# Development Of Web-Based Interactive Game Media  Application Wordwall Material Odd Numbers Even Mathematics Subjects Grade Ii Elementary School

**Susilo Sudarsono[1]✉, Sapriya[2]**

[1,2] Primary Education Study Program, School of Postgraduate Studies, Universitas Pendidikan Indonesia
✉ susilosudarsono@upi.edu

**Abstract.** Teaching a new concept in mathematics to students requires more attention from the teacher. That teaching will be very risky if it is not implemented as much as possible so that students are able to understand the new concepts correctly. The concept of odd-even numbers is one of the concepts in mathematical numbers and is often taught with less attention and seems sober to finally make students less understanding of the concept. The purpose of this study is to develop a web-based interactive game learning media wordwall application in mathematics subjects the concept of odd-even numbers for the second grade of elementary school. The research uses the ADDIE development method which has five stages of research, namely analysis, design, development, implementation, evaluation.  Learning media was declared feasible from the validation results of media experts with a percentage of 87.5% and material experts with a percentage of 88% and questionnaires filled by students with 97%, in addition to tu there was also an increase in test scores in limited trials from an average pre-test score of 75 to an average post-test score of 95.

**Keywords:** development, learning media, interactive games, wordwall.

## INTRODUCTION

Mathematics is a science that can be taught in human daily activities, even before humans themselves enter the world of education. The beginning of man in entering the world of education from the initial stage of kindergarten until a moment man separates from the world of education and begins to work for the sake of his survival, mathematics becomes something that is still in human life. Mathematics is a field of science that is within the scope of symbolic linguistics. mathematics has a meaning as a science resulting from thinking / reasoning, in mathematics it prioritizes action in the world of reasoning / ratio, rather than prioritizing the results of an experiment or an observation (Rahmah, 2013).

Learning mathematics at the elementary school level is a place for character building and as an initial process for students. Educators have a position as people who have an important role in learning activities, although also in reality teachers have an important role in the early stages of forming a new concept and making the concept well embedded in students to the stage of honing skills. There are a lot of concepts in mathematics that need to be understood by humans, especially in students who are in elementary school. The knowledge learned for learners is supposed to be built from a balanced mix of procedural knowledge and conceptual knowledge. Students who are in elementary school generally have the age of 7 to 12 years, in this age students enter the concrete operational phase according to Piaget (Nurisan and Agustin, 2013). In this phase, the visible characteristic of students' abilities is the ability to think which aims to operate various logical rules, although they are still tied to various concrete objects. So it is necessary to require learning based on actions / deeds. It does not only contain the meaning of a concept with a memorization method, because actually remembering an understanding alone will make such learning easy for students to forget. Concept understanding is the process of mastering the material taught to students and is useful so that students are able to re-explain and express the concept in the same way or in their own language. (Susanto, 2016) a person who already has a concept then he also has a clear understanding of the concept or image of something. Bloom in (Susanto, 2014) explains that understanding is the ability to absorb the meaning of a material studied.  furthermore,  Bloom in (Siregar, 2013) said understanding is actions and behaviors that

are reflected in a written message in communication. The understanding stage in mathematics learning is an advanced stage that begins with the introduction of new concepts, understanding can be generated by trying new concepts introduced and applying them directly. The ability to understand mathematics is an ability to absorb and understand mathematical ideas (Lestari and Yudhanegara, 2015). The process of applying directly requires suitable props so that students are able to learn more about a concept. All concepts taught to students must be accompanied by reinforcement with the aim that the concepts taught can be embedded in students.

Teachers as educators in mathematics learning must have an understanding of the different abilities of students and the level of interest of students in mathematics that are diverse. classroom management is included in the teacher's skills to create a conducive classroom climate (Wiyani, 2013). The existence of this fact requires that teachers be able to develop various ways of teaching with creative and innovative methods to teach mathematical concepts. The use of media in learning is very influential in the success of a learning (Amir, 2016). One creative way to teach new concepts in mathematics is to use the linkage of new concepts with old concepts so that students are able to get to know the new concept more closely, for example, teaching the odd-even concept by associating the new concept with the concept of numbers.

Suherman, et al (Indra, 2015: 199) stated that the meaning in understanding concepts is that mathematical concepts are arranged hierarchically, structured and logical. The concept of mathematical numbers has many types of numbers. These various numbers are related to each other. One example of the relationship between the concept of numbers is the relationship between natural numbers and even odd numbers, even numbers have the meaning of being a natural number that will be divided by two, while odd numbers have the meaning of natural numbers whose numbers are not divided by two. The concept of odd even numbers is an important mathematical concept for students to learn. An understanding of the concept of a bad even odd number has many causal factors. One of the contributing factors is that the media circulating in the world of education is small in number to support the process of understanding the concept of even odd numbers.

The researcher's experience found that some children in their environment were found to have difficulty understanding the concept of even odd numbers even though they should have been able to master it. In grade II, elementary school already has the material of fractional numbers but does not understand the concept of even odd numbers. This fact finding began with researchers who saw children of the second grade age of elementary school playing with their peers, this group of children wanted to play in groups of two but the number of their groups was in odd numbers. Some children said that the game could not be carried out because their numbers were at odd numbers, but some other children in the group did not understand the concept of even odd numbers until finally researchers asked children who did not understand the concept of even odd numbers and it turned out that these children did not understand the concept of even odd numbers. The researcher felt that this incomprehension needed to be traced to the cause so the researcher conducted a brief interview with one of the teachers. The results of the interview with the teacher concluded the fact that learning the concept of even odd numbers in elementary school only became a slip and received less special attention so that sometimes the learning was missed and even just a refresher of the material between the main materials. Unfortunate findings of fact regarding the concept of even odd numbers which should be an important number concept to learn for students, are even often found in the daily lives of students at school such as the findings of semester naming in various school documents such as question sheets and answers that write odd or even semesters.

Learning new mathematical concepts to good learners requires full support from teachers and several other factors. Learning aids commonly called media are one of the supporting things in learning new concepts in mathematics, this aims to make the understanding of new concepts can be conveyed by teachers quickly understood and applied by students. Learning media containing images can facilitate understanding and foster student interest (Arsyad, 2015). The age of elementary school children who still have the characteristics of children's cognitive development who are still in the cognitive stage of concrete operations makes teachers have to adapt and adjust learning methods accordingly. Mathematics learning that requires learning takes

place in a real way so that students are able to understand new concepts well. The selection of appropriate learning methods and media should be an important consideration for teachers in mathematics learning, even the selected learning media can be directly made and taught to students directly. The creation of a learning media aims to help students understand the new concepts taught. The use of image media as a tool in mathematics learning to increase interest and learning outcomes (Rohmadi, 2013). Learning media combined with games will produce a learning media that makes students feel comfortable and happy in the implementation of learning with media. The process of learning and also playing in the application of learning media will be able to make cognitive students think and understand a new concept in mathematics, namely the concept of even numbers.

The activities of students in the classroom when holding online learning become very boring and monotonous so that it often makes learning less meaningful and understanding is less obtained by students because the class only takes place by staring at the glass layer, the need for the development of learning media based on games in the glass layer will provoke the enthusiasm of learning students, besides that it will also help the learning process that will be carried out in the understanding of a new concept that is the concept of even odd numbers. The development of interactive game media for students will make the media not only a means of teaching new concepts but also a means of playing for students. Learning media are made ranging from simple to very complex planning (Febriyanto, 2018). Learning media about the concept of odd-even numbers is not widely circulated in the world of education although this concept is often found in everyday life. Some of these factors are the reason for researchers to develop a learning medium to teach the concept of even odd numbers. Before researchers tried to develop learning media regarding the concept of even odd numbers, there have been several previous studies that have been carried out, namely Dwi Safitri's research with the title "development of find me media in mathematics lessons for even odd numbers material for grade II elementary schools" by producing a board-shaped learning media containing groups of even odd numbers that process the use of media in a group way and attaching an even odd number according to the group. The development of media by dwi cannot be carried out during the online learning period and does not make individual students understand the concept of even odd numbers. Researchers aim to develop learning media regarding the concept of even odd numbers that can be used in online learning, while also keeping up with the times which often require students to play their gadgets. Learning media that can be done individually and happily played by students. Game media is also included in audio-visual media. Media that has sound elements and image elements (Netriwati, 2018).

The learning media to be developed is a learning media based on a web application. The web application in question is the wordwall web application. The reason for choosing the wordwall web is that it is provided free of charge and easily accessible from various electronic devices available. The learning media to be developed will be a simple game containing simple commands that students can follow by choosing the available answers by touching the glass layer with an image according to the selected answer. The use of media that resembles this game is intended so that students can remain enthusiastic in the learning process and can learn to play. The development research carried out is expected to produce a practical and effective learning media. The effectiveness and practicality of learning media will be tested in order to achieve the expected results. Testing to be carried out in accordance with the selected Constraints so that there is no unnecessary and unnecessary development burden. The limitations of research development focus on the concept of even odd numbers according to the material of grade II elementary school and the use of web wordwall applications.

**METHOD**

Research carried out in the form of research and development is research with the aim of developing learning media in the form of interactive games using the wordwall web application on the concept of even odd numbers in elementary school mathematics subjects.

Researchers choose to apply the ADDIE model when developing learning media. Model ADDIE has five stages of development, namely analysis, design, development, implementation and

evaluation (Branch, 2009). This model is arranged programmatically with a systematic sequence of activities (Tegeh, 2013) The use of this development model was chosen on the grounds that the flow of the research model is simple and the stages are easy to implement.

The research carried out includes the stages that are in the ADDIE model, while the stage for the first is analysis (analize), the analysis stage is carried out to find the initial problem and the initial solution for the development to be carried out, in this stage careful observation and also follow-up observations that are in accordance with the problem in order to find the initial plan in the development research process. The second stage, namely design (design) contains the initial design of the development to be carried out, the design is based on the results of observations and conclusions that have been taken in the analysis stage. The third stage, namely development, contains the process of making media and implementing the planning that has been made. The fourth stage is the implementation stage containing the trial of learning media for students, as well as several assessments to support and improve the development of media that has been made. The fifth stage, namely evaluation, contains reassessing the results of the trial and improving if there are improvements needed.

The research subjects in this study were grade II students of Dumas elementary school, bubutan district, Surabaya city, the research subjects were 15 second grade students with 6 male students and 9 female students. The focus in this development research is to assess the effectiveness and practicality of learning media for second graders on web-based learning media wordwall applications regarding even odd number material.

The operational definition in this study include: 1) Interactive game, the definition of interactive game is a game that involves players in the game process.   This type of permainan aims to stimulate brain performance related to creation, production, and distribution that is based on entertainment, agility, and education. 2) Wordwall web application.   A web site-based application that can be used to create learning media such as quizzes, matchmaking, pairing and so on. The results of the media created can be shared and can be downloaded for free. 3) Even odd number, even odd material is a division where the number is said to be odd when divided by two will be left with one and the number is said to be even when divided by two.  This operational definition was made to avoid misperceptions in research. The resulting data processing analysis technique is to use the Likert scale as follows:

**Table 1** Assessment Likert Scale

| Value | Criterion |
|---|---|
| 4 | Excellent |
| 3 | Good |
| 2 | Not Good Enough |
| 1 | Very Unkind |

The expected analysis is material and media analysis in the form of validation by material experts and media experts in the form of test questionnaires, for practicality analysis is a score questionnaire which will later be filled by a sample, namely students in the trial stage, The questionnaire / questionnaire method is a way of obtaining or collecting data by sending a list of questions / statements to respondents / research subjects (Agung,  2014). For the measurement used the following formula

$$percentage = \frac{total\ score\ results}{highest\ score} x100\%$$

Based on the percentage results obtained from the media analysis developed, it can be categorized into assessment criteria based on a likert scale as follows:

76 % - 100 %   = Excellent
51 % - 75 %     = Good
26 % - 50 %     = Not Good
≤ 25 %             = Bad
(Source: Tresnanto: 2017)

In addition to data analysis with questionnaires, data analysts are also carried out with data on the average test results that will be carried out at the trial stage later. This is done in testing the effectiveness of the developed media, the way to see it is by pre-test and post-test methods. The effectiveness can be seen by whether or not there is an increase in the average score of the test after the sample is given the application of the developed media.

**DISCUSSION**

The development of learning media used a game or play concept, namely learning to play, the use of interesting learning media for students aims to trigger students' interest in learning the concept of even odd numbers in the second grade material of elementary school.

Development of learning media using the ADDIE model which has five stages, namely; analysis, design, development, implementation, and evaluation. will be carried out gradually and in order to achieve the desired results by the researcher. The analysis stage was carried out starting from the initial findings that most students in the second grade of elementary school still did not understand the concept of even odd numbers, the initial findings were found by researchers in the environment around the researcher, many children who were in the second grade of elementary school did not understand the concept of even odd numbers, this initial finding continued with a brief interview with the children, The results of the short interview stated that the concept of even odd numbers was not taught in elementary schools and the children had not received it. The analysis continued to the school for interviews of teachers and other students there, the researcher's findings produced the results of interviews with teachers and students, namely often the concept of odd even numbers in its application in the classroom and the learning process is only one of the slip materials that are considered unimportant and sometimes forgotten by the teacher because they are not included in the material tested in the final exam later, Even regarding learning media that supports the teaching of the concept of even odd numbers also does not exist and ultimately makes teachers not interested in teaching this material. In addition, students also feel that they do not get the material on the concept of even odd numbers and seem to forget the concept easily, it seems that learning the concept of even odd numbers feels boring and so fast that it makes the material taught easily forgotten by students. The conclusion of the analysis is from the many problems collected, namely the lack of innovation and attention in learning the concept of even odd numbers, the need for interesting and simple learning tools regarding the concept of even odd numbers. Researchers are trying to develop interesting and simple learning media to provoke students' interest and make it easier to teach the concept of even odd numbers.

The design stage, in this stage, is carried out by making a learning media design that will be developed. From the results of the analysis, it is concluded that an interesting and simple learning media is needed. Children are often interested in games, especially simple and fun games, in the wordwall web application there is a wide selection of game programs that can be developed according to the needs of the game maker. The concept of even odd numbers has two large options in the material, namely odd numbers and even numbers, in this case the game can be done on the basis of sorting and grouping. In the Wordwall web application there is a game with a sorting concept, namely a game with the concept of the name "whack a mole", this game can be used as an option to develop learning media with the concept of even ganjl numbers, some numbers will appear with images of moles coming out of the ground and children will be instructed to choose numbers with simple commands such as choose odd numbers or even numbers. The way to choose the image of a mole is to touch the device layer with the tip of the hand, if the player makes a mistake by choosing a number in the mole image that does not match the command then the game will be repeated Back from the beginning, in the game there is also a limited time in completing the game level, as well as there are game levels that the longer it will be more difficult, In addition, in the initial process of entering there is data input in the form of the player's name and also as a teacher or game creator will later be able to see the game score to monitor the extent of students' understanding of the material. This will be useful so that students are able to directly apply the new concepts they learn, besides that if they still do not understand the concepts learned, students will gradually get to know and understand the concepts as they play.

The development stage is to start making the planned learning media. The first thing that needs to be done is to visit the Wordwall (wordwall.net) webpage. Once inside the wordwall web application page, a login step is required first so that the web allows you to create the desired game. After successfully entering, you can immediately make a game with the format that has been provided, in this development, the whack a mole game format was chosen to be developed into a learning medium. this is an example to make a command to choose an odd number, then in the game later it will be ordered to hit the image of a mole with an odd number, in this option the researcher lists the choices of odd numbers in the correct choice then the choices of the gneap number in the wrong choice so that later in the game when the command hits the mouse with an odd number then if the player hits the even number the game will stop and start from the beginning.

After entering the commands and answer choices, the next development of the game will be made final adjustments to the level selection, playing time, etc. After the final adjustments, the game can be played, because this game uses the wordwall web application as the basis, the resulting game can be played with any device with the condition that the internet and web browser are available, besides that a game link is also needed to play the game. The game link can be shared after the game is created and saved by the game creator.

After the learning media has been developed, the next process is the validation process before being tested on students. The validation process is in the form of an assessment with a questionnaire by validators, namely media experts and material experts as examiners of the learning media developed. Learning media that can be tested later are learning media that have been validated by experts and get decent grades. Validation is carried out with the following results

**Table 2** Validation Results From Media Experts

| NO | ASSESSMENT ASPECTS | | INDICATORS | VALUE | | | |
|----|--------------------|---|------------|---|---|---|---|
| | | | | 4 | 3 | 2 | 1 |
| **1** | Display | 1 | *Attractive background* color composition | | √ | | |
| | | 2 | Interesting animations and images | √ | | | |
| | | 3 | Displayed image according to the material | | √ | | |
| | | 4 | The type and appearance of the fonts is not annoying | √ | | | |
| **2** | Audio | 5 | Proper use of *back sound* | | √ | | |
| | | 6 | Instrument music does not interfere with the material | √ | | | |

| NO | ASSESSMENT ASPECTS | | INDICATORS | VALUE | | | |
|----|-------------------|---|-----------|---|---|---|---|
| | | | | 4 | 3 | 2 | 1 |
| 3 | Content Standards | 7 | Easy-to-understand operating instructions | √ | | | |
| | | 8 | Rendering a coherent view | | √ | | |
| | | 9 | Easy to use program | √ | | | |
| | | 10 | Corresponding difficulty level | | √ | | |
| | | 11 | Challenging for students | | √ | | |
| | | 12 | Fun to play | √ | | | |
| Sum | | | | 24 | 18 | | |
| Final Percentage | | | | 87,5% | | | |
| Final Remarks | | | | Excellent | | | |

The implementation of validation by media experts resulted in a final score of 87.5%, indicating that learning media is included in an excellent assessment, although there are some inputs that require adjustments to learning media. The input from media experts is that the lack of number options in the game and also the speed or time in the game that is too slow will make the child less challenged, with this input the development is carried out by increasing the number option from the original 60 options to 100 options in the game and also increasing the speed of time in playing. The next process is the validation process from the material expert, in this validation will assess the scope of the material and the limits of the material to be included in the learning media. Validation from material experts is the same as validation from media experts using assessment questionnaires and generating the following values.

**Table 3** Validation Results from Material Experts

| NO | ASSESSMENT ASPECTS | | INDICATORS | VALUE | | | |
|---|---|---|---|---|---|---|---|
| | | | | 4 | 3 | 2 | 1 |
| **1** | Learning | 1 | Suitability of the material to learning | √ | | | |
| | | 2 | Ease of understanding the material | | √ | | |
| | | 3 | Clarity of the material | | √ | | |
| **2** | Content of the Material | 4 | Submission of material content | | √ | | |
| | | 5 | Collapse of the content of the material | | √ | | |
| | | 6 | Conformity of content to the question | √ | | | |
| | | 7 | The content of the material can increase students' knowledge | | √ | | |
| **3** | Effectiveness | 8 | The effectiveness of the presented material | √ | | | |
| | | 9 | The effectiveness of media by duration | √ | | | |
| **4** | Serving | 10 | The suitability of the material to the abilities of the student | √ | | | |
| | | 11 | Conformity of the material to the learning objectives | √ | | | |
| **Sum** | | | | **24** | **15** | | |
| **Final Percentage** | | | | **88%** | | | |
| **Final Remarks** | | | | **Excellent** | | | |

The validation process from material experts has given 88% score results with excellent information, providing a statement that the learning media developed is feasible and can be used in learning activities. The trial stage, after the development and validation stages are assessed by the validators, a trial will be held with students. The trial phase in this study was carried out with a limited trial using one class of second-graders in elementary school. The trial phase begins with a pre-test or initial test to the research subjects, namely second-grade elementary school students who are the sample of this study. Then the next process will be held a learning process with the concept of even odd numbers with the help of learning media that has been made, then at the end of the learning will be carried out post-test or final test on the sample involved. After the final test, the researcher will provide a questionnaire sheet for students to fill out, this questionnaire sheet is useful for taking data on the practicality of learning media that has been developed and applied to students in the learning process.

Questionnaire sheets for students are useful for testing the practicality of a learning medium. The questionnaire distributed has 10 questions to fill out by the sample. Filling the questionnaire resulted in a presestase of 97%, this result indicates that the practicality of the learning media is at a very good level. To find out the question items in the questionnaire, you can see the following table:

**Table 4** Student Questionnaire Results

| No. | Question | Overall Score |
| --- | --- | --- |
| 1 | *The design* used is attractive | 20 |
| 2 | *The font* of the writing on the learning media is clear | 19 |
| 3 | Instructions for use of learning media are clear | 20 |
| 4 | The image used is clear | 20 |
| 5 | The use of learning media is very easy | 20 |
| 6 | The language used is easy to understand | 17 |
| 7 | The delivery of material content through games is easy to understand | 19 |
| 8 | Can add experience for students | 19 |
| 9 | Love learning with interactive gaming Media | 20 |
| 10 | Learning media increases enthusiasm for learning | 20 |

The development of learning media has satisfactory assessment questionnaire results and is in a very good scope, in the questionnaire also states that the learning media developed into a learning media that increases student attention in the learning process and also increases student interest in learning the concept of even odd numbers. Play while learning is a learning approach that is very much in line with the learning characteristics of elementary school children (Chabib, 2017). Learning media can make it easier for students to understand the material (Rahmawati, 2018). The use of learning media can arouse desire and interest in learning (Afifah, 2019). The learning media developed also makes it easier for students to understand the concept of even odd numbers and increases the enthusiasm of students to learn new concepts.

The trial stage also produces a level of effectiveness of learning media, namely with pre-test and post-test results. The test given to related students consists of 8 questions containing a number for students to select the group of numbers that will be included in an even number or an odd number. The results obtained in the pre-test give an average score of 75. This result occurs because the mistake that is often made by students is in a number consisting of two numbers including odd and even numbers, such as the example numbers 23 and 12, students will be confused and often wrong in choosing, even though students can classify the numbers only with the numbers behind them. Furthermore, the results of the post-test carried out by students get an average score of 95, an increase of 20 points on average in this post-test, this result is influenced by the understanding embedded and found by students in the learning media developed. The average result of an increased score indicates that the effectiveness of learning media in the learning process is very high.

## CONCLUSION

Based on the results obtained and the discussion, research on the development of learning media using the ADDIE development method resulted in the conclusion that the media developed has been declared to be a valid, effective, and practical learning media. This conclusion is marked by the results of the trial conducted to get a percentage result of 97% in the practicality questionnaire by the sample and an increase in the average score of 20 points in the test conducted in the trial stage, in addition to the validity score results from media experts of 87.5% value and material experts of 88%.

Inetactive learning media can be used by teachers in the learning process, interactive games in the wordwall web application are very interesting and if used in learning it will attract the attention of students. Learning media based on the wordwal web application can be further developed with different materials and different ways as well, this requires the creativity of a teacher or media developer to take advantage of what is already there to become something useful in the world of education.

## REFERENCES

Afifah, N., & Hartatik, S. (2019). Pengaruh Media Permainan Ular Tangga terhadap Motivasi Belajar pada Pelajaran Matematika Kelas II SD Kemala Bhayangkari 1 Surabaya. *MUST: Journal of Mathematics Education, Science and Technology*, *4*(2), 209-216.

Agung, A.A.G. (2014). Buku Ajar Metodelogi Penelitian Pendidikan. Yogyakarta: Aditya Media Publishing.

Amir, A. (2016). Penggunaan media gambar dalam pembelajaran matematika. *Jurnal eksakta*, *2*(1), 34-40.

Arsyad, A. (2015). Media Pembelajaran (eighteen ed). Jakarta: PT. Rajawali.

Branch, R. M. (2009). Instructional Design-The ADDIE Approach. New York: Springer.

Chabib, M., Djatmika, E. T., & Kuswandi, D. (2017). Efektivitas pengembangan media permainan ular tangga sebagai sarana belajar tematik SD. *Jurnal Pendidikan: Teori, Penelitian, dan Pengembangan*, *2*(7), 910-918.

Febriyanto, B., Haryanti, Y. D., & Komalasari, O. (2018). Peningkatan pemahaman konsep matematis melalui penggunaan media kantong bergambar pada materi perkalian bilangan di Kelas II Sekolah Dasar. *Jurnal Cakrawala Pendas*, *4*(2), 32-44.

Indra, M.R. dan Ishnaningrum, I. (2015). "Efektifitas Penggunaan Media Ict dalam Peningkatan Pemahaman Konsep Matematika." Mifa Learning Journals. Vol 2, (3). hlm.198-199.

Lestari dan Yudhanegara. (2015). Penelitian Pendidikan Matematika. Bandung: PT. Refika Aditama.

Netriwati, M. S. L., & Lena, M. S. (2018). Media pembelajaran matematika. *Bandar Lampung: Permata Net.*

Nurisan, J. A. dan Agustin, M. (2013). Dinamika Perkembangan anak &Remaja Tinjauan Psikologi, Pendidikan dan Bimbingan (two ed). Bandung: PT. Refika Aditama.

Rahmah, N. (2013). Hakikat pendidikan matematika. *Al-Khwarizmi: Jurnal Pendidikan Matematika dan Ilmu Pengetahuan Alam*, *1*(2), 1-10.

Rahmawati, P. N., Sulaiman, S., & Siswoyo, A. A. (2018). Pengembangan Media Permainan Scrabble Berbasis Macromedia Flash Untuk Materi Menulis Karangan Sederhana Bahasa Indonesia Kelas III SDN Betiting. *Widyagogik: Jurnal Pendidikan dan Pembelajaran Sekolah Dasar*, *6*(1), 13-28.

Rohmadi. (2013).Penggunaan Media Gambar dalam Pembelajaran Matematika Untuk Meningkatkan Minat dan Hasil Belajar Berhitung Pada Siswa Kelas II Semester 2 SD Negeri 01 Ploso, Kecamatan Jumapolo, Kabupaten Karanganyar Tahun Ajaran 2012/2013, Skripsi : Universitas Muhammadiyah Surakarta

Susanto, A. (2014). Teori Belajar dan Pembelajaran di Sekolah Dasar. Jakarta: Kencana.

Susanto, A. (2016). Teori Belajar Pembelajaran. Jakarta: PRENAMEDIA GROUP

Siregar, S. (2013). "Meningkatkan Pemahaman dan Hasil Belajar Siswa Pada Mata Pelajaran Matematika dengan Menggunakan Software Graphmatica. Journal Penelitian, Vol 3, (1), hlm.1-9.

Tegeh, I. M., & Kirna, I. M. (2013). Pengembangan Bahan ajar metode penelitian pendidikan dengan addie model. *Jurnal Ika*, *11*(1).

Tresnanto, Edo. (2017). Pengembangan Media Cai Super-t Berbasis Aplikasi Android Materi Satuan Ukur Matapelajaran Matematika Kelas IV SD. Jurnal Penelitian Pendidikan Guru Sekolah Dasar, vol. 5, no. 3,

Wiyani, A. N. (2013). Manajemen Kelas Teori dan Aplikasi Untuk Menciptakan Kelas yang Kondusif. Yogyakarta: AR-Ruzz Media.