

Learning with Mak Karjo Media to Increase Student Motivation for Learning Materials Trigonometry High School Students

Eka Susanti*, Siti Kumawati

Mathematics Education Study Program, Faculty of Teacher Training and Education, Tidar University,
Jl. Kapten Suparman 39 Magelang 56116, Indonesia. Tel. (0293) 364113, Fax.(0293)362438.
Email*: wsari3554@gmail.com

Abstract. Math learning is growing as the times evolve. More and more media is used to enhance student learning motivation. This assessment aims to create a math learning design that can increase the motivation of learning students through Math card matchmaking (Mak Karjo) in high school students. As for the use is a descriptive method and the post facto method ex. The descriptive method used is with the development of pre-existing research results. While the method ex post facto, that is to assess the use of Media card soul mate in improving the motivation to learn high school students. Mak Karjo is the length of mathematics with a matchcard, so the media used is the media of a soul mate filled with sin, cos, and tan. Results show that the application of *Mak Karjo* in trigonometric learning motivates students in learning because learning is designed in such a way that it can create a pleasant learning atmosphere.

Keywords: motivational learning, matchmaking cards, trigonometry

INTRODUCTION

Mathematics is one of the fields of science that is scary for some people. Careful and uncomplicated calculations are the reason for people who dislike this field of study. Many formulas are considered complicated and confusing in mathematics, one of which is trigonometry. Trigonometry is one of the branches of mathematics that many memorize, such as sin, cos, tan.

Mathematics learning is only monotonous less desirable to students. If students are less interested then the lesson will be difficult for students to receive. As educators should be good at organizing strategies to keep students interested in subjects taught. The strategies that are made should be as creative as possible but learning materials can also be delivered well.

There are several types of math games that can be developed as an exercise media for independent problems. Domino Math is a relevant mathematical game to play in the age of student capacity. The student's judged to have enough knowledge and ability to play a pair of mathematical domino cards. Domino Mathematics Card in its development is still rarely used in learning and is known by students, researchers want to introduce learning media in the form of this mathematical Domino card. Therefore, the development of learning media in the form of mathematical domino for trigonometric courses is seen as necessary. One of the methods of learning mathematics that can be done is to use a game combined with mathematics, especially trigonometry that is less desirable by students. Learning with the game is done so that students are attracted to the subject and can easily master it. Card games are one of the alternatives because this game is familiar among

teenagers so it's easy to play. Trigonometric studies with this method of cards are expected to improve learning motivation and skills in mathematics, especially trigonometry.

The main advantage of this domino is its good media design, good material selection and the questions presented in the media have been compiled with difficulty levels that encourage and challenge students. The use of Domino card in previous learning has been done in research conducted by Nengsih & Rochmawati (2014), namely the development of Domino card as a learning media accounting in the adjustment journal paragraph material with the results Percentage of eligibility (82.46%) With very decent categories and excellent student responses with a percentage of (95.4%). In addition, the research was performed by Larasati & Poedjiastuti (2016) aiming to develop the Domino card on the material materials for the deaf SMALB students provide very decent validation assessment results, students provide a positive response and Increase in the gain score in the medium category.

Based on Prapenelitian results, analysis of learning style needs as well as literature study, math Domino cards can be developed as learning media that can be adapted to the needs of educators and students in the classroom. Therefore, it is necessary to take follow-up to research and develop learning media that utilize Domino card or commonly called Match card that is mathematical development with matchmaking card (Mak Karjo) as learning Media at Courses of trigonometry Mathematics. The hope and objectives of the study are to develop mathematics with a match card (Mak Karjo) in trigonometric courses as a valid, effective and practical learning medium.

The purpose of the preparation of this scientific work is to know the new media in the learning, namely Mak Karjo media, knowing the application of Mak Karjo media to increase the motivation to learn students in trigonometric materials and to know the weakness and the excess media of Mak Karjo in learning.

MATERIALS AND METHODS.

Learning Motivation

Student motivation is indispensable in learning. Overly complex material will make students less interested in learning. Low student motivation can have an impact on the process and outcomes of students who do not improve well, even greatly decreases. Motivation has an important role in student learning success. Highly motivated students, have enormous possibilities for success than students who do not have the slightest motivation. Mc. Donald (Djamarah, 2011) says that, 'motivation is a change of energy in the person who is characterized by the occurrence of affective (feeling) and reaction to achieve the goal'. Based on that opinion, students who are motivated will always strive to achieve their goals by learning more actively in each of the teachings that follow. A person's motivation includes students to teaching or teaching materials. Students who have an interest in something tend to give more attention and learn it wholeheartedly. However, mathematics has become a frightening scourge for most students because of teaching materials that are deemed difficult and the presentation of the material by a boring teacher. This is in line with the opinions of Dean (Kurnianingtyas, Windayana, and Ardiyanto, 2015) that, "mathematics is a difficult and tedious thing for students".

The motivation of students who are still very lacking in math lessons and the ability of mathematical connections that are still very low can be caused by several factors. One of the reasons is a more teacher-centered learning activity. Even more so sometimes the proud results of students are less appreciated. Besides, conventional learning emphasizes more on the activity of teachers who are more dominating the activity while in the class and receive the teacher's explanation without allowing students to actively try and find out for themselves.

According to Makmun (Nashif, 2012), that to understand motivation can be seen from several indicators. The indicator is the duration of activity, frequency of activities, the activity of activities, steadfastness, resilience, and ability to deal with obstacles and difficulties, devotion and sacrifice to achieve the objectives, the level of aspiration to be achieved with activities undertaken, qualification level of achievement or product (output) achieved from activities undertaken, and direction of attitudes towards the target activities.

Mathematics Learning

According to Gagne and Briggs learning as "the efforts of the person whose goal is to help people learn". Gagne also defines learning as "a set of external event events designed to support the occurrence of several learning processes that are internal.

According to R. Soedjadi (Emiliya, 2014) Teacher mathematics learning needs to know and implement a variety of guidelines on (1) Learning strategies, (2) Learning approaches, (3) Learning methods, (4) learning techniques.

Trigonometric

Trigonometric matter is one of the basic material taught high school with its competency standards is using comparisons, functions, equations, and trigonometric identities in problem solving. The basic competence in the mathematical learning of trigonometric matter is

Using properties and rules about trigonometric functions, sine formulas, cosine formulas. Perform algebraic manipulation in technical calculations related to trigonometric functions

Another material that is not less important is taught is about a special angle that has not been mastered by many students. Students still often forget the material when a special angle is the basis for solving trigonometric problems. In addition to the special angles, trigonometric identity formulas are also important and should always be remembered students because almost all questions in trigonometry use the nature of trigonometric identities.

Media Dating Card

Media is an attraction for learning information or message distributors, (AECT (Association of Education and Communication Technology) gives limitations on the media as a form of channel used to convey messages or information (Andriantomi & Nurdin, 2016). This indicates that the media is a tool used to facilitate the learning process. Various forms of media can be used, one of which is in the form of games.

According to Mulyani, the game will help the child in training to hone the ability to solve various problems using logic (Rosyid, 2017). Whereas Ruseffendi stated that math games are fun or exhilarating activities that can support the achievement of the objective of teaching mathematics both cognitive, affective and psychomotor aspects (Dwirahayu & Nursida, 2017)

Game-based learning refers to learning by borrowing (using directly or modifying) certain game principles to achieve learning objectives (Rahaju & Hartono, 2017). So the game media used in learning must be designed to be the most appropriate to achieve the expected learning objectives. Development of the game media is expected to make the mathematical concepts more powerful applied by students. So when students are given questions related to the material in the game, students can more easily remember the completion algorithm.

Some forms of the game have been used in mathematics learning. One of them is a domino or Matchcard game. Domino Card is a game that uses blocks on one side of the mark, stating its value from 1 to 6.

A matchcard or commonly known as a Domino card is one of the card-based games played for fun. The identical Domino game is done using money as the ultimate goal of the game. This resulted in dominoes often seen as a less good game to be played by children (students). To change the negative view, we strive to adapt the Domino game to math learning.

Procedure Mak Karjo

Mak Karjo is a math learning that uses media match cards or better known as Domino cards, especially on trigonometric materials that students are difficult to master because of the many formulas.

Trigonometric Matchmaking cards are a set of cards in which each card is divided into two parts that each part is filled with a sinus, cosine or tangent for a special corner angle in trigonometry. While the game Mak Karjo on trigonometry is a game that utilizes Domino trigonometry cards with a rule that starts with each player receives the same number of cards then each player gets a chance to put the card is the same value as the end card that has been placed first in turns, until at least one player is discharged as the winner and whose sum is the biggest value of the player is losing.

Innovations in Trigonometric matchmaking games are developed to help students be skilled in remembering

trigonometric function values for special angles, as this is indispensable for students in discussing the material of the equation Trigonometry, where the main indicator is to solve trigonometric equations.

Innovation Learning Game Domino trigonometry begins with the students creating and designing their dominoes first in a group way, then tried to play them if there is a shortage can be fixed so that the cards made really already can be played. By the time students design Domino trigonometric cards There is already a process of remembering, counting trigonometric functions at special angles, then proceeding while playing the card there is also the process. Obviously, this is the drilling process that is intended so that the students are increasingly skilled considering the values of trigonometric functions are special angles.

Trigonometric Matchmaking cards are created and designed with the following steps:

- Make a card from an Astro paper material that is cut with the same color and size.
- Create a special angle list (Quadrant I – IV) that is worth the sinus, cosines or hand.
- Attach and the value of sine, cosine, and hand that have been arranged according to the number of pairs on the match card.
- Write the value of the sinus, cosine, and tangent on the label and paste it into the prepared homemade card.

Tabel 1. Trigonometric Corner Tables.

	1	2	3	4	5	6	7
1	0	$\frac{1}{2}$	$\frac{1}{2}\sqrt{2}$	$\frac{1}{2}\sqrt{3}$	1	$-\frac{1}{2}$	-1
2	Cos 270°	Sin 30°	Sin 45°	Sin 60°	Sin 90°	Cos 120°	Sin 270°
3	Cos 90°	-cos 120°	Cos 45°	Cos 30°	Cos 0°	Sin 120°	Cos 180°
4	Sin 180°	Sin 150°	-sin 315°	Sin 120°	Tan 45°	Sin 330°	-tan 45°
5	Sin 0°	Cos 300°	Cos 315°	-cos 120°	Cos 360°	Cos 240°	Tan 135°
6	Tan 0°	-sin 330°	-sin 225°	-sin 300°	Tan 225°	-sin 30°	Tan 315°
7	Tan 180°	Cos 60°	-cos 135°	-cos 150°	-sin 270°	-cos 60°	-sin 90°
8	Sin 360°	-sin 210°	Sin 135°	Cos 330°	-cos 180°	-cos 300°	-cos 0°

Trigonometric Matchmaking cards are ready to play



Figure 1. Trigonometric cards.



Figure 2. Trigonometric cards.

Application of Mak Karjo in Trigonometric Materials

For example in learning about trigonometric comparisons. Trigonometric learning is often feared because the surfaces are symbols and abstract formulas. The meaning is rarely lifted and raised to the students. The comparison of trigonometry originated from real problems. One of the teaching alternatives that can be done is to make a game, that is, with a trigonometric dating card media.

A trigonometric matchmaking game is a card game developed from a domino game by replacing the dot that is in a matchcard/Domino into values of Sinus, cosine or hand of special angles that exist in trigonometry.

How to use it or how it is playing in the classroom

- a. The teacher explained to the students how to play in front of the class that the same way as playing Domino cards but the contents of the card is replaced with trigonometric problems (recognizing the privileged angle of the quadrant I to the Quadrant IV)
- b. master divides the class into 4 groups
- c. Shake the Matchcard and then take one card.
- d. Paste in front of the class (if it is too small the card will need to be drawn on the board) can also be highlighted using the camera and then displayed with the LCD projector.
- e. Divide the remaining cards so that each group gets 4 Domino cards.
- f. The game starts from Group 1, followed by group 2, Group 3 and Group 4 then group 1 and so on.
- g. Groups that can not answer in turn added 1 Domino card
- h. The most fast-consuming group of cards is the winner.
- i. The first winning group has a value of 10, the second winner has a value of 9, the third winner has a value of 8 and the loser gets a value of 7.

Note:

- a. The game can also be done individually
- b. For each student with one trigonometric Matchcard
- c. Who will be the most immediate 10
- d. Fastest No 2 Gets a value of 98
- e. The third fastest gets a value of 96
- f. The fourth fastest gets a value of 94
- g. And so on until it runs out
- h. If the pupil is more than 28 make a match card to 36 pieces.

RESULT AND DISCUSSION

Results

The concept of learning by using the media matchmaking card is more emphasis on the way the match card game to gain a meaningfulness so that it can

cause more memory in the students so that the learning interest of students increasingly High. As a result of increased motivation and growing students ' understanding of learning mathematics, it can improve students ' activity in learning. Students therefore obtain the results of learning good trigonometric material.

It can be analogued that the previously implemented research supports the theory concluded by Sundayana (2013) that using a soul mate memory card can remember the students become more and understand the students become more understanding. Therefore, learning using Media card learning is effective to achieve trigonometric learning targets because the learning makes students active and learning is more enjoyable for students.

Kamarul (2009) states that learning strategies such as the use of media in the learning process have a positive correlation with the students ' learning motivation. This demonstrates the better learning strategy teachers use, the students are increasingly motivated to learn. Students who have strong motivation will have a lot of energy to do learning activities (Sardiman, 2012).

Statistical test results show the motivational differences of control class students and experimental classes, where the motivation of experimental graders who have been given learning using card media is higher than the motivation of the control class students who Without using a matchmaking card media. This is in line with the opinions of Sudjana and Ahmad (2005) stating that 13 media will make the learning process more attractive to students so that it can cause motivation

Advantages and Disadvantages of Mak Karjo Media for Learning

Media Advantages of Mak Karjo

- a. Create a unique and not boring brlajar atmosphere
- b. Easy game to do
- c. Can train students ' social souls because they are done together
- d. Train Brain Intelligence

Mak Karjo Media weakness and how to overcome

- a. It takes a long time, then this trigonometric Domino game can be performed outside the hours of the KBM, and
- b. The creation of the card is the task of Project, there is an dishonest student so that when the play does not want to calculate the value of the cards, but just put the card without paying attention to the worth or not. On the goal of the game is to provide drill, so students memorize and skilled to calculate trigonometric values of special angles. To overcome it is before the next player put the card then all players must first correction to determine the right or wrong card

CONCLUSIONS

This Mak Karjo adopts conventional match card game so that in its use is easily understood by students. Of the overall research was concluded that the use of effective card learning media to achieve targeted learning of trigonometric material.

From the results of this research, it is advisable to the teacher to use the media matchcard as one of the alternatif to achieve the learning target. Due to limitations, the authors suggest for further research on the use of media-card learning, to be done with a larger number of samples, longer allocation of research time, and carried out on the subject Other discussion.

ACKNOWLEDGEMENTS

We express our gratitude and sincere appreciation to all reviewers who have contributed their skills and time to review a script titled Learning with Mak Karjo to Increase Student Motivation for Learning Materials Trigonometry High School Students, to evaluate and assess the articles submitted for consideration in the publication process; To be accepted or rejected in the publishing process. All of this is very important to ensure the quality and scientific impact of this article.

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