA I and II were 39 students divided into 25 males and 14 females. Research data obtained and analyzed. The results showed that the average level of concept understanding with pretest and posttest was 12.09% and 69.6%, the percentage increase was 57.51%, the pretest normality test was 0.513 (> 0.05), then the data was normal, while the posttest was 0.368 (> 0.05) then the data is normal. The t-test results of the pretest and posttest are the t_{count} value (27,042) $>$ t_{table} (1,686). The t_{table} value obtained with a confidence level of 95% and df 38, so it can be concluded that there is an effect of using comics media on the understanding of the concepts of Sumenep Private High School students on chemical bonds.

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INTRODUCTION

Education is something that is very important to support the progress of a nation. the progress of a nation is strongly influenced by good education so that it can print good quality of the nation's children. one of the factors that influence the advancement of education is the quality of the teachers themselves. a good teacher will always pay attention to the conditions and needs of the students themselves, both in terms of strategies for providing materials and facilities needed in the learning process. 2013 curriculum used in this learning process uses a scientific/scientific approach, namely an approach that is able to provide a complete understanding of students about the material being studied. there are two important aspects of learning activities such as teaching methods and learning media.

Based on the results of observations and interviews conducted with Sumenep Private High School teachers, it was revealed that the learning media on chemical bonding material was still rarely used in the learning process. The media used so far is the package book. The books used have not been able to make it easier to understand chemical bonding material, because books are dominated by reading texts which result in difficulties in understanding chemical bonding material. Misunderstanding for students, for example, students have difficulty in classifying existing concepts, this happens because students tend to memorize and really do not understand and the percentage of mastery learning that tends to be low on chemical bonding material, from the whole class X which consists of 2 science classes, the average completeness ranges from 35% - 40% for each class. Difficulties in understanding chemical bonding material are generally caused by the process of delivering information that is not optimal between teachers and students. So that the role of the media is needed to optimize the delivery of learning materials.

Chemical bond is one of the fundamental concepts in chemistry but is very complex because it consists of several types, is one of the chemical materials that is quite difficult to study (Safitri, 2018). Chemical bonds cannot be obtained from experiments in ordinary chemical laboratories, must be studied theoretically, the application of theory requires reasoning ability to solve. One way that can be taken is by adding media, to concrete concepts that are abstract and also able to make students have more interest in learning so that students understand more about chemical bonding material (Lubis, 2015).

Understanding is the ability of students who can interpret, interpret, translate, and master the material to be studied so that they are able to describe it using their own language (Islamika, 2020). Concept understanding is a skill or skill that is expected to be achieved in a learning process with attractive illustrations. The test instrument that can be used to measure the level of understanding of students is the Three Tier diagnostic test, because to identify and distinguish between students who really experience misconceptions and do not understand a certain concept, identify students' understanding abilities and the time required is shorter. in detecting misconceptions.

Media is one of the factors that determine the success of teaching, because the use of media in the teaching and learning process can generate new interest in learning, motivation and can also improve understanding. One of the media that can be used for chemical bonding with interesting illustrations is comics. The selection of the right media for the learning process is very influential on learning outcomes so that the learning objectives are achieved (Sudarmin, 2016). Comics are visual communication media that have the power to convey information that is easy to understand, because learning by looking at pictures and reading makes it easier for students to understand and remember the messages or information contained in the book. Because the brain will be easier to remember things that have been seen by the eyes than just hearing the teacher's explanation without the help of pictures (Haryati, 2019).

Some of the results of research that have been carried out on how the influence of comic media on learning is as follows; comic media can improve literacy skills (Rakasiwi, 2019), improve learning outcomes (Sari, 2021; Ntobuo, 2018), improve speaking skills (Mayasari, 2019), increase understanding of concepts (Nurvianti, 2018; Faradilla, 2016), increase interest in learning (Prastowo, 2019), increase learning motivation and reading comprehension skills (Budiarti, 2016), improve reading comprehension skills (Untari, 2016; Jayanti, 2019).

Based on the description above, it is necessary to have an effective media to improve students' understanding of the concept of chemical bonds.

METHODS

Method used in this research is mixed methods or also known as mixed research, which is a research approach that combines qualitative and quantitative research. This

method was chosen in order to obtain strong and mutually supportive research data between qualitative and quantitative (Creswell, 2009). This research was conducted at the Sumenep Private High School. With the research subject at the Sumenep Private High School, 39 students consisted of two classes, namely Class X IPA 1 and X IPA 2. The class used by the researcher was selected based on the recommendation of the chemistry teacher at the school.

Sources and methods of data collection include: documentation, questionnaires, tests, observations, and interviews. This research contains data analysis, namely: feasibility validation analysis, and concept understanding analysis.

RESULTS AND DISCUSSION

Comics are used as learning media with chemical bonding material in the form of a flipbook. As shown in Figure 1.



Figure 1. Comic Cover Display

Advantages of the comic media used are attractive cover designs, consistent image characters, each example of the material using pictures, illustrations and image characters used are attractive, appropriate color proportions, the language used is easy to understand and in accordance with EYD, the sentences used are easy to understand, comics according to the level of cognitive development of students and can motivate students in learning activities. Comic media was chosen as a learning medium because this media is an attractive visual media, with serial images that are interrelated in forming interesting stories, making students more interesting in studying chemical bonds whose material is filled with concepts (Irawati, 2016; Minami, 2016). 2019).

Before being used as an instrument of learning media, comics first needed a feasibility test from media experts to declare the media used to be valid so that they could be used. Some researchers state that comics media must be declared valid by validators who are experts

in learning media (Adiyah, 2018; Asmiarsih, 2019; Yuselita, 2019; Nengsi Sri, 2017).

Pretest and posttest techniques were used in this study. The pretest technique is a technique for taking scores before being introduced to the treatment. This technique aims to determine the ability of students before treatment. The posttest technique is a scoring technique after being given treatment. This technique aims to determine the ability of students after treatment. The treatment in this study was in the form of giving comics as a medium to improve students' understanding of concepts. Researchers used a three-tier multiple choice question instrument to measure the level of understanding of students.

Results of the level of understanding of the concept of students using Three Tier Multiple Choice questions with 21 questions with pretest and 21 posttest questions, the types of questions used are the same. described in Tables 1 and 2.

Table 1. *Three Tier Multiple Choice Pretest Results*

Category	Score (%)
Understand The Concept	12.09
Type 1 Misconception	17.34
Type 2 Misconception	18.80
Type 3 Misconception	45.30
Guess	0.61
Don't Understand The Concept Type 1	0.98
Don't Understand The Concept Type 2	0.73
Don't Understand The Concept	4.15

Table 1 shows that students' understanding of concepts before the application of comic media is still low. the category of type 3 misconceptions is the category with the highest percentage, namely 45.30% this is because students do not understand the combination of answers, level 1 answers wrong, level 2 answers wrong, and level 3 answers sure. category 1 misconceptions for the combination of answers level 1 answered correctly, level 2 answered incorrectly, and level 3 answered sure, this means that students cannot answer the correct reason so that there are still misconceptions about chemical bonding material. the category of understanding the concept is only 12.09% this indicates that only a few students really understand for the combination of answers at level 1 answering correctly, level 2 answering correctly, and level 3 answering sure. This indicates that students for their level of understanding are at chemical bonding material is still low. The cause of the low understanding

of the concept is because some students are still having difficulties. This difficulty is indicated by the presence of students who still do not understand the analysis of three-tier multiple choice questions in the category of not understanding the concept of 4.15% for the combination of answers at level 1 answering incorrectly, level 2 answering incorrectly, and level 3 answering unsure.

Table 2. Three Tier Multiple Choice Posttest Results

Category	Score (%)
Understand The Concept	69.60
Type 1 Misconception	19.41
Type 2 Misconception	7.57
Type 3 Misconception	3.42
Guess	0.00
Don't Understand The Concept Type 1	0.00
Don't Understand The Concept Type 2	0.00
Don't Understand The Concept	0.00

Table 2 shows the type 3 misconception category decreased by 41.88%, the concept understanding category increased by 57.51%, including the sufficient category, this is supported by Safitri's research (2018) which states that understanding the concept of chemical bonding is sufficient. However, in the type 1 misconception category, there was an increase of 2.07% in the category of not understanding the concept of 0%.

Muslichatun's research (2021) states that media selection is very important to convey learning messages to students so that learning objectives are achieved. Concept understanding data analysis provides information that the paired sample t test with an average result of pretest 33.54 and posttest 58.13. The comparison can be seen in the graph Figure 2.

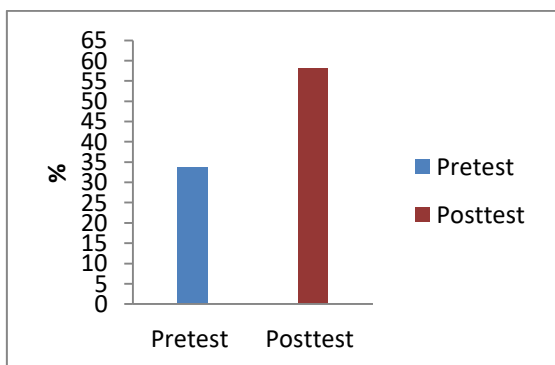


Figure 2. Comparison of the mean scores of the Pretest and Posttest

Figure 2. states that there is an increase in understanding of the concept seen from the average results of the pretest and posttest of 24.59% so it can be concluded that the use of effective media is very influential. According to Rahmawati (2019), a good understanding of the concept can solve a problem optimally for students.

Analysis to determine whether the pretest and posttest data used was normal or not, using the Shapiro-Wilk method because the sample was less than 50. The value used was sig. with a pretest significance value of 0.513 (> 0.05) then the data is normal. And the posttest significance value of 0.368 (> 0.05) then the data is normal. Thus, it can be said that the sample meets the assumption of normality so that it can be seen in Table 3.

Table 3. Normality Test Results for Concept Understanding

Data	Normality Value
Pretest	0,513
Posttest	0,368

Table 3. the pre-test data for normality requirements have been carried out showing that the sample comes from a normally distributed population, this is evident from the results of the pretest and posttest for each data understanding of the concept of more than (0.05).

Results of calculations using the t test are the t_{count} value (27,042) > t_{table} (1,686) which shows a significant difference with the comic media, students become more enthusiastic about learning so it is easier to understand chemical bonds, the t_{table} value obtained with a confidence level of 95 % and df 38, then H_0 is rejected and H_a is accepted, meaning that there is a difference in the average results of the pretest and posttest. so it can be concluded that there is an effect of using comic media on understanding the concept of chemical bonds. This is supported by Purnamasari's research (2018) which states that comics media greatly influence students' understanding.

CONCLUSION

Based on the research that has been done, it can be concluded that the comic media used in chemical bonding material affects the understanding of the concepts of students in class X IPA 1 and X IPA 2 SMA Swasta Sumenep, namely $t_{count} > t_{table}$. the results of three tier multiple choice pretest 12.09% and posttest 69.60%, an increase of 57.51% in the category of understanding the concept.

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