PRIMARY: JURNAL PENDIDIKAN GURU SEKOLAH DASAR
VOLUME 12 NOMOR 2 APRIL 2023
ISSN : 2303-1514 | E-ISSN : 2598-5949
DOI : http://dx.doi.org/10.33578/jpfkip.v12i2.9113
https://primary.ejournal.unri.ac.id/index.php/JPFKIP

POTENTIAL USE OF TECHNOLOGY TO DEVELOP ELEMENTARY STUDENTS' MATH SKILLS THROUGH TOON MATH

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POTENSI PENGGUNAAN TECHNOLOY UNTUK MENGEMBANGKAN KEMAMPUAN MATEMATIKA SISWA SD MELALUI *TOON MATH*

ARTICLE HISTORY

Submitted:
08 Agustus 2022
08th August 2022

Accepted:
18 Maret 2023
18th March 2023

Published:
25 April 2023
25th April 2023

ABSTRACT

Abstract: *Everyone needs to learn mathematics, which is a basic science. It is undeniable that the life of the world cannot be separated from mathematics. But, most elementary school students, unfortunately, are still difficult to count and lack interest in mathematics. Through this paper, the researcher aims to find out the elementary students' arithmetical speed in grade 2 and to apply a quantitative approach by applying the pre-experimental design method, one group pretest-posttest type. The research results indicate that there was a significant increase. In the pretest, there were students who answered quickly and correctly on the summation questions, there were 32% students. Based on the subtraction questions, there were 22% of students. Based on the story summation questions, there were 43% of students. Based on the division questions, there were 13% of students. And based on multiplication, there were 51% of students. And these results increased in the post-test conducted by researchers, which students who answered quickly and correctly on summation questions at 84% of students, subtraction questions at 73% of students, story summation questions at 62% of students, division questions were 43% of students, and on multiplication questions 54% of students. The implication of this Toon Math application is that Toon Math can be used as a variation of mathematics learning so that students have an interest to learn mathematics. Based on the description of the data, it states that the Toon Math game influences the students' increasing arithmetical speed.*

Keywords: math skills, counting, toon math

Abstrak: Setiap orang perlu mempelajari matematika yang merupakan ilmu dasar. Tidak dapat dipungkiri bahwa kehidupan dunia tidak lepas dari peran matematika. Namun sayangnya sebagian besar siswa SD masih kesulitan berhitung dan kurang minat terhadap matematika. Melalui artikel ini, peneliti bertujuan untuk mengetahui kecepatan berhitung siswa kelas 2 SD dan menerapkan pendekatan kuantitatif dengan menerapkan metode desain pra-eksperimental, tipe *one group pretest-posttest*. Hasil penelitian menunjukkan bahwa terdapat peningkatan yang signifikan. Pada pretest terdapat siswa yang menjawab dengan cepat dan benar. Pada soal penjumlahan sebanyak 32% siswa. Pada soal pengurangan sebanyak 22% siswa. Pada soal penjumlahan cerita sebanyak 43% siswa. Pada soal pembagian terdapat 13% siswa. Dan pada perkalian sebanyak 51% siswa. Dan hasil tersebut meningkat pada *post test* yang dilakukan oleh peneliti, yang mana siswa yang menjawab dengan cepat dan benar pada soal penjumlahan sebanyak 84% siswa, pada soal pengurangan sebanyak 73% siswa, pada soal cerita pada penjumlahan sebanyak 62% siswa, pada soal pembagian 43% siswa, dan pada soal perkalian sebanyak 54% siswa. Implikasi dari aplikasi *Toon Math* ini adalah *Toon Math* dapat digunakan sebagai salah satu variasi pembelajaran matematika agar siswa memiliki minat untuk belajar matematika. Berdasarkan deskripsi data yang ditemukan menyatakan bahwa permainan *Toon Math* berpengaruh terhadap peningkatan kecepatan berhitung siswa.

Kata Kunci: kemampuan matematika, menghitung, toon math

CITATION

Putri, A.,Hanif, M., Ramadhani, T, P., Nurhaliza, F., Febriyanti, A., Mutiara, I., & Agustin, S, K. (2023). Potential Use of Technology to Develop Elementary Students' Math Skills Through Toon Math. *Primary: Jurnal Pendidikan Guru Sekolah Dasar, 12* (2), 306-314.

PRIMARY: JURNAL PENDIDIKAN GURU SEKOLAH DASAR
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https://primary.ejournal.unri.ac.id/index.php/JPFKIP

DOI: http://dx.doi.org/10.33578/jpfkip.v12i2.9113.

INTRODUCTION

Improving the quality of human resources is strongly influenced by the role of the education sector, therefore in Aini, Baiq Olatul et al in 2019 it was explained that efforts to improve and improve quality in the educational aspect are needed. Meanwhile, mathematical ability can be defined as the ability when faced with problems, both in math problems and in real life. Mathematical abilities include mathematical thinking, mathematical communication, solving mathematical problems, conceptual and mathematical understanding, creative and critical thinking. In addition, it is also necessary to have a good opinion of mathematics which students' must have, namely in the form of self-confidence when applying mathematics, flexibility when analyzing mathematical concepts, being diligent when working on mathematical assignments, and having a high desire to learn and curiosity in mathematics. math problem. Learning mathematics has a goal as stated by Permendikbud number 58 of 2014 in (Apriyono, 2018) that is, if students are able to understand mathematical ideas, students will be able to master the skills of describing relationships between concepts and applying these concepts or the steps in a coherent or structured manner. appropriately, effectively, and correctly in solving problems.

Permendikbud number 58 of 2014 in (Arrahim, 2018) states several parameters of the ability to understand mathematical ideas, which is: a) Re-explaining the mathematical concepts that have been studied, b) Grouping several objects based on the qualifications that build the mathematical concept, c) Recognizing the various properties of an operation or concept, d) Applying the concept correctly, e) Presenting an example of a concept that has been studied, f) Explaining the concept in various mathematical supporting elements such as tables, graphs, diagrams, drawings, sketches, and others, g) Linking various mathematical or non-mathematical concepts, h) Increasing the necessary and sufficient conditions for a concept.

Wahyudin in 2000 in (Intisari, 2017) stated that mathematics plays a very important role in aspects of life. Therefore, it is needed as soon as possible to create better mathematics lessons so that the impression that has been unfavorable towards mathematics so far can be in a better direction. Therefore, it is necessary to create interesting learning, so that a learning media is needed. Valuable learning can be obtained by students because the delivery of mathematical concepts can be understood easily. This can happen because learning mathematics is done through playing activities, so that the abstractness of mathematical concepts can be reduced (Supriadi, 2020).

In accordance with the development of technology, it brings the influence of change in the world of education. In facing the revolution of the 21st century, education has the goal of forming the character of students who have high creativity, are innovative and competitive (Sanusi et al., 2020). Educators are assisted in creating an atmosphere of learning activities that is comfortable, friendly with interesting learning media with the presence of technology. Educators can innovate and develop their level of creativity by taking advantage of current technological developments in order to be able to create fun learning media in various forms such as audio, visual, and motion (Kartikasari, 2018). ICT learning media through the use of Smart Phones is expected to create an interesting and fun atmosphere for learning activities. Basically children also prefer to play, therefore learning with game media especially digital can increase their enthusiasm. This is also in accordance with Saripudin and Faujiah sari in (Adlina, Livya Mora 2020) stated that by implementing learning while playing, students will gain boundaries and understand life because while playing, students become happy. Playing is an activity that is expected to

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maximize and develop all aspects of children (Adlina, Livya Mora, 2020).

In accordance with what has been explained, this study uses ICT-based educational games for elementary school children so that learning mathematics in class comes alive again and is liked by many students. The educational game that will be applied by researchers in this study is an android-based math game, namely the Toon Math application. By introducing it to children, it is hoped that learning mathematics will be more fun and children will not think that mathematics is difficult. The Toon Math application is used in research by considering its benefits, that is making students' mindsets develop and helping students to learn independently. Then, when math learning activities take place the Toon Math application makes students happy because there are lots of features provided, this is to make it easier for students to understand how to work on various questions that are already listed in the Toon Math game application, its use is also easy to understand.

Previous research on educational games has been carried out by (Hakim & Sari, 2019) with the title "Application of Mathematical Games in Improving Mathematical Computing Skills", the results of this study showed an increase after learning math games was carried out, the results in experimental class students were superior when compared with students in the control class. Next is the research conducted by Rahmawati in 2018 with the title "Application of Educational Games to Improve Understanding of Mathematical Concepts for Students of SDN 1 Padamukti Garut". gave the result that the experimental class on learning mathematics by applying learning methods using educational games showed good results. This can be seen based on the answers to the attitude scale questionnaire which say strongly agree and agree from the point of view of students' attitudes towards learning mathematics applying educational games to positive statements. Behavior that shows a positive attitude of students towards learning by using educational games appears when the learning process is running, students are very enthusiastic, actively involved, and communicative and more confident when group discussion activities.

Furthermore, in the research carried out by Chrisnanji Banindra Yudha in 2018 entitled "Application of Android-Based Educational Games and Images for Elementary School Students". A clear difference can be seen between the effectiveness of educational games for learning mathematics based on Android and without media for learning multiplication material at SDN Rempoa 4, South Tangerang. The results of his research, learning mathematics using educational games based on Android shows more effective results than without media. Multiplication learning material learning activities at SDN Rempoa 4 South Tangerang using educational games for learning mathematics on an Android basis show more effective results than media images and no media.

From several previous studies, there are some similarities and differences with the research conducted by the researcher. The similarities are that some of these studies have the same topic, namely regarding educational games and their results which improve learning outcomes. While the difference in this study will discuss the application of the Toon Math educational game specifically for 2nd grade elementary school students. This study aims to determine the speed of calculation in 2nd grade elementary school students by applying the Toon Math application to learning mathematics according to the ability level of students.

METHOD

This research is included in the type of experimental research. In this research, the researcher applied a quantitative approach and applied a research method in the form of a pre-experimental design type one group pre test-post test (single group pre-test-post test). Which in this design the treatment will be

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given after doing the pre-test. Then after that a post test will be carried out. Based on this, the results of the treatment can be found more precisely, because it can compare the conditions before and after the treatment. This research was conducted with the subject of class II students with a total of 37 students at SDN Mendya 3 which is located in Carenang District, Serang Regency.

This research applies data collection techniques in the form of tests. Data acquisition was carried out through a formative test, namely a short essay test which included a pre-test and post-test so that it could measure students' cognitive competence and students' numeracy speed. The material for the test questions is taken from Theme 1 Living in Harmony and Sub-theme 3 Living in Harmony in Schools for mathematics. The test was carried out for 7 minutes each.

The test in this study was not only used with the aim of measuring students' cognitive competence, but also to measure how quickly students could answer the questions that had been given. Before using the application, students are tested through a pre-test. Then after using the Toon Math application the children will be tested again using the post-test to find out the extent to which students have achieved learning (knowledge and skills) after carrying out the learning process using the Toon Math application.

RESULT AND DISCUSSION

Toon Math Game Application

Everyone can have different opinions about mathematics. For some people, mathematics may be a subject that tends to be easy and fun. However, for some other people, mathematics becomes something that is difficult and less fun. As an alternative to making math lessons more interesting and fun, a game-based learning system appears where we can use game media when carrying out learning activities so that it is more interactive and fun for students so that the learning process does not seem boring and students can carry out two activities at once, namely learn and play. This endless run or Toon Math game is very suitable for use as a mathematics learning medium for children. (Kuswanto, 2017) states that games do not only have a bad impact but there are also positive things to be gained from these educational games which can be used effectively for students learning mathematics.

The game play system in Toon Math is quite simple like other endless run games. Players only need to let their characters run, avoid obstacles encountered, and collect as many coins as possible. But what makes it different is that there are math problems that appear suddenly. The player must direct the character to the right answer and let the character successfully overcome the obstacles encountered. But if the answer given is not correct, then the character will hit the obstacle in front of him. Which is certain the longer the game lasts, the higher the level of difficulty that will appear, this will increase the competence or ability of the players to answer questions. Apart from that, players can also choose the character they want to run. These characters are provided in several options that can be selected as desired.

This game has several interesting features: 1) Endless running game with an educational component, 2) Has a variety of new and funny characters, 3) Excellent graphics, 4) Players can control what material can appear in the game, such as only only addition, or addition and multiplication, or even all 4 materials provided, 5) There are 5 levels of problem difficulty that can be set, namely very easy, easy, normal, hard, and very hard. This media is obtained from the Google Play Store with a rating of 4.7 out of 5.

Pra Experiment Result

The research began with observing the students' speed skills in counting and student learning outcomes in arithmetic before applying the Toon Math application and the PMRI (Indonesian Realistic Mathematics Education) method during the learning

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process. Observations were made by asking the guardian teacher about students' ability to count, then conducting trials in the form of giving random questions about the arithmetic operations of addition, subtraction, division and multiplication. After making observations, the researcher held a pre-test for students by giving 5 questions consisting of addition, subtraction, stories about addition, division and multiplication.

Observations and pre-tests are used as materials to carry out experimental activities. During the pre-experimental activities the researcher observed the students' counting speed and the pre-test material for addition, subtraction, multiplication and division arithmetic operations. Based on the results of the pre-test material for the arithmetic operations of addition, subtraction, multiplication and division which were carried out in class 2 of SDN Mendaya 3, the results were 31% of students who were able to work on addition questions to completion quickly and accurately, 22% of students who were able to work on subtraction problems to completed quickly and correctly, 43% of students were able to solve addition calculation problems in stories quickly and correctly, 13% of students were able to work on division problems quickly and correctly, and 51% of students were able to work on multiplication problems to finish quickly and Correct. Based on the results of the pre test, it was found that the average number of students who were able to answer questions quickly and correctly in all arithmetic operations was 32% of the total number of students in the class.

Tabel 1. Results of the Pre-test Rubric Count speed and student learning outcomes in arithmetic

No.	Criteria	Addition (+)	Subtraction (-)	Story Question (+)	Division (÷)	Multiplication (x)
1.	Fast and Correct	12 Respondent	8 Respondent	16 Respondent	5 Respondent	19 Respondent
2.	Fast and Wrong	17 Respondent	13 Respondent	9 Respondent	14 Respondent	10 Respondent
3.	Less Fast	8 Respondent	16 Respondent	12 Respondent	18 Respondent	8 Respondent
Persentase		32%	22%	43%	13%	51%

Experiment Result

Eksperimen dilakukan sejumlah 2 kali pertemuan, dengan distribusi waktu 2x30 menit untuk setiap pertemuan. Setiap pertemuan peneliti melakukan penerapan penggunaan aplikasi *Toon Math* dan metode PMRI (Pendidikan Matematika Realistik Indonesia), lalu pada pertemuan terakhir peneliti melakukan *post test* terhadap peserta didik untuk mengetahui perkembangan kecepatan siswa dalam berhitung serta hasil belajar peserta dalam berhitung.

Tabel 2. Results of the Post test Rubric Counting speed and student learning outcomes in arithmetic

No.	Criteria	Addition (+)	7Subtraction (-)	Story Question (+)	Division (÷)	Multiplication (x)
1.	Fast and Correct	31 Respondent	27 Respondent	23 Respondent	16 Respondent	20 Respondent

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2.	Fast and Wrong	-	6 Respondent	5 Respondent	6 Respondent	9 Respondent
3.	Less Fast Cepat	6 Respondent	4 Respondent	9 Respondent	15 Respondent	8 Respondent
Persentase		84%	73%	62%	43%	54%

Based on Table 2 above, it can be seen that the results of the post-test of students' numeracy speed and the learning outcomes of students in arithmetic in the learning materials for addition, multiplication, word problems about addition, division and multiplication experienced a significant increase compared to the results of the students' pre-test on pre experiment. In Table II it can be seen that the increase was quite large, during the pre-test the average student got during the pre-experiment was 32% and when the experiment was carried out it increased to 63%.

The research was conducted in 2 meetings with a time distribution of 2 x 30 minutes. Which at each meeting applies the use of the Toon Math application and the PMRI method in accordance with the material presented, namely addition, subtraction, word problems regarding addition, multiplication and division. The PMRI method was applied by researchers in this research in every meeting, in addition to using the Toon Math application to improve counting speed skills and student learning outcomes in arithmetic.

Before the experiment, the researcher conducted a few interviews with the teacher regarding students' ability to count. Researchers made observations and pre-tests with the aim of knowing the pre-experimental conditions of students' speed in counting and students' learning outcomes in arithmetic. Then the researchers used the Toon Math application and the PMRI method. Based on the results of the analysis of the pre-test results, the researcher can conclude that the students' numeracy speed and learning outcomes are still in a fairly low category, therefore experimental measures are needed. In this experiment the researchers applied the Toon Math application and the PMRI method well. Meanwhile, learning materials were given in the first and second meetings.

During the first meeting the researcher conducted observation activities by asking the guardian teacher about students' ability to count, then conducted a trial by giving random questions regarding the arithmetic operations of addition, subtraction, division and multiplication, then the researcher conducted a pre test by giving 5 questions and for each question given 1 minute for students to answer except for story questions given 3 minutes for students to answer. After conducting the pre-test, the researcher carried out the learning by applying the Toon Math application and the PMRI method. At the second meeting, the researcher carried out the lesson by applying the Toon Math application and the PMRI method again, then after that a post test was carried out to find out the development of counting speed and student learning outcomes in arithmetic. After the experimental activities are completed, the researcher analyzes the experimental results and then the researcher compares them with the pre-experimental results. For the results of the rubric, the speed of counting and student learning outcomes in arithmetic at the time the experiment was carried out had increased from the pre-experiment.

Based on the results of the research that has been carried out, it was found that the results increased the speed of students in

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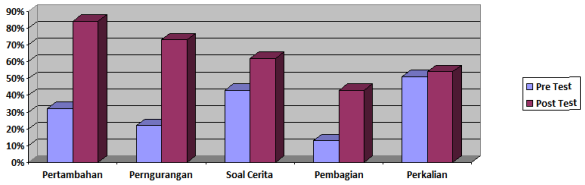
counting from the pre-experiment, namely in the addition arithmetic operations there were 12 students or 32% who were able to work on the questions quickly and correctly, in the subtraction arithmetic operations it was known that 8 students or 22% could do questions quickly and correctly, in the arithmetic operation of addition in story questions there were 16 students or 43% who were able to work on the questions quickly and correctly. In the arithmetic division operation, there were 5 students or 13% who were able to work on the questions quickly and correctly, and in the multiplication arithmetic operation there were 19 students or 51% who were able to work on the questions quickly and precisely.

After implementing the use of the Toon Math application and the PMRI method, the results of the speed of counting and student learning outcomes in arithmetic changed to increase, in the addition operation to 31 students or 84% who were able to do the questions quickly and correctly, in the subtraction arithmetic operations to 27 students or 73% who were able to work on the questions quickly and correctly, in the arithmetic operation the addition of word problems became 23 students or 62% who were able to work on the questions quickly and precisely, in the arithmetic operations of division there were 16 students or 43% who were able to work on the questions quickly and precisely, and in multiplication arithmetic operations, 20 students or 54% are able to work on questions quickly and precisely.



Gambar 1. Comparison of Percentage of Counting Speed and Student Learning Outcomes in Numeracy from Pre Test to Post Test

In addition to the main results, this experiment also produced two additional results to complement and provide additional information to this experiment. First, even though at the beginning there was a perception that one of the children was less receptive to mobile-based learning, when told that playing with gadgets was not only playing but there was also learning like the application we chose, namely Toon Math, which included counting, addition, subtraction, multiplication and division, so that the child wants and tries to play the application happily. Second, at first the children didn't want to listen to the teacher speak in front of the class because the children felt bored just hearing the teacher talk and thought that learning math was difficult after the children played while learning to use the application, the children were very enthusiastic. ordinary and enthusiastic people get high to the point of asking about the name of the application they are using so they will download it at their respective homes and want to play it right away. Conducting experiments regarding the Toon Math application which can help children have the correct counting speed regarding addition, subtraction, multiplication and division is in the criteria of developing and increasing very well in a fast and correct way.

CONCLUSIONS AND RECOMMENDATIONS

The use of technology-based learning media using the Toon Math application and by applying the PMRI approach was quite successful in increasing the level of activity and learning outcomes of students. Based on this, it can be seen that the results of the post test have increased compared to the results of

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the pre test, and there are even some fields where the percentage has actually increased very rapidly. The increase also had an impact on the activeness of students during teaching and learning activities.

Based on the conclusions above, we researchers have several recommendations that can be useful for students and teachers, which is (1) it is better for students who still answer quickly and incorrectly and are not fast enough to pay more attention when participating in learning activities, (2) students should be more active during learning activities. group learning, and it is also expected to actively ask questions if something is not understood, (3) teachers should apply more various kinds of media and more innovative approaches, so as to be able to make students enthusiastic and feel happy when carrying out learning activities. There are lots of media and approaches that can be applied to learning activities in elementary schools, for example technology-based media using the Toon Math application and also the PMRI (Indonesian Realistic Mathematics Education) approach which aims to increase student activity, student learning outcomes, and to be applicable. in the daily life of students.

ACKNOWLEDGMENT

The researcher would like to thank several parties who have helped during the research process. Especially to the supervisor because this experiment can be carried out properly. Thank you also to the Principal of SDN Mendaya 3, Homeroom Class 2 of SDN Mendaya 3 and the Board of Teachers of SDN Mendaya 3 who have provided good cooperation in this experiment.

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