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Student's Response Toward Teman Ritma Application as Mathematical Learning Media

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ABSTRACT

The education sector has a vital role in the advancement of science and technology. One of the technological advances in the education sector is the use of android-based learning media. This study aims to determine students' response to the use of the Teman Ritma application as a mathematics learning media and the influence of student learning outcomes on student response rates. This research is a quantitative descriptive with research instruments used: an android application, namely Teman Ritma and student response questionnaires. The research sample consisted of 32 students of 7th grade of SMPN 5 Yogyakarta. The sample was divided into two groups. The first group, known as K-1, contains 15 students with good learning outcomes, and the second group, known as K-2, contains 17 students with poor learning outcomes. The results from both groups showed that the response rate of all aspects assessed was very satisfactory and easily operated. This means that students can run the application without difficulty, and students easily get information from the material and do the exercises presented. Based on the student's response, the Teman Ritma application is eligible and practical to use as mathematics learning media. Then from the results of statistical tests, the learning outcomes affect students' response rate for the learning design aspect. Meanwhile, learning outcomes have no effect on student response rate for operational and visual communication aspects.

Keywords: Android, Mathematics, Learning Media, Student Response

ABSTRAK

Sektor pendidikan memiliki peranan penting dalam kemajuan ilmu pengetahuan dan teknologi. Salah satu kemajuan teknologi dalam sektor pendidikan adalah penggunaan media pembelajaran berbasis android. Tujuan dari penelitian ini yaitu untuk mengetahui respons peserta didik terhadap penggunaan aplikasi Teman Ritma sebagai media pembelajaran matematika dan pengaruh prestasi belajar siswa terhadap tingkat respons siswa. Penelitian ini berjenis deskriptif kuantitatif dengan instrumen penelitian yaitu aplikasi Teman Ritma dan angket respons siswa. Sampel yang digunakan adalah siswa kelas 7 SMP Negeri 5 Yogyakarta sebanyak 32 siswa di mana sampel tersebut dibagi menjadi 2 kelompok yaitu 15 siswa memiliki prestasi belajar baik (K-1), dan 17 siswa memiliki prestasi belajar belum baik (K-2). Hasil penelitian menunjukkan bahwa tingkat respons dari segala aspek yang dinilai adalah sangat puas dan mudah digunakan dari kedua kelompok. Artinya, secara umum siswa bisa mengoperasikan aplikasi tanpa kesulitan, siswa dengan mudah mendapatkan informasi dari materi dan mengerjakan latihan yang disajikan. Berdasarkan respons siswa tersebut, aplikasi Teman Ritma layak dan praktis digunakan sebagai media pembelajaran matematika. Kemudian dari hasil uji statistik ada pengaruh prestasi belajar terhadap tingkat respons siswa pada aspek desain pembelajaran, tetapi tidak ada pengaruh prestasi belajar terhadap tingkat respons siswa untuk aspek operasional dan aspek komunikasi visual.

Kata kunci: Android, Matematika, Media Pembelajaran, Respons Siswa

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Introduction

Information technology has grown rapidly and should be used to support the learning process (Charissudin et al., 2021). Education must follow technological advancement to improve its quality (Fitri et al., 2021). Information technology is a tool for educational reform as well as means of promoting knowledge in modern society (Burbules et al., 2020). Knowledge is the result of the process of finding out that is obtained from the educational process or experience (Ridwan et al., 2021). Education is gaining knowledge, skills, and habits that a group of people or individuals conduct through the teaching process or educational research (Mulyani

& Haliza, 2021). Education is also one of the determinants of science and technology improvement (Widodo & Wahyudin, 2018). An educational institution such as a school has an essential role and challenges in order to prepare students to use technological devices with full awareness and responsibility, so the student could take advantage of technological devices to increase their creativity and lifelong learning spirit (Sailer et al., 2021; Srisawasdi & Panjaburee, 2014). Educators can utilise the phenomenon of applying technology to create an innovation that can help students in improving their academic abilities that are not limited by time and space (Nuryadi et al., 2020; Yuliyanti, 2021). In addition, the application of technology also shifts the paradigm of the learning process from teacher-centred learning to student-centred learning (Rosiyanah, 2021). For example, the application of technology in the education sector is the use of android-based learning media to facilitate student learning in the classroom (Komariah et al., 2018). The example above is in line with the Regulation of 22/2016 issued by the Ministry of Education and Culture, Republic of Indonesia, regarding the Standard Process of Primary and Secondary Education, which explains that learning media is an integral part of learning planning (Widodo & Wahyudin, 2018).

Learning media is a tool in teaching and learning process that aims to stimulate learners' thoughts, feelings, attention, and abilities or skills to encourage the learning process and reach the learning goals (Tafonao, 2018). Learning media has benefits, namely: (1) as an aid during the learning process in the classrooms, (2) learning media could increase students' interest and motivation during the learning process, and (3) learning media is able to overcome the limitations of space, time, and energy (Hamid et al., 2020). Learning media could be implemented in almost any learning subject, including mathematics (Kartini et al., 2020). Mathematics is an exact science that is learned about mindset, logical proof, organising patterns and some concepts about numbers that have a relationship with each other with a large-size of number (Aditya, 2018). Mathematics contains competencies that must be achieved because mathematics has many uses in daily activities or the advancement of science and technology (Ehmke et al., 2020; Luju et al., 2020). Based on the uses, the government of Indonesia issued the Regulation of 20/2003 about the National Education System, which explains that mathematics becomes one of the essential subjects to be taught and studied from primary education to higher education.

However, mathematics is also one of the difficult subjects for students, causing students to give up easily before studying mathematics (Amallia & Unaenah, 2018). This condition is increasingly felt because the implementation of online learning due to the COVID-19 pandemic is not ready yet (Jannah et al., 2021). Other factors, namely: (1) Limited space of interaction between teachers and students that causes learning is not optimal, (2) The number of formulas used in mathematics learning makes it difficult for students to understand the material, (3) Objects learned in the form of abstract patterns, making it more difficult for students to understand the material (Fauzy & Nurfauziah, 2021). One of the solutions to this problem is creating and using learning media to make it easier for students to understand learning (Aziz, 2020). This solution is in line because the COVID-19 pandemic forced teachers and students to use technological devices during learning (Lestari et al., 2020).

The COVID-19 (Coronavirus Disease 2019) pandemic changed the learning system that was originally face-to-face learning into online learning and hybrid learning (a combination of online and face-to-face learning). For example, this learning system implementation can be seen in SMP Negeri 5 Yogyakarta (public-state junior high school). The school implemented a hybrid learning system for students in 7^{th} and 8^{th} grade, where 50% of total students per

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class learn from home, and the remaining 50% learn in the classroom with COVID-19 prevention protocols. This current condition led the researcher to interview one of the mathematics teachers. Teacher has concerns about students who learn from home because the students are at risk of being left behind in understanding materials during the learning process. The teacher uses Microsoft Office PowerPoint as learning media. Based on the interviews, the teacher stated that the learning media that teacher used was not yet enough to facilitate the students during hybrid learning. This statement then led the researcher to interview several students and spread questionnaires related to the learning media used. As a result, the students need various learning media with exciting features. Based on the results, the researcher then develops PowerPoint slides into an android application containing features that suit students' needs. The development of android-based learning media is one of the solutions that teacher could use to answer various problems in the learning process during the COVID-19 pandemic, especially in mathematics subjects (Bilda et al., 2021).

The use of android-based learning media developed by researcher is expected to attract students' attention and facilitate their learning process during mathematics learning. The effect can be known from student responses to android-based applications used during the learning process. Student response is a tool that serves as feedback between teachers and students in case to improve the quality of learning (Turan & Meral, 2018). Previous research on students' responses to android-based learning media was conducted by Firda Fina Fitriya and Siti Faizah, entitled "Development of Android-Based Mathematical Learning Media in Trigonometric Materials". Their study result showed that the learning media received a score of 74.63%, which was positively categorised and practically used during the learning process (Fina Fitriya & Faizah, 2021). Based on the background, the researcher wants to conduct research about the analysis of student responses to an android-based application learning media called Teman Ritma as mathematical learning media in SMP Negeri 5 Yogyakarta.

Research Methods

The type of this research is descriptive quantitative. This research aims to determine the student response about the use of Teman Ritma application during the learning process. The sample consisted of 32 students of 7th grade SMP Negeri 5 Yogyakarta. The sample was divided into two groups. The first group contain 15 students with good learning outcomes, and the second group contain 17 students with poor learning outcomes. The sample was divided based on the student's initial problem-solving test results held on November 12th, 2021. Mathematics learning using the Teman Ritma application was held in February – March 2022. The learning media used is the android-based application, namely Teman Ritma, which contains social arithmetic materials. Social arithmetic material has basic competence according to the Indonesian Curriculum 2013, which can be seen in Table 1.

Table 1. Basic Competence of Social Arithmetic

No	Basic Competence
3.9.	To know and analyse the various situation that is related to social arithmetic (sell, buy, discount, loss and profit, loss and profit percentage, simple interest, gross, net, and tare)
4.9.	To solve the problems that are related to social arithmetic (sell, buy, discount, loss and profit, loss and profit percentage, simple interest, gross, net, and tare)

Students use the Teman Ritma application during social arithmetic learning to achieve learning goals, namely: (1) Resolving problems related to selling prices, purchase prices, profits, losses, discounts, and taxes; (2) Resolving problems relating to a single interest rate; and (3) Resolving problems related to gross, net, and tare. Teman Ritma application was designed and developed using Microsoft Office PowerPoint integrated with ISpring Suite and a converter HTML-to-App software namely "Website 2 APK Builder". The development stages of Teman Ritma can be seen in Figure 1.

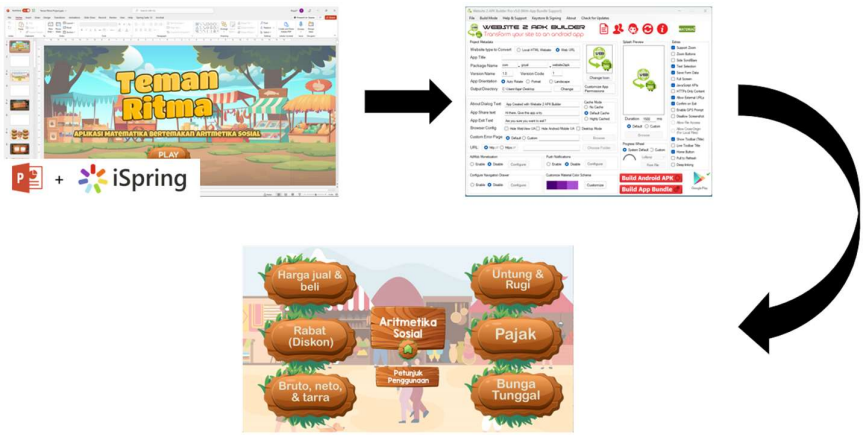

Figure 1. The Development Stages of Teman Ritma

Teman Ritma application contains several features as follows: main menu, materials, and a problem-based student worksheet that was arranged according to the Polya aspect, namely (1) understanding the problem, (2) Draw up the plan, (3) Carry out the plan, and (4) Review and concluding (Marhaeni & Suparman, 2019). Figure 2 below contains the appearance of each feature.

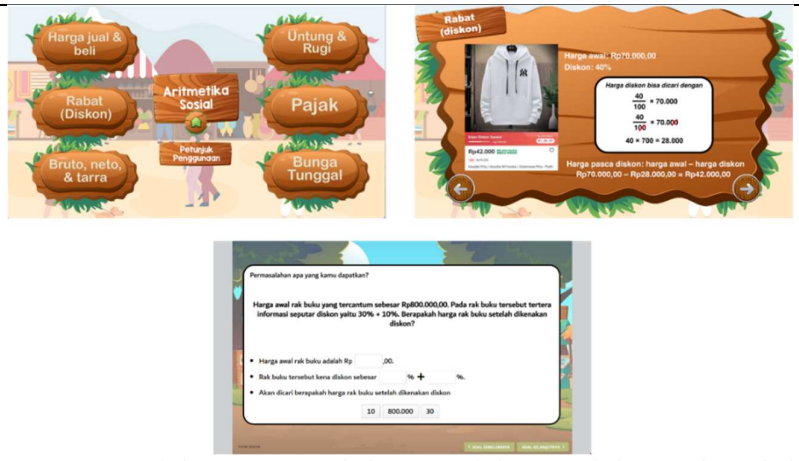

Figure 2. Materials menu (top-left), materials (top-right), and worksheet (bottom)

Students then download and use the Teman Ritma learning media provided by the researcher through a cloud drive service, namely Google Drive (which can be accessed at:

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bit.ly/AplikasiTemanRitma) on the first meeting. Teman Ritma application is used during the learning process of social arithmetic materials. All materials, assignments, and quizzes can be accessed by students through the application.

The data regarding the student responses about the use of Teman Ritma application was collected using a student response questionnaire. The questionnaire contains 10 numbers of statements and was arranged and adapted from Usha V. Reddi with several aspects and indicators, as shown in Table 2 (Mishra & Reddi, 2003).

Table 2. Aspects and Indicators of Student Response about the Use of Teman Ritma

No	Aspects	Indicators
1.	Learning Design	• Easy-to-understand materials by using learning media • Accuracy of material presented in media with student worksheet • Learning interest when using learning media
2.	Operational	• Ease of accessing media • Ease of navigation function • Availability of instruction for using learning media
3.	Visual Communication	• Attractiveness of initial view when using learning media • Font type and sizes selected on media are easy to look and readable • Suitability of image size, colour, and resolution in learning media • Grammar arranged on learning media is easy to understand

The assessment of each statement was using a Likert scale from 1 to 5, i.e., 1 represents a strongly disagree answer, 2 represents disagree answer, 3 represents fair answer, 4 represents agree answer, and 5 represent strongly agree answer. Student responses data that has been collected then calculated with Microsoft Office Excel software to find out the overall score from each group based on the aspects. Each aspect of the assessment will be calculated (in percentage) using the formula as shown in equation (1)

$$\text{Score Percentage} = \frac{\text{Total of score obtain}}{\text{Total of maximum score}} \times 100\% \quad (1)$$

The percentage of scores of each aspect obtained then classified into a response categories table based on Riduwan. The response category can be seen in Table 3 below (Riduwan, 2007).

Table 3. Response Category from Each Aspect

Percentage Score	Category		
	Learning Design	Operational	Visual Communication
81% – 100%	Very Satisfied	Very Easy	Very Satisfied
61% – 80%	Satisfied	Easy	Satisfied
41% – 60%	Neutral	Fair	Neutral
21% – 40%	Unsatisfied	Difficult	Unsatisfied
0% – 20%	Very Unsatisfied	Very Difficult	Very Unsatisfied

The Teman Ritma application is said to be eligible and practical to use as mathematics learning media if the percentage score received from the student response questionnaire is at least 61%. After knowing the student response category, the research then analysed whether or not the influence of learning outcomes on student response rate between groups with students who have good learning outcomes and students who have poor learning outcomes by using SPSS software. To get the result, the researcher used a parametric-statistical test, namely independent sample t-test with a significance level of 0.05.

Result and Discussions

The research was conducted on 7th grade SMP Negeri 5 Yogyakarta students, with a total sample collected of 32 students. Previously, the researcher conducted an initial test of student problem-solving skills on November 12th, 2021, consisting of 3 number of questions. The test results showed that there were 15 students with good results and 17 students who got poor results. Based on the test results, the researcher divided the samples into two groups, namely Group 1 (K-1), consisting of 15 students with good learning outcomes, and Group 2 (K-2), consisting of 17 students with poor learning outcomes. This research was held in February – March 2022. The student uses the Teman Ritma application that the researcher provided. Then, the students are directed to fill out the student response regarding the use of Teman Ritma application as mathematical learning media on February 24th, 2021. The student's response data were analysed, resulting in a graph in Figure 3 below.

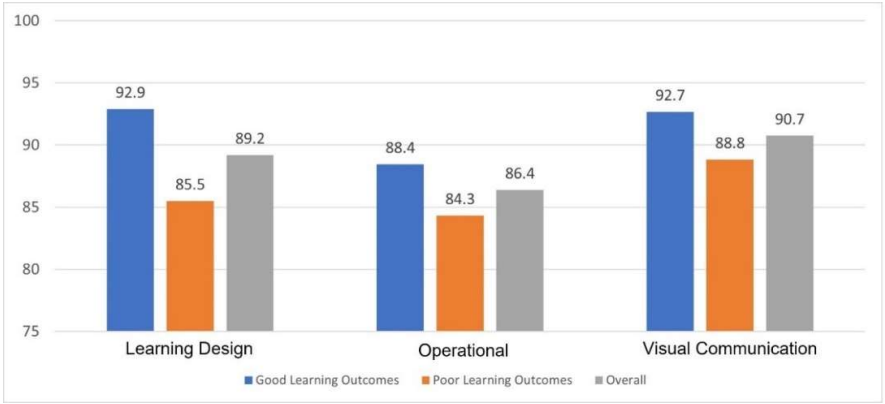

Figure 3. Graph of Student Response from Each Indicator

The graph above is then clarified using the student response classification as in Table 3. The results of the percentage score of each aspect can be seen in Table 4 below.

Table 4. Student Response Result

Group	Learning Design		Operational		Visual Communication	
	%	Category	%	Category	%	Category
K-1	92,9%	Very Satisfied	88,4%	Very Easy	92,7%	Very Satisfied
K-2	85,5%	Very Satisfied	84,3%	Very Easy	88,8%	Very Satisfied
Overall	89,2%	Very Satisfied	86,4%	Very Easy	90,7%	Very Satisfied

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The response from K-1 group had a very positive response from all aspects. It means students can use the Teman Ritma application in mathematics learning because it has appropriate material that is easy to understand, easy to operate, and students are satisfied with the information delivery techniques available in the application. A similar response was received from the K-2 group. From the table above, the average percentage of the overall response score percentage from all aspects is 88.8%. This means Teman Ritma was categorised as a very positive response. It concluded that the student's response to the Teman Ritma application was very positive, so the Teman Ritma learning media application is eligible and practically used as mathematics learning media.

The following discussion will be analysed whether or not the influence of learning outcomes on student response rate from both groups. This analysis requires a parametric-statistical test, namely the independent sample t-test. Parametric statistics serve to analyse interval or ratio data, where the data is collected from a normally distributed population and has a homogeneous variance (Sugiyono, 2015). Based on the statement, the data must fulfil the prerequisites tests, which are normality and homogeneity test using SPSS software. The normality test uses the Shapiro-Wilk technique, and the results can be seen in Table 5 below.

Table 5. Normality Test Result

Data	Shapiro-Wilk		
	Statistic	df	Sig.
K-1 Group Response	0.934	15	0.315
K-2 Group Response	0.942	17	0.343

The K-1 group has a p-value of 0.315, and the K-2 group has a p-value of 0.343. The p-value of both groups is higher than 0.05 (0.315 > 0.05), which means all the data is normally distributed. The next prerequisites test is the homogeneity test using Levene's Test technique which can be seen in Table 6 below.

Table 6. Homogeneity Test Result

Data		Levene Statistic	df1	df2	Sig.
Student Response	Based on Mean	3.024	1	30	0.092

The total score of the two groups, K-1 and K-2, has a value of 3.024 and has a "based on mean" p-value of 0.92. The p-value is higher than 0.05 (0.092 > 0.05) so, the data above is homogeneous. Because the data is normally distributed and homogeneous, the data is ready to be analysed using independent sample t-test to determine the influence of learning outcomes on student response rate. The result of this statistical test is shown in Table 7 below:

Table 7. Independent Sample T-test Result

Aspect	Sig. (2-tailed)	Mean Difference	Lower	Upper
Learning Design	0.039	1.110	0.058	2.162
Operational	0.317	0.620	-0.625	1.864
Visual Communication	0.318	0.769	-0.776	2.313

The result of the independent sample t-test above shows that the p-value of the learning design aspect was 0.039, the operational aspect was 0.317, and the visual communication aspect was 0.318. The p-value of the operational aspect and visual communication aspect is higher than 0.05, which means there is no significant difference between the K-1 group and the K-2 group. So, it concluded that learning outcomes have no influence or effect on the student response rate for the operational aspect and visual communication aspect. Meanwhile, the p-value of the learning design aspect is less than 0.05 ($0.039 \leq 0.05$). It means there is a difference between the K-1 group and K-2 group and concludes that learning outcomes affect the student response rate for the learning design aspect.

In general, the Teman Ritma application that developed by the researcher received a very positive response from students who have good learning outcomes and poor learning outcomes. Based on their responses, students can operate the application without difficulty. Students can easily understand the presented materials, and they are expected to train their problem-solving skills when they do the worksheet. Because the Teman Ritma application received a very positive response, students are expected to learn mathematics more effectively.

Conclusion

This research concludes that the response from the K-1 and K-2 groups regarding using the Teman Ritma application as mathematical learning media is very positive. Students who have good or poor learning outcomes can use the application without any trouble, understand the materials easily, and be satisfied with the information delivery techniques available in the application. Based on these responses, the Teman Ritma application is eligible and practically used as mathematics learning media. Then, another conclusion based on the statistical test results shows no influence or effect from K-1 and K-2 groups learning outcomes on student response rate for operational and visual communication aspects. Meanwhile, there is a difference between K-1 and K-2 groups for the learning design aspect, and it concluded that learning outcomes affect student response rate for learning design aspect.

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