

## Application of Interactive Quizzes to Increase Interest in Learning Mathematics

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### ARTICLE INFO

#### *Keywords:*

Interactive quizzes;  
Interest to learn;  
Mathematics

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### ABSTRACT

This research aims to overcome problems in the post-Covid 19 learning process, namely the low interest in learning mathematics among students. The application of interactive quizzes is expected to increase interest in learning mathematics. This type of research is PTK (Classroom Action Research). The subjects of this research were 36 grade 7 students at SMPN 3 Candi. The data collection technique in this research used a questionnaire. The research results showed that there was an increase in students' interest in learning mathematics as indicated by the increase in the number of students with high interest in learning and the decrease in the number of students with low interest in learning. In cycle I, there were no students with low interest in learning, there were 20 students with moderate interest in learning and 16 students with high interest in learning, while in cycle II there were no students with low interest in learning, there were 14 students with moderate interest in learning and 22 students with high interest in learning.

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## INTRODUCTION

During the Covid-19 period, learning was carried out online so that students could continue to learn and the spread of the Covid-19 virus did not occur. This has both positive and negative impacts on the education system in Indonesia. The positive impact of online learning during Covid 19, learning is carried out more practically and relaxedly, information is delivered more quickly with a wider reach, students are more interested in doing assignments, and new experiences are gained regarding online learning. Meanwhile, the negative impact of online learning is that students do not understand the learning material, students are less enthusiastic about participating in learning, students have difficulty

using devices or networks to participate in learning, and their interest in learning decreases when participating in online learning.(Nyoman Serma Adi et al., 2021). After 2 years of the Covid emergency, students are starting to get used to online learning. Study from home using the electronic devices they have and utilizing the internet network. After the Covid 19 pandemic, online learning began to change into hybrid learning, namely a combination of online and offline learning. Hybrid learning is implemented to overcome the negative impacts of online learning and to slowly get students used to face-to-face meetings again. Hybrid learning has been proven to increase students' learning motivation and make them more enthusiastic about learning. This is due to the advantages of hybrid learning which reduces online meetings and adds meaningful interactions, besides that students have many choices to be able to improve their competence by accessing various sources anytime and anywhere, students also not only learn one way sequentially but also get reciprocity during meetings at school(Sri Wahyuni, 2021). After the Covid 19 virus subsided, learning returned to normal and was carried out offline. However, because students are used to spending more time at home with their gadgets, various problems arise that they experience when they return to carrying out normal learning at school. Students experience a decrease in motivation which leads to their low interest in learning. This is characterized by students being less enthusiastic about learning, they tend not to be able to get away from gadgets, get bored quickly when sitting for a long time in class, get sleepy quickly, and are very passive when interacting in class.(Danang Yuanga et al., 2022).

If students' interest in learning is low, it will affect the learning process. Students' learning interests will be related to students' learning activities so that students' learning interests are important in the learning process which also determines the level of learning success.(Besare, 2020). According to Purwanto(Rusmiati, 2017)says that interest is a strong and inherent inclination of the heart in a person. Interest will influence a person's activities because he will do something according to his heart's desires. Interest in learning is a feeling of liking and interest in learning activities without being asked by anyone(Ricardo & Meilani, 2017). According to Slameto (2010: 180) several indicators of interest in learning include: feelings of pleasure, interest, acceptance and student involvement.A similar thing was also explained by Renninger, Hidi, & Krapp (2014 in(Ricardo & Meilani, 2017)) that students' interest in learning can be described by greater attention and concentration, feelings of joy in learning, and an increased willingness to learn.In mathematics learning, students' interest in learning has a significant relationship with mathematics learning outcomes with the highest percentage of aspects being the feeling aspect(Ndraha et al., 2022).

Interest in learning mathematics tends to be low because many students do not like mathematics lessons. Teachers can overcome this by using varied and fun learning methods such as learning using games(Nurhana Friantini & Winata, 2019). The use of games can make learning more active and enthusiastic so that it can foster students' interest in learning(Efendi et al., 2022). Teachers can play games during the evaluation process in the form of a quiz. With various menus presented in the games application, teachers can apply several models such as taking quizzes individually, in groups, or accommodated directly by the teacher. An interactive quiz is an application that contains subject matter in the form of questions that allows students to increase their knowledge of the subject matter(Mualimah et al., 2019).

Some previous research related to students' learning interests was research conducted by Marsya and Puri(Azzahra & Pramudiani, 2022)regarding the influence of quizziz as an interactive media on students' interest in learning in mathematics lessons in grade V elementary school with research results showing that there is an influence of quizziz as an interactive media on interest in learning mathematics, namely that interest in learning increases and students appear active in learning. Apart from that, there is also research conducted by Sri Wigati(Wigati, 2019)regarding the use of Kahoot game

media to improve results and interest in learning mathematics with research results showing that there is increased student learning outcomes from cycle I by 87% and cycle II by 92%; 2) there was an increase in students' process skills from cycle I by 83% and cycle II by 92%; 3) there was an increase in student interest in learning by 82% in cycle I and cycle II by 93%.

According to the results of observations carried out by researchers in class 7.3 of SMPN 3 Candi, it shows that there are still students who have low interest in learning and there are still a few students who have high interest in learning. Researchers also found that the learning carried out in class used a direct learning model and the learning evaluation provided was in the form of summative assessments only without formative assessments. So the researcher aims to conduct follow-up research regarding the application of interactive quizzes to increase interest in learning mathematics.

## RESEARCH METHODS

This type of research is Classroom Action Research (PTK) which aims to improve the quality of learning by increasing interest in learning mathematics. Muchlisin Riadi believes that Class Action Research (PTK) or Classroom Action Research (CAR) is a form of research that occurs in the classroom in the form of certain actions taken to improve the teaching and learning process in order to improve learning outcomes that are better than before. (Nanda et al., 2021). The subjects of this research were students in class VII-3 at SMP Negeri 3 Candi for the 2022/2023 academic year, totaling 36 students, 18 males and 18 females. This research was carried out at SMP Negeri 3 Candi which is located on Jl. Kedaton, Waras, Sugihwaras, District. Candi, Sidoarjo Regency, East Java 61271 This research was carried out in the even semester of March – April 2023.

The research procedures that will be carried out in this research are:

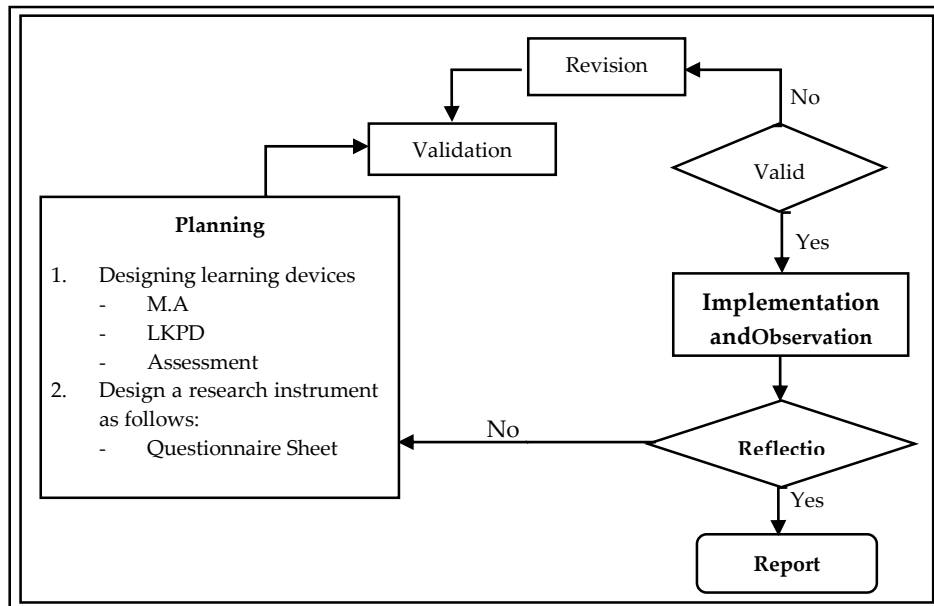


Figure 1 PTK Research Scheme Adopted from Arikunto (2015)

The detailed stages in the research include:

a) Planning (Plan)

The planning stage begins with identifying problems in the field, then, based on the problem identification, the following action steps are determined:

- 1) Plan data collection time
- 2) Develop learning objectives based on learning outcomes

- 3) Create learning tools in the form of teaching modules, learning media, and assessments
  - 4) Prepare a grid of questions to be used as an assessment
  - 5) Create an interactive quiz according to the question grid that has been created
  - 6) Prepare a student interest questionnaire sheet
- b) Implementation of actions and observations (Do)
- At the implementation stage, it will be carried out in accordance with the learning steps in the teaching module and a formative assessment will be given in the form of an interactive quiz. During the process of taking quizzes by students, the teacher makes observations of the students. After the learning process is complete, the researcher will distribute a questionnaire about students' learning interest in the form of a form so that students can fill it in using their respective gadgets.
- c) Reflection (See)
- Reflection is carried out by researchers based on the findings obtained from observations. At this stage, researchers reflect on learning activities with the results of students' learning interest questionnaires. Then, the results of the reflection are used to determine improvements in the implementation of the next cycle and see an increase in students' interest in learning.

The data collection method in this research uses a questionnaire which is distributed in Gform to students so that students can access it anytime and anywhere. The interest in learning mathematics questionnaire also uses a Linkert scale which has a gradation from very positive to very negative. The questionnaire results will then be analyzed based on the following table:

**Table 1** Guidelines for Scoring Students' Learning Interest

No	Student Learning Interest Score	Information
1	$skor\ minat < 42$	Low
2	$42 \leq skor\ minat < 66$	Currently
3	$66 \leq skor\ minat$	Tall

This research is said to be successful if 60% of students who take part in teaching and learning activities achieve the criteria for high learning interest and there are no students with low learning interest criteria.

## RESULTS AND DISCUSSION

### Results

Research data collection was carried out in class VII-3 of SMP Negeri 3 Candi for 2 cycles, namely March 20 2023 – April 5 2023. The following are details regarding the data collection activities that have been carried out:

**Table 2** Schedule of Classroom Action Research Activities

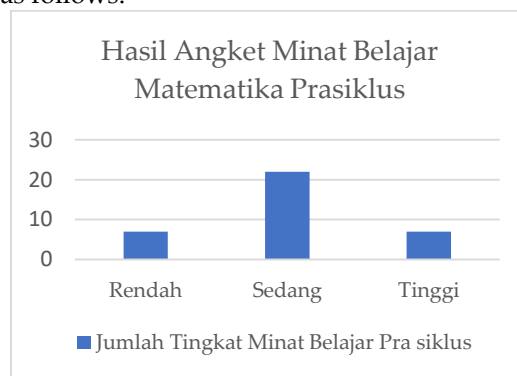
Cycle	Implementation date	Hour
Pre cycle	March 20, 2023	5 - 7
Cycle I	March 29, 2023	1 – 2

Cycle II	April 5, 2023	5 – 7
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### Pre Cycle

During the pre-cycle implementation, researchers still looked at the learning carried out by teachers who still used direct learning. Even though learning attention is not completely centered on the teacher because the teacher also carries out two-way communication with students, it can be seen that some students are chatting to themselves, not paying attention, joking around, and showing that they are bored. Apart from that, teachers never provide formative assessments that can enable students to determine their level of understanding. The researcher then distributed a questionnaire about interest in learning mathematics to students via the Gform link after the lesson was carried out by the teacher.

From the results of the interest in learning mathematics questionnaire, the interest scores for each student were obtained as follows:



**Figure 2**Pre-cycle Learning Interest Questionnaire Results

In detail, the number of students with low interest in learning mathematics was 7 people (19.44%), the number of students with moderate interest in learning was 22 people (61.11%), and the number of students with high interest in learning was 7 people (19.44%). This shows that there are still a small number of students with high interest in learning and there are still students with low interest in learning, this is influenced by students' interest in learning. So students' interest in learning still needs to be increased further by providing action.

### Cycle I

Based on the plans that have been made in the research method, PTK in cycle I stage includes activities carried out by researchers, namely:

a. Planning (Plan)

Several things were done by researchers at the planning stage of cycle I as follows:

- Develop learning objectives from learning outcomes
- Develop teaching modules
- Prepare LKPD to be distributed to students during the learning process
- Develop rubrics and assessments that will be included in interactive quizzes in the form of quizziz
- Prepare a questionnaire sheet about interest in learning mathematics to measure students' interest after implementing the interactive quiz.

b. Implementation and Observation (Do)

Based on the planning stage that has been made, the next stage is the implementation or implementation stage of the plan that has been prepared. Implementation is carried out based on the teaching module that has been created which includes 3 activities, namely introduction, core and conclusion.

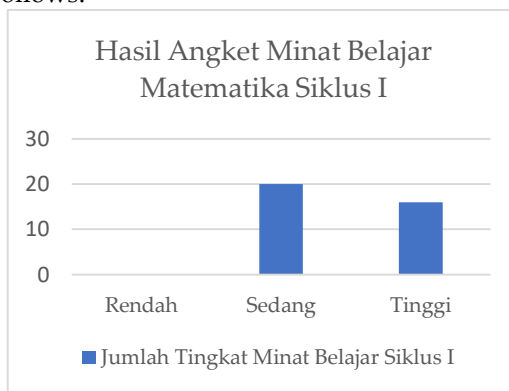
In the introductory activity, the teacher begins the lesson by praying together and giving greetings, then the teacher checks the students' attendance. Teachers provide motivation to students to be enthusiastic in learning.

In the core activities, the teacher applies a discovery learning model with 6 phases. The teacher begins the stimulation phase by informing him about the material to be studied, learning objectives, benefits of studying the material, activity steps and assessment methods that will be implemented. The teacher also provides trigger questions related to the material. Then the teacher carries out the problem statement phase by giving examples of problems to students and students will observe and understand the problems individually. Next, students will carry out the data collection phase by individually searching for information about problems through any media. In the next phase of data processing, the teacher groups students into 6 groups consisting of 6 students, with the groups arranged by the teacher based on student activity. The teacher distributes LKPD to each group to build their learning concept and students begin to discuss to solve the problems on the LKPD. Students who experience difficulties are allowed to ask questions and the teacher will provide assistance, especially to groups with low learning activity. Next, in the verification phase, students will prepare the results of the discussion and come forward to make a presentation and present the results of their discussion in front of the class. Other groups will listen to the group presenting and then provide responses, suggestions or questions. The final phase is the generalization phase, the teacher provides an assessment of the results of each group's discussion and asks for conclusions from the results of the group presentations that have progressed. The teacher also generalizes the opinions expressed by the students.

After all phases are completed, the teacher carries out a formative assessment using interactive quizzes and utilizing Quizziz media. The rules for this quiz are that each student will get a game pin and start working on each question on their respective gadget. The questions are in the form of multiple choices with the order of the questions being different for each student, as is the order of the choices. The teacher promises that there will be a quiz at the next meeting if students can complete the learning process better at the next meeting.

In the closing activity, students and teachers carry out reflection activities together. All students said that they enjoyed the meeting that day, especially during the interactive quiz and wanted to play again and try other quiz models because they had already played quizz in other subjects. Then the teacher distributed a Gform link containing a questionnaire about interest in learning mathematics which students had to fill out according to how they felt during that day's learning. The teacher informs about the material that will be studied at the next meeting and ends the lesson with closing greetings.

After the learning process, the teacher makes observations on the Gform results that have been filled in by each student. The results of students' interest in learning were obtained from the questionnaire results as follows:



**Figure 3** Results of Cycle I Mathematics Learning Interest Questionnaire

The number of students with low interest in learning mathematics was 0 children (0%), students with moderate interest in learning were 20 children (55.56%), and students with high interest in learning were 16 children (44.44%)

c. Reflection (See)

Based on the results of observations from the student interest in learning mathematics questionnaire in cycle I, it was found that the number of students in the high learning interest category increased from 7 children to 16 children, for the medium learning interest category from 22 children to 20 children, while the low learning interest category occurred a decrease from initially 7 children to 0 children.

This shows that implementing interactive quizzes at the end of learning can increase students' interest in learning in the high category from initially 19.44% to 44.44% and there are no students in the low category. However, based on the success criteria in this research, this research has not achieved success. So planning and implementation is needed for the next cycle.

From the results of the questionnaire, it was found that the highest percentage increase from pre-cycle to cycle I was an indicator of feelings of happiness with an average percentage increase of 11.25%, while the lowest percentage increase was an indicator of feelings of interest with an average percentage increase of 6.6%.

Based on several things above, improvements need to be made in the next cycle to achieve the success criteria in this research. Some of the improvements made were changing the use of the application in interactive quizzes, which was originally Quiziz to Kahoot with question models that were initially multiple choice to several question models, namely multiple choice and true false. The researcher will also change the rules of the game in a way that is accommodated by the teacher. This is done to increase the indicator of feelings of interest in students' interest in learning mathematics.

## Cycle II

Based on the results of reflection in cycle I, further research needs to be carried out in cycle II, namely

a. Planning (Plan)

Several things were done by researchers at the planning stage of cycle I as follows:

- Develop learning objectives from learning outcomes.
- Develop teaching modules.
- Prepare LKPD to be distributed to students during the learning process.
- Develop rubrics and assessments that will be included in the interactive quiz.
- Prepare a questionnaire sheet about interest in learning mathematics to measure students' interest after implementing the interactive quiz.
- The teacher also informs before the day of learning that there will likely be another interactive quiz at the end of the lesson so that students must prepare their own devices and networks.

b. Implementation and observation (Do)

Based on the planning stage that has been made, the next stage is the implementation or implementation stage of the plan that has been prepared. Implementation is carried out based on the teaching module that has been created which includes 3 activities, namely introduction, core and conclusion.

In the introductory activity, the teacher begins the lesson by praying together and giving greetings, then the teacher checks the students' attendance. The teacher motivates students to be enthusiastic about learning and reminds them that at the end of the lesson there will be an interactive quiz.

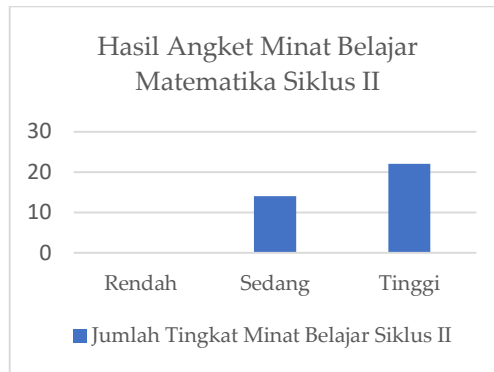
In the core activities, the teacher applies a discovery learning model with 6 phases. The teacher begins the stimulation phase by informing him about the material to be studied, learning objectives, benefits of studying the material, activity steps and assessment methods that will be implemented. The teacher also provides trigger questions related to the material. Then the teacher carries out the problem statement phase by giving examples of problems to students and students will observe and understand the problems individually. Next, students will carry out the data collection phase by individually searching for information about problems through any media. In the next phase of data processing, the teacher groups students into 6 groups consisting of 6 students, with the groups arranged by the teacher based on student activity. The teacher distributes LKPD to each group to build their learning concept and students begin to discuss to solve the problems on the LKPD. Students who experience difficulties are allowed to ask questions and the teacher will provide assistance, especially to groups with low learning activity. Next, in the verification phase, students will prepare the results of the discussion and come forward to make a presentation and present the results of their discussion in front of the class. Other groups will listen to the group presenting and then provide responses, suggestions or questions. The final phase is the generalization phase, the teacher provides an assessment of the results of each group's discussion and asks for conclusions from the results of the group presentations that have progressed. The teacher also generalizes the opinions expressed by the students.

After all phases are completed, the teacher carries out a formative assessment using interactive quizzes and utilizing Kahoot media. During the quiz, students looked enthusiastic and excited. The rules for this quiz are that students will read the questions displayed by the teacher via the LCD and students will choose the answers via their respective gadgets, each question has a duration of 20-30 seconds. Students look happy during the interactive quiz process. They are enthusiastic and read the questions carefully and thoroughly, they really want to get the best score by answering them with the correct answer. Even when the quiz is over and their scores are out, they want to play it again promising to try harder.

In the closing activity, students and teachers carry out reflection activities together. All students said they were happy and enthusiastic. They feel that if they take the test in the form of a quiz like that, they will be more relaxed in doing it and it will feel more exciting. Then the teacher distributed a Gform link containing a questionnaire about interest in learning mathematics which students had to fill out according to how they felt during that day's learning. The teacher informs about the material that will be studied at the next meeting and ends the lesson with closing greetings.

After the learning process, the teacher makes observations on the results of the second cycle Gform which has been filled in by each student. The results of students' interest in learning were obtained from the questionnaire results as follows:





**Figure 4** Results of Cycle II Mathematics Learning Interest Questionnaire

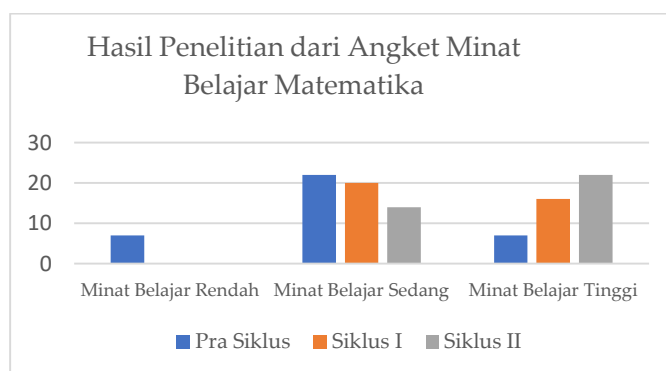
The number of students with low interest in learning mathematics was 0 children (0%), students with moderate interest in learning were 14 children (38.89%), and students with high interest in learning were 22 children (61.11%)

c. Reflection (See)

Based on the results of observations from the student interest in learning mathematics questionnaire in cycle II which was compared with data in cycle I, it was found that there was an increase in the number of students in the high interest in learning category from initially 16 children to 22 children, for the moderate interest in learning category it fell from 20 children to 14 children, while the low interest in learning category still has 0 children.

This shows that the application of interactive quizzes at the end of learning can increase students' interest in learning in the high category, which was initially 44.44% in cycle I to 61.11% and there were no students in the low category. Apart from that, the replacement of the interactive quiz model also had an effect on increasing the average percentage of each indicator with the highest increase obtained by the feeling of interest indicator of 7.36%. Based on the success criteria that have been determined in this research, this research only reached cycle II because it had met the criteria.

*Discussion*



**Figure 5** Research Results from the Mathematics Learning Interest Questionnaire

Based on the results of research that has been carried out through 2 cycles, interactive quizzes are able to increase interest in learning mathematics. The increase in interest in learning mathematics can be seen from the number of students in the high learning interest category before the treatment, only 7 students and after 2 cycles there were 22 students. Apart from that, the number of students in the low interest in learning category, which was initially 7 students, became 0 students after 1 cycle. This is in line with Riyan's statement (Ramenda, 2019) that students are more interested in working on questions using the interactive game Kahoot application than working on questions using books.

From the research results, it was found that all indicators of interest in learning mathematics in each cycle always increased. The highest increase after 2 cycles occurred in the indicator of student engagement with a total increase of 15.97%, then the indicator of feelings of interest was 13.94%, then the indicator of feelings of happiness was 13% and finally the indicator of attentiveness was 8.5%.

## CONCLUSION

Based on the results obtained in this research, students who met the indicators of high learning interest increased with each cycle, while students who only met the indicators of moderate and low learning interest decreased with each cycle. So it can be concluded that implementing interactive quizzes can increase interest in learning mathematics. It is hoped that the results of this research will be useful for improving education, especially in increasing interest in learning mathematics. In this research, researchers used interactive quiz applications in the form of quizziz and kahoot. It is hoped that in future research other interactive quiz applications can be used to increase interest in learning mathematics. Apart from interest in learning, the application of interactive quizzes can also be researched further to increase students' motivation, learning outcomes or self-confidence.

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