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Students' Response, Learning Interest, and Conceptual Understanding Ability of Two-dimensional Figures in Junior High School: A Study on the Use of Quizizz App

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Abstrak

Quizizz sebagai aplikasi evaluasi memiliki peranan penting untuk meningkatkan minat belajar dan pemahaman konsep matematika siswa. Di Indonesia, sudah terdapat beberapa guru menggunakan aplikasi tersebut, namun penggunaan secara luas masih belum optimal. Tujuan penelitian ini mendeskripsikan respons, minat belajar, dan kemampuan pemahaman konsep bangun datar siswa SMP berbantuan aplikasi Quizizz. Penelitian ini berjenis deskriptif kuantitatif. Subjek penelitian adalah 30 siswa SMP. Data diperoleh dari angket dan tes. Analisis data menggunakan teknik deskriptif kuantitatif dengan menghitung total skor respons, minat belajar, dan pemahaman konsep siswa yang dikonversi pada skala 100 dan dikategorilan sangat baik, baik, cukup, dan kurang baik. Hasil penelitian menunjukkan respons dan minat belajar siswa pada pembelajaran bangun datar menggunakan Quizizz berkategori baik. Rata-rata kemampuan pemahaman konsep bangun datar siswa sebesar 66 berkategori cukup baik. Dengan demikian, guru diharapkan menggunakan Quizizz dalam pembelajaran dan evaluasinya sehingga dapat meningkatkan minat siswa belajar dan berlatih kemampuan pemahaman konsep matematika.
Kata Kunci: Minat Belajar; Pemahaman Konsep; Respons; Quizizz.

Abstract

Quizizz as an evaluation application has an important role in increasing students' interest in learning and understanding mathematical concepts. In Indonesia, there are already several teachers using the application, but its use hasn't been maximized. The purpose of this study was to describe the response, interest in learning, and the ability to understand the concept of two-dimensional figures for junior high school students with the help of the Quizizz application. This study was quantitative descriptive. The participants were 30 junior high school students. The data were obtained from questionnaires and tests. The data were analyzed using a quantitative descriptive technique by calculating the total response score, learning interest, and students' conceptual understanding converted on a scale of 100 and categorized as very good, good, fairly good, and poor. The results showed that the responses and students' interest in learning two-dimensional figures using Quizizz were in a good category. The average ability to understand the concept of two-dimensional shapes of 66 students was in a fairly good category. The teachers were expected to use Quizizz in their learning and evaluation so that it could increase students' interest in learning and practicing their ability to understand mathematical concepts.
Keywords: Concept Understanding; Interest in Learning; Responsse; Quizizz.

I. INTRODUCTION

Mathematics is a structured subject studied from the easiest to the most complex material (Cahani & Effendi, 2019; Fikri et al., 2022). Mathematics is an abstract idea containing symbols that requires students to understand the concept of mathematics itself before manipulating the mathematical symbols (Oktiani & Nugroho, 2021; Ali, Lestari, & Rahayu, 2023). The main objectives of learning mathematics based on Permendikbud Number 22 of 2016 include the importance of understanding mathematical concepts, being able to explain the relationship between concepts and also the relationship between mathematical concepts, and the implications of concepts or algorithms effectively, validly, and carefully in activities to solve various problems (Zacharias & Yustina Dwi, 2020). Therefore, the ability to understand concepts is one of the basic abilities to study mathematics.

Understanding is the individual's ability to understand a material at a higher level beyond insight and reading or understanding something that is memorized and known (Aqsa et al., 2021); Ardiansyah & Nugraha, 2022). Understanding is a basis for students to develop knowledge so that learning could be conducted more easily and providing the meaningfulness of learning (Lestari, 2018; Nurnazarudin & Sulistyaningsih, 2021). Thus, conceptual understanding means to understand the design, conception, or idea of the questioned problem or reality, in this case not just remembering verbally but being able to re-express it in a different way that is easier to understand.

There are seven indicators of conceptual understanding, namely (1) Restate a concept, (2) Classify objects according to certain properties (according to the concept), (3) Provide examples and non-examples of a concept, (4) Present concepts in various forms of mathematical representation, (5) Develop necessary or sufficient conditions of a concept, (6) Use, utilize, and select certain procedures or operations, (7) Apply concepts or problem solving (Yulianti & Gunawan, 2019; Setyaningsih & Kustiana, 2023).

Conceptual understanding is a crucial factor in learning activities, because when students understand a concept, they are able to remember the material that has been learned for a long time (Sepriani, 2021; Solihah et al., 2022). Therefore, to be able to understand the learning material, students are required to understand the concept first, so that students can solve problems from a variety of problems given.

Despite its importance, conceptual understanding of students is sometimes left behind. Some studies proved that the performance of students' understanding of mathematics concepts in Indonesia has not been fully encouraged (Khairunnisa & Aini, 2019; Pasaribu et al., 2020; Aziyah & Nugroho, 2022; Najikha et al., 2022). The lack of understanding of mathematical concepts occurs among students at the secondary school level to higher education (Agustina et al., 2021; Mardarani & Apriyono, 2023). The conceptual understanding ability of students in Indonesia is reflected through the results of the PISA (Program for International Student Assessment) evaluation (Winarsih & Mampouw, 2019; Hartono et al., 2022).

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According to PISA, Indonesia's ability to understand mathematical concepts were increasing from an average score of 375 in 2012 to 386 in 2015 where Indonesia was ranked 73 out of 80 countries (Ikhsan & Afriansyah, 2023). However, PISA findings revealed that the students' ability to understand mathematics concepts has not been at the peak yet (Zahid, 2020; Ramadoni & Shakinah, 2023). Based on a review by TIMSS (Trends in International Mathematic and Science Study) and international studies on mathematics achievement revealed the fact that in Indonesia there were a large number of students who experienced difficulties when understanding mathematical concepts, therefore Indonesia was ranked 36th out of 49 countries.

A study from Pratiwi et al. (2019) found that the teacher simply explained the material briefly about the material being taught without paying attention to the students' conceptual understanding. A similar study was conducted by Kamin et al. (2021) which stated that many students were distracted causing students to make mistakes when performing calculations. There were also some students who were unable to link one concept to another. This was due to a lack of understanding of certain concepts so that students incorrectly implemented the concept. In addition, the low ability of students to understand concepts were caused by several elements, both external elements, namely teachers and internal elements, namely students (Rismen, 2021; Putri & Nasution, 2023). External elements such as learning methods or strategies. Meanwhile, internal elements include students' interest in learning mathematics.

Conceptual understanding had a close relationship with student interest in learning (Radiusman, 2022; Winata & Friantini, 2020). If students were interested in something, then students would tend to pay attention, feel happy, and have high curiosity (Rahayu & Prayitno, 2020; Winahyu et al., 2020). Students with high curiosity about the various problems available, will probably develop high learning enthusiasm and are able to connect what will be learned as a goal, orientation, and are more confident when conveying ideas (Astuti & Hikmah, 2021). Interest in learning is a comprehensive implication of students with an effort to pour all their ideas and interests to gain knowledge and reach an understanding of the knowledge sought (Hikmah, 2021). Therefore, interest and conceptual understanding in learning mathematics will affect students' mathematics learning achievement regarding the materials and subsequent materials. However, currently the media used to assess conceptual understanding in research is generally conventional, namely using pencil and paper, not yet assisted by technology (Asral & Chandra, 2021; Wulandari et al., 2021).

One of the efforts to increase learning interest and concept understanding is the use of technology-based media (Firdaus, 2018; Zahwa & Syafi'i, 2022). The use of attractive technology-based media such as smartphones could increase student interest to understand mathematical concepts better (Puspitasari et al., 2023; Sholihah & Istiqomah, 2022). The use of

technology in the scope of education might lead to more effective mathematics learning and be able to change the quality of students' concept understanding (Yana et al., 2020; Sukmaningthias, Hasyanah, Sari, & Nuraeni, 2023). In the current time, research media of conceptual understanding studies that utilize technology are widely available, one of which is the Quizizz application.

Quizizz is a media that can support effective, efficient, and fun learning activities (Rofiq et al., 2022). Quizizz could encourage student interest in learning (Salsabila, 2020). Quizizz is an interesting game that includes animated images or still images that make it easier for students to learn (Nurmanita, 2022). With the Quizizz application, it is easier to observe and analyze students' conceptual understanding and interest in learning.

The utilization of Quizizz on learning evaluation can be implemented on any material. However, in this study, the researchers used two-dimensional figures as the material because they are one of the complex materials to master by most students. On the other hand, two-dimensional figures are a very crucial subject matter both for learning geometry, or its use in daily life (Karim Abdul, Muchtar. Hidayanto, 2012). In addition, competences in two-dimensional figures are often found in daily life, for example making a table from the construction of two-dimensional shapes, measuring the area of a building, and others (Siregar, 2017). This issue was supported by Asria et al. (2021) that determined that the Quizizz application was effective as a learning evaluation media.

Previous research conducted by Elisa et al. (2021) said that interactive quizzes using the Quizizz application to measure students' physics competence were tested valid, practical, and effective. Quizizz was able to distribute the increase in an educator's creative power to questions online. Quizizz generated more detailed learning and helped teachers to make learning outcome decisions more quickly and accurately (Suciningsih, 2020). A similar study by Haryati et al. (2021) explained that students' assessment of evaluation instruments using the Quizizz application was very good and students were encouraged to be the best during tests using the Quizizz application. Setiawati (2021) also explained in her findings that the use of Quizizz challenged and encouraged students' interest in learning. Wihartanti et al. (2019) revealed that the Quizizz application can improve students' thinking skills.

Based on the exposure of previous studies above, the gap that was trying to fill by this study involved describing the response, learning interest, and ability to understand the concept of two-dimensional figures of junior high school students using the Quizizz application. A statement was obtained that Quizizz was one of the useful applications as a teaching and learning medium.

II. METHOD

This study was a type of quantitative descriptive research that described the characteristics of a population regarding the observed phenomenon through an explanation of the participants' answers in the form of numbers. In this case, the data was shown by a percentage of the

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participants' answers (Laga et al., 2021; Putri, 2023). The participants of this study were 30 students of class VIII-D at SMP Negeri 4 Pare located at Jl. Merbabu, Plongko, Pare, Kec. Pare, Kediri Regency, East Java 64211.

This study used questionnaires and tests as research instruments. The test was a short form using the Quizizz application to measure the students' ability to understand the concept of two-dimensional figures. It contained 10 questions. Meanwhile, the distribution of questionnaires of learning interest and students' responses to mathematics learning using the Quizizz application was carried out through Google Form. The learning interest questionnaire statement consisted of 15 statements. The learning interest questionnaire was the ARCS (Attention, Relevance, Confidere, Satisfaction) model by John Keller (Setiyani et al., 2020; Purwoko et al., 2021). There were four indicators that could be used as a reference to measure student learning interest, namely, attention, relevance, confidence, and satisfaction. The students' response questionnaire to the use of the Quizizz application consisted 15 statements adapted from the study by Rizky et al. (2022), covering four indicators, namely usefulness, ease of use, ease of learning, and satisfaction with 4 Likert scales, namely strongly disagree, disagree, agree, and strongly agree. The minimum and maximum scores of students' response and interest in learning were 15 and 60.

Data analysis of the students' responses and interest in learning used quantitative analysis techniques, by calculating the total score of students' response and interest in learning on a scale of 100. Referring to the minimum score of 25 and the maximum score of 100 and the number of intervals of four (poor, fair, good, and very good), the criteria for the students' responses and interests in learning were developed as in Table 1 below.

Table 1.
Students' Response and Learning Interest Criteria

Range	Criteria
82 −100	Very good
63 −81	Good
44 − 62	Fairly good
25 − 43	Poor

Source: (Son, 2019)

Data analysis of the conceptual understanding ability obtained from two-dimensional figure test scores utilized quantitative descriptive calculations. The conceptual understanding was scored based on correct answers (correct answer was 10 and incorrect answer was 0). The highest total score was 100 and the lowest score was 0. The criteria for the level of students' conceptual understanding ability is illustrated in Table 2 below.

Table 2.
Criteria for Conceptual Understanding Ability

Range	Criteria
$80 \leq x \leq 100$	Very good
$70 \leq x < 80$	Good
$60 \leq x < 70$	Fairly good
$x < 60$	Poor

Source: (Sitonga, 2022)

III. RESULTS AND DISCUSSION

A. Results

The results of this study were dealing with responses, learning interests, and conceptual understanding abilities. The percentage results of the response questionnaire to the two-dimensional figure

test assisted by the Quizizz application is presented in table 3 below.

Table 3.
Students' responses

Statement	%	Criteria
I am interested in taking tests using the Quizizz application.	82,50	Very good
Tests using the Quizizz app are fun	79,17	Good
The Quizizz application motivate me to learn math increasingly	75,00	Good
The presentation of the Quizizz application is very good and increasing my enthusiasm in taking tests.	81,67	Very good
The Quizizz app encourage me to work harder during the tests	76,67	Good
Tests using the Quizizz application could test to what extend my understanding of two-dimensional figures material that has been learned at school	78,33	Good
I'm confused how to use Quizizz app	79,17	Good
Quizizz could stimulate my thinking ability during the test	72,50	Good
Quizizz could stimulate curiosity in the learning process	76,67	Good
I feel challenged to use Quizizz	78,33	Good
I can use Quizizz without assistance	77,50	Good
Internet network was quite disturbing the test through Quizizz	75,83	Good
I prefer taking test on Quizizz to conventional written test	83,33	Very good
Quizizz has a gaming nature that motivate me to get the highest score	84,17	Very good
Quizizz could prevent cheating	77,50	Good
Average	73,39	Good

Based on the results of the questionnaire recorded, it was found that the usefulness, ease of use, ease of learning, and satisfaction of using the tools used in this test were Good. Then from the overall average presented in the table above showed a positive response from students, which was in Good criteria with an overall percentage of 73.39%. According to students, the Quizizz application was an interesting and fun application that increased their desire to learn mathematics, and it was easy to use, and excel at improving students' enthusiasm in taking tests. In addition, the students preferred tests using Quizizz to conventional written tests. The students were feeling challenged when taking tests because the tests through Quizizz were similar to playing games motivating the students to achieve high scores and also minimize cheating with peers. In general, the results of the student responses showed positive results. This issue was crucial because tests in the current era must be able to create a learning evaluation that facilitates the needs of Generation Z who were born in the 2000s and coexisting with everything that was technology-based (Sari & Yarza, 2021).

The students' learning interest assisted by the Quizizz application could be analyzed through the questionnaires of the student learning interest using the Quizizz application. The media used to fill out this questionnaire was Google Form. Google Form could carry out and review surveys online quickly and practically (Parinata & Puspaningtyas, 2021; Saleh, 2021). The percentage results of the student learning interest questionnaire could be reviewed in Table 4 below.

Table 4.
Students' learning interest

Statement	%	Criteria
I understand the lesson that was delivered by the teacher through Quizizz.	75,83	Very good

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I feel motivated when the teacher was delivering the two-dimensional figure lessons through Quizizz	76,67	Good
I feel happy when the teacher provides me assignments on Quizizz	71,67	Good
I feel happy when there is a learning activitiy using Quizizz	79,17	Very good
I feel disappointed when the teacher do not use Quizizz	77,50	Good
I feel happy when the teachers collect my assignments through Quizizz	76,67	Good
I finish the assignments on Quizizz as soon as possible	78,33	Good
I answer the teacher's questions on Quizizz because I have learned the lesson	76,67	Good
I do the exercises at home using Quizizz, even when there is no available assignments.	78,33	Good
I write down important points delivered by the teacher during the lesson through Quizizz	79,17	Good
I am trying to understand some difficult material on Quizizz	77,50	Good
I did my homework through Quizizz at home.	73,33	Good
I study every day through Quizizz. .	80,83	Very good
I pay attention when the teacher is explaining the use of Quizizz	82,50	Very good
I am trying to achieve higher score on the test using Quizizz to compete with friends.	84,17	Good
Average	72,28	Good

Based on the explanation of the table above, the overall percentage of the students' interest in learning using the Quizizz application was 72.28%, and met 'high' criteria. The results of the percentage of overall interest in learning in the high category indicated that most students were more interested to learn on Quizizz application. They were feeling delighted and enthusiastic when teaching and learning and giving assignments was delivered using the Quizizz application. In terms of the process of collecting assignments earlier and obedience and the results obtained, the students preferred to do questions using the Quizizz application. The students were very interested in the teacher's strategy of giving exercises on two-dimensional figures on Quizizz application.

In terms of the process of collecting assignments earlier and obedience and the results obtained, the students prefer to do problems using the Quizizz application. The students were very interested in the teacher's strategy to give practice problems on two-dimensional figures when they were using Quizizz. The students highly interested in learning tend to be excited during learning, disciplined in learning, persistent, and very enthusiastic when challenged (Ardiansyah, 2022; Nisa et al., 2022; Nurmala, 2022). Two-dimensional figures learning was considered more fun on Quizizz application because the Quizizz application was game-based with various interesting characters such as avatars, themes, memes, and music that could entertain students during the test.

The students' conceptual understanding of two-dimensional figures had been tested. The level of ability to understand the concept of two-dimensional with Quizizz application was categorized into four criteria, including the criteria of poo, fairly good, good, and very good. The level of understanding of student concepts is presented in Table 5 below.

Table 5.
The level of conceptual understanding ability

Range	Criteria	Total	%
$80 \leq x \leq 100$	Very good	12	40%

$70 \leq x < 80$	Good	5	16,67%
$60 \leq x < 70$	Fairly Good	4	13,33%
$x < 60$	Poor	9	30%
Rata-rata	66		

Based on the data from the test results of the ability to understand the concept of two-dimensional figures obtained, there were 9 people who met 'poor' criteria with a percentage of 30%, as many as 4 people met the criteria for fairly good with a percentage of 13.33%, as many as 5 people met the criteria for good with a percentage of 16.67%, and as many as 12 people met 'very good' criteria with a percentage of 40%. The class average value of the ability to understand the concept of two-dimensional figures was 66 which was included into the 'fairly good criteria.

B. Discussion

The analysis of the students' responses in this study was in line with the studies of Basyith & Fauzi (2022); Nisa (2022); Nurmanita (2022) that the students' responses considered learning more fun, interesting, and the students responded in 'good' category using the Quizizz application. The positive response given by the students in using online media was that the Quizizz application was able to be a way out for teachers so that the strategy could be continuously conducted along with the use of learning evaluation systems using online media.

The utilization of smartphone-based online evaluation media could increase the student' learning motivation, and help teachers in assessing student learning outcomes. In addition, the students could use smartphones to do positive things as a support for the learning process, so as to reduce the occurrence of cheating in learning evaluation activities. The implementation of more flexible evaluation using the Quizizz application and the use of online media in learning could improve the quality of education as an implementation of digital learning programs (Amany, 2020; Wahyudi, 2020).

This study showed that the students' interest in learning using the Quizizz application was high with an average percentage of 72.28%. The high interest in learning was due to the emergence of a sense of pleasure and excitement during tests on the Quizizz application, thus increasing students' curiosity. The indicators of students who had a high interest in learning could be recognized through the learning process including the emergence of feelings of pleasure, attention in learning, interesting learning materials and teacher attitudes (Febrianti et al., 2021; Kurniasari et al., 2021; Kurnia et al., 2021). Learning interest is dynamic which tends to be determined by the environment, so it is crucial for teachers to create a pleasant teaching and learning environment in order to build students' interest in learning (Fadilla et al., 2020; Ningsih et al., 2021). Environmental indicators in the learning interest questionnaire included the condition of the classroom environment that affected the participants during the learning process using Quizizz. Learning mathematics using the Quizizz application was able to foster a pleasant environment so that students felt interested, happy, and had a high interest in learning (Asria et al., 2021).

In this study, it was found that students' concept understanding ability was

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categorized as 'fairly good'. The average score of the students' conceptual understanding ability was 66. It was discovered that 12 out of 30 students were categorized as having 'very good' conceptual understanding, 5 students were categorized as 'good', 4 students were categorized as 'fairly good', and 9 students were categorized as poor. IT was in line with Radiusman (2020) that understanding a mathematical concept allowed students to understand new information to make decisions, solve problems, generalize, reflect, and make conclusions. When the students were not interested in learning, it would be more difficult to understand mathematical concepts (Winahyu et al., 2020; Winata & Friantini, 2020).

IV. CONCLUSION

Students' response and interest in learning two-dimensional figures using Quizizz was categorized as 'good'. The average ability to understand the concept of two-dimensional figures of students was 66 considered as 'fairly good'. The implication of this study was that teachers were expected to use Quizizz in learning and evaluation to increase students' interest in learning and practice their ability to understand mathematical concepts. The implementation of Quizizz in mathematics learning can be conducted in schools that allow students to bring and use smartphones during the lesson.

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