

Effectiveness of using Gebar modules (The Movement of Line Marching) for students in elementary school

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Abstract

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One innovation that can be developed based on the problem learning angle created is the movement of line marching skills as learning media alternatives for students. This study aims to determine the effectiveness of using the Gebar Modules. The sample comprised 30 students from grades 4A and 4B who were randomly selected with one-group pre-test–post-test design. The result showed that the designed module is feasible to use. First, the data show that the N-gain coefficient is 0.77, which indicates the module's effectiveness on student-learning outcomes. Another data collection showed that 82% of the students could use a bow properly and 62% of the students can perform drill movements with the appropriate rules. In conclusion, this module makes students not only observe the things that shape the angle but also those that give them an angular shape by themselves so the material is etched deeper in their memory.

Keywords: Gebar module, learning outcomes, THE movement of line marching skills

1. Introduction

The problem that is often encountered in primary school is that students easily forget the class material. Books/modules play an essential role in restoring students' memories because the module can help students restore their memories through illustrations and explanations (AIP Conference, 2019). This problem is also found in the angle material in fourth-grade students, where the results of preliminary studies show that 98% of the students cannot interpret what angles are. This is in line with previous research (Sulistiowati, Herman & Jupri 2019), and 82.7% of the students have difficulty using the protractor (Yigit, 2014).

The concepts of angles are one of the competencies that exist in fourth-grade elementary school according to the 2013 curriculum in Indonesia. Van de Walle, Karp and Bay-Williams (2016) stated that an angle itself can be interpreted as an area bounded by two lines that intersect each other at one point called the vertex. Devichi and Munier (2013), referring to 'The Journal of Mathematical Behaviour. About the concept of angle in elementary school: Misconceptions and teaching sequences research,' stated that the vertex is vital to know when measuring angles. Angles are necessary materials in learning geometry, which we often find in everyday life and they can be observed up and demonstrated.

Angle material has many varieties of things in human life which contributes to developing other alternative learning media. The first media development undertaken by Nabella (2015) was the Jadut (corner clock). This media was easy to make, but the media were not designed to shape students' characteristics. Secondly, Natas (2019) developed a semaphore activity module that could increase students' skills in using semaphores, but this media is limited only to the material types of angles. This shows that the concepts of mathematics can be applied to human life (Ernest et al., 2016).

The interview results on three teachers showed the media used in learning angles were door, blackboard, etc. It also shows that media originating from the environment is more often used and accessible for students to understand. Gestures and movements of line marching skills provide an interesting comparison to action-on-objects and allow us to identify the circumstances under which gesture versus interaction with objects may be differentially beneficial to learning (Congdon, Kwon & Levine, 2018). The movement of line marching application can be seen in several activities like students' routine activities, namely the flag ceremony every Monday, as the government regulation number 23 of 2015 requires all school levels to carry out the flag ceremony every Monday.

The flag ceremony has several essential components in it, and one is the movement of line marching skills. It is a physical activity that aims to instil habits in order to form certain dispositions (Sumanta & Santi, 2017). It has rules that must be obeyed that are commonly called Line Regulations by the United Nations (UN). The UN aimed to help build a strong and agile character and physical attitude by working together and not being selfish (Sumanta & Santi, 2017). The Scout PocketBook also states that the marching activities are carried out to instil a disciplined attitude, a sense of unity, responsibility and obedience in carrying out orders accurately and quickly. Discipline and responsibility fostered by marching and accompaniment of national songs can indirectly apply a sense of nationalism.

In the *Sosio Religi Journal*, Dahliya (2017) also stated that a child's character education can be developed through the existing extracurricular activities, namely scouts. It can also foster good social attitudes in children. The result showed differences between students who followed marching training with high social competence, such as a sense of responsibility, empathy and cooperation. The marching activities have also become students' routine when conducting several state ceremonies, scouting ceremonies, gymnastics and other activities. So, they are expected to have a positive impact on students.

By learning through the movement of line marching skills, students will receive the rules in every movement that requires them to comply. This follows the theory of learning by Piaget (Lestari & Yudhanegara, 2017), which states that from the age of 7 to 11 years, student development has the characteristics of using some logical and clear rules, such as rules at home, at school or in the environment where children play. So, they can accommodate students. It is not wrong if the marching has been introduced and familiarised from an early age for elementary school children, because the lines can help them develop their personalities better.

The results of further studies in PBB also show that several movements of line marching skills contain angles in them. Implementing these innovations requires an intermediary media that can help illustrate the motion of lines in accordance with angular movements. One of the media that has a manipulative nature is the module. The module also has several criteria that enable students to learn independently (self-instruction) because the module is equipped with materials, work instructions, evaluation sheets, answer keys and others (Yuni & Thohiri, 2018).

It can be concluded that the right solution to accommodate the relationship between the movement of line marching and angles material is the module. The module is instructional and arranged interestingly and systematically. It includes the content of the material, objectives and evaluations that students can use independently with or without the teacher's help to achieve the expected competencies (Suryani, Anwar, Hajidin & Rofiki, 2020). The module is named the Gebar module (movement of line marching).

The Gebar module supports students learning independently by developing an angular concept related to their lives. The material is presented in stages, starting from understanding, types and measuring angles with protractors. Other competencies that are obtained and integrated through this module can be seen from the psychomotor aspects, namely skills in marching and the ability using a protractor. Then, the affective aspects contain students' discipline and independence.

One example is that the movement of line marching cue will require students to be more focused and responsive. It will indirectly train student discipline. The achievement of student independence is also supported by the exercise of the module's questions to assess their abilities independently. The module also features illustrations and rules of each movement so that the reader of the module can know the exact rules and positions in making the movement of line marching. The module is designed in a minimalist size to make it easy for users; so, this module uses an A5 design. The module also does not require many supporting media because the media in this module are the students themselves.

This innovation can make students not only pay attention and observe concrete objects that have angles but also observe the shapes of each angle by themselves so that learning becomes enjoyable. The material is easy to remember, and learning becomes meaningful. It is suitable for the humanistic learning theory by Arthur Combs (Lestari & Yudhanegara, 2017). One example is the study conducted by Surgandini, Sampoerno and Noornia (2016). Using the movement of line marching helps students understand geometrical concepts, including the nature of translation, dilation and other symmetries. Based on the study results, the use of modules can attract and give students a more in-depth understanding. This is also evidenced by research in the *Journal of Mathematical Behaviour* by Petrick, King and Hoyte (2014). He analysed the learning of angles through body movements that facilitate students in understanding the concept of angles, but the student's initial knowledge is an essential component in this study. For example, a child can imitate the straightening angle in the video. The reason is because he has imagined his hands beating like a bird's wings.

So, mathematics is deductive (Lerman, 2020). The evidence can be derived with an integrated mindset that integrates learning activities with the student environment as contained in the 2013 curriculum. Learning angle material through the Gebar module can contain the core competencies (KI) that must be achieved in the 2013 Indonesian curriculum. The core competencies in the curriculum of Indonesia include KI 1, KI 2, KI 3 and KI 4. KI 1 is showing gratitude to God for the Indonesian people's independence through the flag ceremony. KI 2 is regarding a sense of nationalism, as evidenced by students' discipline to obey each line-marching rule in national ceremonial activities. KI 3 focuses on students' knowledge of material angles in everyday life and knowledge of marching rules. Students' skills are shown in KI 4 as carrying out marching movements and skills in using a protractor.

The Gebar module used has fulfilled several module criteria (Yuni & Thohiri, 2018), namely self-instruction indicated by using the module, learning objectives, illustrations and explanations, summaries, practice exercises, evaluation sheets, answer keys and assessment techniques. The module also uses the right language, which is simple, unambiguous and allows a two-way communication (Suryani et al., 2020). The results of previous trials also obtained students' questionnaire results data on the module. The questionnaire results for grade 4A students were 86% (feasible) and for grade 4B 85% (feasible). This data shows that the module has a clear and not blurry illustration because the data shows that students more easily understand the Gebar module; it follows the opinion of Mdyunu, Ayub and Hock (2019) which states that the illustrations in the module can help students to understand the material lesson. The choice of colours and prints makes students not become lazy to read.

According to the opinion of Suryani et al. (2020), using sharp colours and prints will make students more interested in reading.

Students also felt the ease in using the module because it is equipped with instructions for use by using sentences that are easily understood and apparent, i.e., in line with one of the characteristics of the module, namely self-instruction using communicative language (Yuni & Thohiri, 2018). The existence of the skills assessment sheet makes the Gebar module optimise the role of students in learning into one of the module's functions (Suryani et al., 2020). The module is also equipped with a psychomotor assessment rubric that shows the integration in the Gebar module adapted to the 2013 curriculum so that it not only focuses on aspects of student knowledge but also on aspects of skills. The use of this module is expected to help overcome existing problems and can find out the impact/influence of the module on cognitive and psychomotor aspects of grade IV elementary school students.

Based on the preliminary study results, the study was conducted to test the Gebar module in understanding the angle material and student's skills in fourth grade at an elementary school. This study is entitled 'The Effectiveness of Using the Gebar Module for Students in Elementary School.'

2. Method

The study is a quasi-experimental study. This study was used to calculate the effect of a particular treatment on a particular population sample. Data obtained were processed and described using words (descriptive quantitative).

2.1. Research design

This study used a one-group pre-test–post-test design; a research design with an initial stage of giving a pre-test sheet to be worked on by students before getting a module and giving a post-test sheet to find out the results after being given a module. The design of this study is described in the following design:

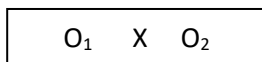


Figure 1. Research design.

Information:

O₁: pretest value;

X : Treatment;

O₂: posttest value.

2.2. Population and sample

The study population consisted of students from grade IV at an elementary school during 2019/2020, which consisted of class IVA with 29 students and class IVB with 31 students. The total number of students was 60.

A sample is a portion of the population or the number of individuals (objects) representing a study. A good sample can describe the population. The random sampling

technique was used. This technique provides the same possibilities for each individual in the population to be used as a research sample. The sample members are chosen by lottery because the school gives the flexibility to choose the research subjects, and all sample members are homogeneous. In this study, the researchers took a sample of 30 students consisting of 15 students each from class IVA and IVB.

2.3. Data collection technique

2.3.1. Observation

The purpose of observing is to observe the ability of students' skills in marching skills and skills in using a protractor. In this research, data collection refers to the rubric for assessing each skill. This rubric is used to observe students' skills in movement of line marching and measuring the angle with a protractor from the beginning to the final stage. The researcher uses the rules of marching as a criterion in formulating the rubric of marching with Likert scale of 1-4 and the rubric of skills assessment using a protractor, including students' initial knowledge about using bows they can determine the angle they are measured. This rubric is used as a reference in measuring student skills with the Gebar module. Rubric assessment consists of two sections: marching skills assessment and rubric assessment of student skills using a protractor using a Likert scale.

2.3.2. Test

A test is a form of measurement and a way to obtain information in the form of knowledge.

2.4. Analysis of data

On the 4-point Likert scale, each statement was given four alternative answers for each skill's appropriate criteria.

2.4.1. Data on the test result

The test result data are concluded by comparing the average results before and after using the module with the desired standard, and if the value after the treatment is greater than before the use, then the module is said to be effective (Sugiyono, 2016). The data obtained will be sought after and before value enhancement using the n-Gain analysis with the following formula::

$$g = \frac{\text{posttest} - \text{pretest}}{\text{scores maximum} - \text{pretest}}$$

Modules will be said to be effective if they have increased learning with a gain score of more than 0.3.

2.4.2 Data assessment of student skills

Data from the charging sheet has a student skills assessment as the evaluation methods, as listed on the assessment rubric. These data are presented by finding the percentage of

every aspect and are described using words to determine the results of the assessment of student skills, which include marching skills and skills in using a protractor, when using the Gebar module. The next technique is to look for percentage score assessment (PSA), using the following formula:

$$PSA = \frac{\Sigma \text{ Score of All aspects}}{\text{Number of Aspects} \times N}$$

3. Result

During the trial, the first step is a question and answer session regarding the angle material to the fourth-grade students to determine the initial knowledge about the angle material. In the second step, students are divided into six groups of five children. The third step is the distribution of the pre-test sheets first to students. The fourth step of the Gebar module is distributed to each group to read, understand and carry out every instruction in the module with the researcher's guidance. While guiding the use of modules, observations were made to assess the aspects of student skills and obtained the data following the assessment rubric available in the module. The final step is distributing the evaluation sheets (post-test) to students.

The result begins by discussing the observations in the field. The first data found by the researchers who conducted the assessment was a simple question on students about their knowledge. As much as 25% of the students could describe the corner they have understood and what they actually had. Some students said, 'angle is a triangle, the corner is taper, the corner is the point and others'. Their answers indicate that basically the corner of the image is illustrated in their thinking, but students still had difficulty in explaining the corners. On the question of both types of angles, 45% of the students had answered correctly to an acute angle, an obtuse angle and a right angle. Nevertheless, when asked to draw and reproduce the angles, students got confused with their answers.

The following is a short response from students after the research was carried out. When the researcher took the module from the students, the students became sad and said, 'Mam, why do you take the book? I want to learn it at home with my sister Mam. Please do not take this mam'. In other conditions, when the researchers went back to the school, the students who are the subject of research said, 'Mam, I have this movement, I know of having the acute angle in my class and others'. With enthusiasm they showed and played some motion line movements up which they had learned in the Gebar module. Meanwhile, the results of the assessment of students' skills in the research are divided into two skills, i.e., skills in using a protractor and marching.

3.1. Assessment skills in marching

For the first time, the students did not understand the meaning of motion lined up. It happened when asking students what the meaning of motion lined up was, and most of them began to answer in a respectful, fast-forward and resting position. When performing the marching movement, some students were confused and did not know about the marching rules, but after being given a module with the marching rules, the students read it and were equipped. 62% of the students were able to discipline every instruction according to the rules. The results of the assessment rubric are shown in Figure 2.

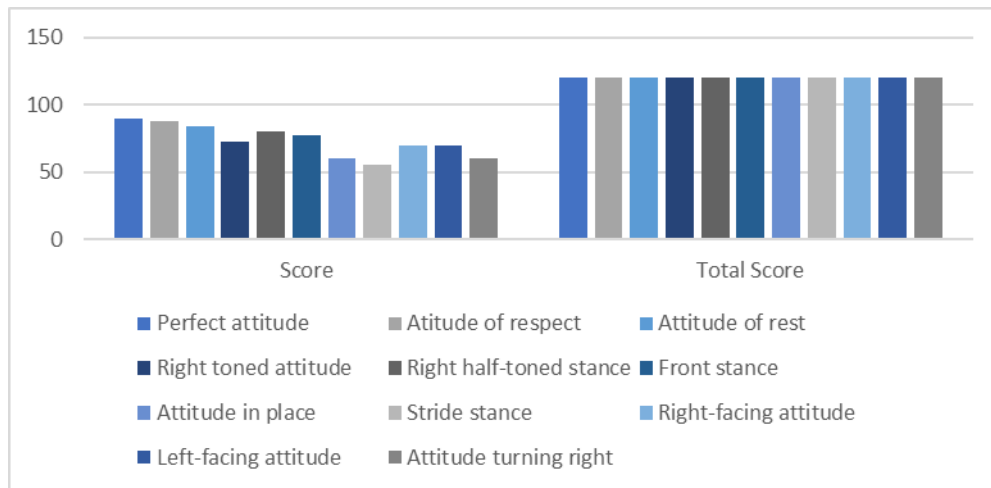


Figure 2. Results of the assessment rubric movement of line marching Skills

These results show a total value of 807 from a total value of 1320; so, the results of student skills in marching shows that 98% of the students can answer correctly.

3.2. Assessment skill using a protractor

The skills assessment results show a total score of 492 out of 600; total scores so, that the results already obtained the percentage score assessment of student skills in using the protractor (Figure 2).

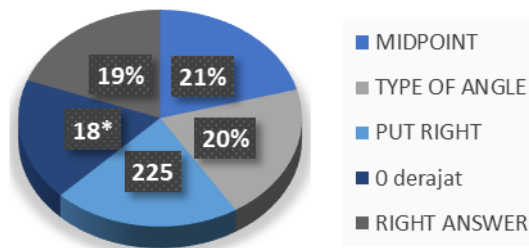


Figure 3. Result of the assessment using a protractor

The percentage shows that 82% of the students who read the module could use the protractor correctly. This shows that the instructions for use in the module can help students in measuring angles.

3.3. Pre-test and post-test

Data on the pre-test score show an average of 32.7 with a processing time of 10 minutes, which is longer than the specified time. While the average post-test results showed an average value of 77 with a processing time of 20 minutes. Figure 4 shows the data values of the pre-test questions with the students' post-test.

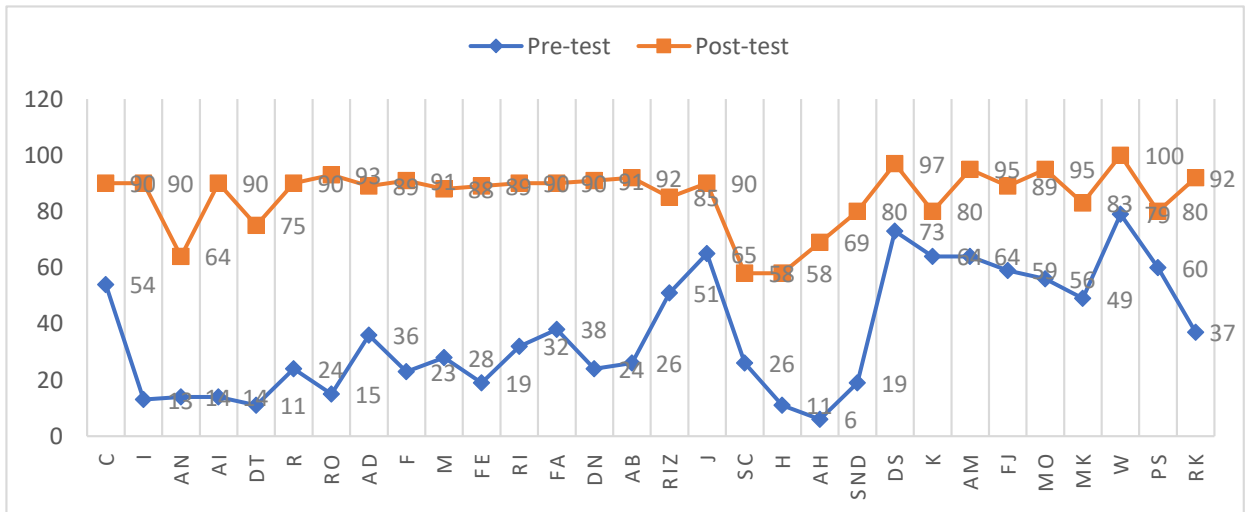


Figure 4. Result of pre-test—post-test

The pre-test and post-test are then used to obtain the N-gain coefficient by using the following formula:

$$\begin{aligned}
 \langle g \rangle &= \frac{\text{posttest} - \text{pretest}}{\text{score maximum} - \text{pretest}} \\
 \langle g \rangle &= \frac{2,563 - 1,090}{100 \times 30 - 1,090} \\
 \langle g \rangle &= \frac{1473}{3000 - 1090} \\
 \langle g \rangle &= 0.771
 \end{aligned}$$

Based on these calculations, with an N-gain coefficient of 0.771, the module is said to have high effectiveness on the learning outcomes of angles material in class IV at an elementary school Made 1 Surabaya.

4. Discussion

A significant difference after being granted the Gebar module can be seen from the pre-test and post-test results. The students' pre-test and post-test results were used to obtain the N-gain value, and the N-gain coefficient obtained was 0.77, wherein this data indicates that students became more robust by being given the Gebar module. The data showed that

students could explain their understanding of an angle, the types of angles, large corners correctly and showed the angle in motion line-up. This shows that the module has a high level of effectiveness on student learning outcomes because one-time learning has shown an increase in learning outcomes than before. The post-test results are also an example of how using students' media as the learning media can help students understand the material. This is in line with a research conducted by Petrick et al. (2014), which makes body movements as a medium for learning angle material, and it makes the material easy to remember and interesting for students. This is one form of a mathematical transformation in daily life.

When working on the post-test sheet, this module also trains the independence and honesty of students in its use, because after reading, the students are asked to answer the evaluation questions without seeing the answer key in the back page of the module, and they practice to correct the answers and give a value on the post-test sheet. This is appropriate with one of the functions of the module. The module can function as a tool to assess themselves and train students' honesty (Suryani et al., 2020). These data were indicated by the observations at the time students were working on a post-test sheet. This post-test is carried out for 30 minutes, students look disciplined and orderly in doing this even though under full instruction and supervision by adults.

The observation shows that the knowledge about students against in motion line-up has been used to perform the nationality ceremony. It was also found that 25% of the students had re-enacted the instructions given. Some students also had confusion in differentiating. In conclusion, before they used the module, students only relied on their knowledge and knew about motion line-up according to what they do during the school flag-raising ceremony. The second question is about the position of the motion line-up. Students did not even know when they played the position of the person concerned the way most students were lifting their feet while bent over. After being given the module, based on the post-test sheets, students can mention how to position movement the motion line-up correctly and the angle's formation.

Learning through motion line-up skills is an example of a form of media taken from the environment or commonly referred to as environmental media. The media environment has the meaning of an intermediary means found in the human environment, which contains teaching material that can be illustrated into various forms of media as needed, as in Sukma's (2020) research. Corner material that consists of various things in human life also contributed to ideas for other developed learning media. First, the media development carried out by Nabella (2015), namely Jadut, is effortless to make, but the media is not designed to shape the character of students. Second, Natas (2019) developed a semaphore activity module that could add to students' skills in using semaphores, but this media was limited to the concept of angles only.

The merging of marching movements with angular material in mathematics learning also shows that mathematics is a logical mindset that has truthfully proven that active learning etches deep memories in students (Mdyunus, Ayub & Hock, 2019). Not only that, through the marching movements associated with angular material, students can also sketch angles on each marching movement, make a marching flow chart formation and daydream about how much distance is needed to make specific row formations. The activity of line-lined movement will gradually help students in their spatial-visual intelligence, where visual-spatial intelligence is the ability to imagine in images, colours, lines and shapes (Aziiza & Juandi, 2021). For example, the ability to differentiate the shape of space is essential in learning mathematics. Teachers, as educators, are required to be able to provide facilities to develop students' imagination abilities. In Aziiza and Juandi's (2021) research, it is stated

that a person's visual-spatial intelligence can be intertwined when making connections between objects and concepts; however, in this study it is not emphasised but it can be used as one material for further research.

The results of the assessment of the aspects of skills (psychomotor) obtained in this study also showed that the module not only focused on learning outcomes (cognitive) but also optimised the role of students in learning. This shows that the module can optimise students' role in learning as in one of the modules' characteristics (Suryani et al., 2020). The illustration in the module can help students to understand the subject matter. Colour selection and casts do not make students lazy to read, and also statements that use sharp colours and casts make students more interested in reading (Mdyunus et al., 2019).

Student responses to the module are also shown in the questionnaire that students have filled in after using it (Amri, 2013) because the module has been equipped with instructions that are easy to understand (communicative) with precise language (self-instruction), so that it makes it easier for students to understand them. The existence of a line-up movement also facilitates understanding. It strengthens students' memories in studying the material angles reflected in the student questionnaire points 5–9. It shows that it can make the material more attached to students' memories with a media outlet from the student environment because it is closer to the students (Sukma, 2020).

The psychomotor assessment inside the module also shows the integration in the Gebar module adapted in the 2013 curriculum where it not only focuses on aspects of student knowledge but also on aspects of skills. The results of the assessment prove that 82% of the students had measured the angle correctly. Even when the research was finished, they continued to practice to measure other angles in the mathematics book. This shows that the module is also adaptive to other textbooks according to the module characteristics (Suryani et al., 2020).

The obstacle most often encountered by researchers when assessing students' skills is that they have difficulty keeping their views straight ahead in each of their movements due to lack of concentration and interference from other friends. This shows the existence of rules in the marching movement makes students more disciplined, according to the theory of learning by Jean Piaget (Lestari & Yudhanegara, 2017), which says that the development of children aged 7–11 years would be better by using several rules that are logical and clear so that it can accommodate students in learning.

5. Conclusion and recommendations

This study illustrated that media coming from the environment has a high possibility to improve student learning outcomes. Other than that, the Gebar module could be categorised into one of the applications: a mathematical transformation in a book. This is due to the transformation in the movement of line marching activity with mathematics. This module is also said to be effective because the study's results show a positive response and an increase in students' ability to study angles. Last, the module has two advantages, namely the Gebar module which not only helps students understand cognitively but can also give them new abilities, and the ability to use bows and perform marching movements.

Based on this conclusion, we provide some recommendations. First, teachers should use the Gebar module as a media alternative. Second, schools can make the Gebar module a reference book to teach movement of line marching for students. Last, other researchers can research the students' visual-spatial abilities in movement of line marching. It would be

better if there were more innovations in applying transformation results in mathematics by learning to help understand the application of various mathematical instructions in life.

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