

---

## Application Of Digimco Media To Improve Student's Understanding

Supriyo<sup>1)</sup>, Ani affiah<sup>2)</sup>\*

<sup>1,2)</sup> Mathematics Education, Faculty Of Pedagogy And Psychology, PGRI Wiranegara University, Indonesia

\*Corresponding Author

Email : [fifa.ani@gmail.com](mailto:fifa.ani@gmail.com)

---

### Abstract

*The learning process will not be effective and interesting if the teacher only talks about things that happened. For that we need a media that can be manipulated, can be seen, can be heard and can be read by students. One of them is comic media. This study aims to describe learning using Digimco Media (Digital Math Comic) which can improve the mathematical understanding of class X students. This research procedure refers to the classroom action research model by Kurt Lewin which consists of problem identification, planning, implementation and observation, and reflection. The instrument used consisted of the results of working on worksheets, quizzes, final tests, teacher activity observation sheets, and student activity observation sheets. The results showed that learning with the Digimco Media could improve students' mathematical understanding. This is shown from the results of observations of teacher and student activities in the good category. In addition, the results of quizzes and final tests are also a determinant of success in this study. The quiz results in the first cycle classically reached 73.91% and the final test in the first cycle reached 65.21%. While in the second cycle the classical quiz results reached 85% and the second cycle final test reached 80%. This means that the research carried out is said to be successful in accordance with the established success criteria.*

**Keywords:** *Learning Media, Digimco, Mathematical Understanding*

---

## INTRODUCTION

Mathematics is often used as a tool to find solutions to various problems. Mathematics consists of several components including axioms and theorems. Mathematics can be seen as a way of understanding, because it contains valid or valid evidence, as well as a systematic process of understanding mathematics (Christiani & Afifah, 2019). According to Anggraini (2022) that mathematics is a science that has special characteristics, including understanding. The ability to understand as stated in the Minister of National Education Regulation No. 22 of 2006 concerning content standards is one of the competencies that must be possessed by students. Understanding is an activity, process or activity of thinking to make a new statement based on several statements whose truth has been proven or assumed. Through understanding mathematics, students can make conjectures, compile evidence, manipulate mathematical problems and draw conclusions correctly and precisely (Yulian, 2018). Therefore, in learning mathematics in schools, it is expected to develop students' mathematical understanding abilities which are reflected in the results of learning mathematics itself.

Researchers conducted initial observations at SMK Leader Al-Yasini Pasuruan in the 2021-2022 school year. This observation was carried out in class X, which consisted of 22 students. SRZ teachers are teachers who teach at the time of observation. The SRZ teacher teaches by giving a brief explanation of the material in the book. After that, the teacher gives students the opportunity to ask if there is an explanation of the material that has not been understood. However, at the time of observation, students tended to be silent and did not ask about the part of the material that was not understood. In this case, the students looked confused by what the teacher said.

Next activity, the teacher gives the task in the book. After students finish working, the teacher discusses classically about how to complete and answer the given task (Lam, Toh Tin;

Pien, Cheng Lu; Yin, Ho Siew; Heng, Jiang; Ming, 2017). Students sitting in the front pay more attention and listen to the teacher explanation. However, students sitting at the back tend to be busy with their own activities, such as some students working on unfinished assignments from other teachers (Cho, H., Osborne, C., & Sanders, 2015) (Maheasy, 2018). After being asked, the students stated that the teacher's learning was not interesting. This problem is caused by the methods used by the teacher are lectures, drills, and assignments. Therefore, in this learning the students seem less active and the teacher still dominates the activities in the class.

In addition, when the teacher asks questions about the material being studied, students can only answer these questions together. But when asked about the reason for the answer individually, students cannot give a clear reason. In this case, the SRZ teacher stated that this learning activity was often used because it was considered more efficient and could take the material according to the specified syllabus. This learning does not involve the role of students in constructing their understanding. From the problems that have been described, it is necessary to have efforts that can be taken to improve student learning activities. Based on the results of these observations, this study focused on improving students' understanding ability in solving mathematical problems.

In an effort to improve mathematical abilities as expected, teachers need to arrange strategies for delivering mathematical material to students. This is done to prepare guidelines for teachers in delivering material, so that optimal mathematics learning outcomes are obtained. The learning process will not be effective and interesting if the teacher only talks about things that are happening (Siregar et al., 2019) (Arifah et al., 2020). For that we need a media that can be seen, heard and read by students.

One way that can be used is to deal with challenges in learning is the use of comics learning media because there is a tendency that many people enjoy and have read comics (Afifah et al., 2021). Comics are sequences of images that are arranged according to the purpose and philosophy of the maker so that the message of the story is conveyed, comics tend to be given the necessary lettering as needed. comic media used in teaching and learning can generate new desires and interests, increase motivation and stimulation of learning activities, and bring psychological effects on students (Nana & Cisil, 2019).

## RESEARCH METHODS

The type of research used is Classroom Action Research. This research is based on the reason for the research problem, namely to improve learning in the classroom. The problems that arise are reflected and analysed based on supporting theories, then actions are taken to seek to increase students' understanding by using Digimco (Digital Math Comic) Media.

This research was conducted at SMK Leader Al-Yasini. This school is located in Areng-areng Village, Wonorejo District, Pasuruan. Participants in this study were students of class X Nursing. The implementation time is in the even semester of the 2021-2022 academic year. The participants of this study were selected based on the consideration of the results of the problem identification conducted by the researcher. The procedure for this action research refers to the classroom action research model developed by Kurt Lewin (Elliot, 2011).

Broadly speaking, the procedure is in the form of a cycle consisting of four stages, namely planning, implementation, observation, and reflection. Cycle will repeat until the criteria set in each cycle are met. The data and data sources of this study are presented in Table 1.

Table 1. Data and Data Sources

<b>Instrument</b>	<b>Data</b>	<b>Data Sources</b>
Validation sheet	Validation of learning tools and research instruments	Validator
Observation sheet	Implementation of learning	Observer
test sheet	Quiz and end-of-cycle test scores	Research participants
interview guidelines	Results of interviews with research participants	Research participants

## RESULTS AND DISCUSSION

The implementation of this research was carried out for 2 cycles, where each cycle consisted of four meetings and one final test. In addition, quizzes are held at the end of each meeting. During the learning activities, observations were held on the implementation of teacher and student activities in learning. The results of observations of teacher and student activities during the first cycle can be seen in Table 2.

Table 2. Recap of Cycle I Observation Results

<b>Type Of Activity</b>	<b>Average (<math>V_0</math>)</b>	<b>Category</b>
Teacher activity	3,27	Good
Student activity	3,12	Good

From the table above, it can be said that the teacher's activities in carrying out learning and student learning activities have reached the specified success criteria. Quiz and final test Cycle I is a test to measure students' understanding. This research is considered complete if the student's score is at least 75. The average individual quiz score is 63.5. This means that the classical percentage is 72.2%. While the average results of the final test of the first cycle were also obtained as many as 16 of the 23 students who took the test were not completed. The results of the final test of the first cycle obtained a percentage of 73.6%. The results of this quiz and final test have not reached the criteria for success, because they have not met the percentage of classical mathematics understanding of at least 75%. Based on the data from observations, quizzes and final tests in the first cycle, this study did not meet the criteria for success. Therefore, the research was continued in cycle II. Before continuing the research in cycle II, researchers and observers analysed the obstacles faced in learning in cycle I. The obstacles faced in cycle I and improvement plan in cycle II can be seen in Table 3.

Table 3. Constraints faced in Cycle 1 and Improvement Plan

<b>Constraints faced in cycle I</b>	<b>Maintenance plan</b>
Apperception given by the teacher is too time consuming.	Teachers pay more attention to time allocation.
Some students still do not master the basic concepts of prerequisite knowledge	The teacher places more emphasis on mastering the necessary prerequisite concepts and important requirements
The teacher still gives too much direction, especially when the students have started doing activities	Provide opportunities for students to be more independent by following procedures on student worksheets and optimizing group work.

Students do not think mathematically because of old study habits. In addition, students are more likely to wait for an explanation from the teacher.	The teacher emphasizes the active participation of all group members
Some students still look shy in presenting their group results because they are not used to conveying ideas and ideas	Emphasize the active participation of students, and encourage students to be bolder in conveying their ideas or ideas.

Furthermore, activities will be carried out to improve learning actions for cycle II as shown in Table 3. Based on the results of observations during the second cycle can be seen in Table 4.

Table 4. Recap of Cycle II Observation Results

Type Of Activity	Average ( $V_0$ )	Category
Teacher activity	3,48	Good
Student activity	3,30	Good

From Table 4 it can be said that the teacher's activities in carrying out learning and student learning activities have reached the specified success criteria. The average score of individual quizzes is 73.5 students who have gotten a minimum score of 75. While the quiz scores in the second cycle classically students who have gotten a minimum score of 75 achieve a percentage of 83.2%. Meanwhile, the average result of the final test of the second cycle classically reached a percentage of 77%. Thus, it can be said that based on all the data obtained in cycle 2 from observation of student activities, the final test of the cycle has met the success criteria, so there is no need to carry out the next cycle. The criteria for the success of the action in question are the results of the analysis of teacher and student observation data at least on good criteria, and the analysis of increasing student understanding, namely at least 75% of many students in the class get a quiz score and a final cycle test score of at least 75.

In this study, learning activities begin by preparing students before starting learning. This is done in order to facilitate and create a sense of comfort in carrying out learning. According to the opinion of Orthon (1992) that students who are ready to learn will learn more than students who are not ready. After students are ready to learn, the teacher carries out activities by greeting. This is one of the routines that the teacher must do before starting learning activities (Priyandani et al., 2018). On this occasion, students and teachers pray for each other and are given convenience in teaching and learning activities.

The delivery of learning objectives is carried out by the teacher orally. This is done so that students can find out the direction of learning that is taking place, so that students will be motivated to carry out learning. This is in accordance with the opinion of Uno (Pardimin & Widodo, 2017) that the pouring of learning objectives is given so that students can know the results to be achieved and get maximum learning outcomes. However, at the first meeting of the first cycle, when the teacher conveyed the learning objectives, the students seemed to pay less attention. This is because previously students were participating in foundation activities, so some students were still outside the classroom. Thus, resulting in students who are in the class assume learning is not ready to be implemented.

At each meeting, the teacher provides opportunities for students to present the results of their discussions classically. In this activity, the teacher randomly appoints a representative of one of the group members to present the answers they find. This is done so that each student in the group is better prepared when appointed. While the other groups were given the opportunity to

ask questions and provide feedback to the presenting group. Presentation activities can help students dare to express their ideas and explain them to other friends, dare to accept criticism and suggestions from others. According to Supriono (Mamolo, 2019) which states that students often feel nervous or embarrassed when asked to present in class. This is because students are not used to doing presentation activities in learning. Thus, it is necessary to take action by improving the design of presentation activities at the next meeting so that the presenting group reads out each point and is immediately responded to by the other groups.

## CONCLUSION

Based on the results of data analysis, it was concluded that learning using Digimco (Digital Math Comic) media can improve students' mathematical understanding. Mathematical understanding is indicated by the acquisition of scores on quizzes and end-of-cycle tests. Based on the results of the analysis of the average quiz scores and final tests, it was found that the percentage of students who completed learning in the second cycle was higher than the percentage in the first cycle. The classical quiz results in the first cycle reached 73.91% and the final test in the first cycle reached 65.21 %. While in the second cycle the classical quiz results reached 85% and the second cycle final test reached 80%. In accordance with these data, the learning carried out in this study is said to have reached the specified criteria. From the description above shows that by paying attention to the results of learning activities and mastery of students' teaching materials, learning by using Digimco Media can improve students' mathematical understanding.

Based on the results of classroom action research using Digimco Media, the following recommendations can be put forward: (1) In providing guidance, the teacher provokes students' thinking with questions, so as to enable students to understand and construct certain concepts. This activity can help students to find new knowledge in this research, (2) In the presentation activity, the presenter group conveys their findings, and other groups as comparisons are given the opportunity to ask questions and provide comments. This activity can help students to dare to express their ideas and explain to other friends, and dare to accept criticism and suggestions.

## REFERENCES

- Afifah, A., Putri, A. D., Info, A., Approach, C., & Understanding, C. (2021). Development of E-Komatik Media ( Mathematical E-Comic ) With a Contextual Approach To the. *Jurnal Scientia*, 10(1), 99–108.
- Anggraini, A., Baharuddin, B., Pathuddin, P., Haerani, N., Sugita, G., & Murdiana, I. N. (2022). *Analysis of Mathematic Communication Skill on Set Operations Reviewed from Mathematics Skill*. 674(TICoSS 2021), 64–66.
- Arifah, K., Indrawatiningsih, N., & Afifah, A. (2020). Analisis kemampuan multiple representasi siswa dalam memecahkan masalah peluang. *JP2M (Jurnal Pendidikan Dan Pembelajaran Matematika)*, 6(2), 67. <https://doi.org/10.29100/jp2m.v6i2.1749>
- Cho, H., Osborne, C., & Sanders, T. (2015). Classroom Experience about Cartooning as Assessment in Pre-service Mathematics Content Course. *Jurnal of Mathematics Education at Teachers College*, 6(1), 45–53.
- Christiani, R., & Afifah, A. (2019). *Education , Science and Technology Analysis of Student Learning Activities in Mathematics Learning Assisted by Educational Game Analysis of Student Learning Activities in Mathematics Learning Assisted by Educational Game*.
- Elliot, J. (2011). *Action Research for Educational Change*. Opc University.
- Lam, Toh Tin; Pien, Cheng Lu; Yin, Ho Siew; Heng, Jiang; Ming, L. K. (2017). Use of Comics to

- Enhance Students' Learning for the Development of the 21st Century Competencies in the Mathematics Classroom. *Asia Pacific Journal of Education*, 37(4), 437–452.
- Maheasy, W. (2018). Analysis of Student Errors in Solving Hots-Type Math Problems Based on Newman's Theory. *Unisida Journal Of Mathematics and Computer Science*.
- Mamolo, L. A. (2019). Development of digital interactive math comics ( DIMaC ) for senior high school students in general mathematics. *Cogent Education*, 00(00), 1–13. <https://doi.org/10.1080/2331186X.2019.1689639>
- Nana, S., & Csil, T. (2019). *The Development of Mathematics Comics Media on Linear Equations and Linear Inequalities of One Variable The Development of Mathematics Comics Media on Linear Equations and Linear Inequalities of One Variable*. March. <https://doi.org/10.1051/shsconf/20184200115>
- Orthon, A. (1992). *Learning Mathematics: Issues, theory and Classroom Practice (Second Edition)*. Dotesios.
- Pardimin & Widodo, S. A. (2017). Development Comic Based Problem Solving in Geometry. *INTERNATIONAL ELECTRONIC JOURNAL OF MATHEMATICS EDUCATION*, 12(3), 233–241.
- Priyandani, C. A., Indrawatiningsih, N., & Afifah, A. (2018). Profil Tingkat Berpikir Kreatif Siswa Kelas VII SMP dalam Pemecahan Masalah Pada Pokok Bahasan Segitiga dan Segiempat. *Jurnal Edukasi Matematika Dan Sains*, 6(2), 50. <https://doi.org/10.25273/jems.v6i2.5329>
- Siregar, N., Suherman, S., Masykur, R., & Ningtias, R. S. (2019). Pengembangan Media Pembelajaran E-Comic Dalam Pembelajaran Matematika. *Journal of Mathematics Education and Science*, 2(1), 11–19. <https://doi.org/10.32665/james.v2i1.47>
- Yulian, V. N. (2018). Developing Teaching Materials Using Comic Media to Enhance Students' Mathematical Communication Developing Teaching Materials Using Comic Media to Enhance Students' Mathematical Communication. *IOP Conference Series: Materials Science and Engineering PAPER*, 335. <https://doi.org/10.1088/1757-899X/335/1/012110>