DEVELOPMENT OF SMART MATHEMATICS MONOPOLY MEDIA IMPROVE MATHEMATICS LEARNING OUTCOMES

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ABSTRACT---The purpose of this study was to determine the use of smart mathematic monopoly learning media able to improve student mathematics learning outcomes. This research uses the Research and Development (R&D) method. Development of smart mathematics monopoly learning media for flat figure material for Mathematics IV fourth grade subjects. The subjects of this study were all grade IV students of SD Negeri Adiarsa Barat II Karawang Barat with a total of 36 students. The results of the validation of the material experts and media experts were 78% with a decent category and the results of the students' responses were 91%, the student's post-test score was 81.39 and with the percentage value of 81% of students who got a score of ≥ 75, while the student's pre-test score was 60.83 with a percentage value of 25% of students who scored ≥ 75. It can be concluded that the learning media monopoly in smart mathematics flat grade material class IV, feasible and can improve mathematics learning outcomes flat grade material class IV SD Negeri Adiarsa Barat II. This research recommends that the school, especially teachers, be able to design and use creative and innovative learning media to increase student participation and improve student learning outcomes.

Keywords---Smart Mathematics Learning Media, Mathematics Learning Outcomes.

I. INTRODUCTION

In elementary school pupils and students in the given provision of basic capabilities such as skills, knowledge, and attitudes that are useful to themselves and the surrounding environment. Ability of skills, knowledge, and attitude should be applied in everyday life, especially for the study of mathematics is one of the useful knowledge to everyday life. In accordance with the opinion of Wijaya (2011: 8) students are not only required to solve a math problem, but students must be able to understand the meaning of a formula and apply it in our daily lives Moreover, mathematics also has many advantages compared to other sciences. Besides being flexible, mathematics can also keep up with the times. Moreover, in the present that everything can be done with computer technology. Mathematics became one language programs effectively and efficiently.

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Based on a preliminary study of researchers on November 26, 2018, in class IV SDN Adiarsa Barat II, showing that the facts in the field many students revealed that mathematics is learning that is less interesting, difficult, boring, and scary. Because this mathematical material learns the count material that must be mastered by students and students learn to reason from problem-solving material. Especially teaching from conventional teachers, only theories are taught in the absence of innovative and renewable learning media. By using learning media here can really help students to better understand and understand the learning taught by the teacher.

The purpose of this study, researchers wanted to produce a smart mathematics monopoly learning media product in mathematics subjects of grade IV SD Negeri Adiarsa Barat II. And want to know the use of the smart mathematics monopoly learning media can improve learning outcomes in mathematics subject class IV SD Negeri Adiarsa Barat II.

Learning media is very meaningful for the continuity of teaching and learning in class and learning media are physical tools that contain instructional material that can arouse students' enthusiasm. Benefits or function of learning media to align opinions between the massage giver and receiver of the message and also the function of learning media to attract students' attention when learning so that students do not get bored or misunderstood from what the teacher conveys.

The game is something fun done on their own volition, the game has certain rules to achieve the objectives of the game and games that contain educational elements will take students longer to remember the knowledge of the game. The game has several components namely the presence of players, the environment, the rules of the game, the purpose of the game. The monopoly game developed by researchers is named the smart mathematics monopoly which aims to improve student learning outcomes in mathematics subject matter in flat shapes.

II. LITERATURE REVIEW

Good learning media can be said when aligned with the learning objectives so that the media selection must be rigorous and relevant learning to the learning objectives and learning materials. Innovative learning media that can attract the attention of students so that it can improve memory in mastering a subject matter.

Learning media itself can be interpreted as something that delivers learning messages between the message giver to the recipient of the message (Anitah, 2010: 4). This can be said that the media as an introduction or intermediary to deliver messages from a teacher to students. As expressed Hamdani (2011: 243) revealed the media is a part of learning or physical tools that contain instructional material in the student environment that can stimulate students to participate actively in learning. As is the case with Kustandi and Sutjipto (2011: 9) expressing learning media is a tool that can help the teaching and learning process and serves to clarify the meaning of the message conveyed, so that learning objectives are conveyed properly. Learning media have benefits or functions that affect teaching and learning activities in the classroom. In accordance with what was revealed by Sanjaya (2013: 169), the media has a function or benefit to respond to certain objects or events, falsify the circumstances of certain events or objects, increase the enthusiasm and motivation of student learning.

Choosing the right media must meet the requirements for media selection and Sudjana and Rivai (2017: 4) say that the conditions for choosing media are in line with the learning objectives and lesson content, ease of obtaining media, teacher skills in using it, availability of time to use it, and according to the stage of thinking of students according to their level. In line with the opinion of Susilana and Riyana (2007: 68-69) general requirements in choosing learning, media are to align with learning objectives, align with teaching materials, align with student characteristics, align with student learning styles, and align with the conditions of the community.

Monopoly games can be used as learning media. Monopoly games are developed to become a medium in learning and are used as actions to improve student learning outcomes. Apart from that, the monopoly game as a learning medium has benefits that are training motor skills, training concentration, training the ability of insight, developing the ability to solve problems, and increase self- confidence. This monopoly game includes visual media in the form of games. This monopoly game has characteristics that are suitable for elementary school students to play with. The purpose of the monopoly game as a learning medium so that students get a pleasant learning experience and students become aware of what they have learned that day. And students are more disciplined in carrying out the rules or rules that apply.

Nur Azizah and Julianto (2013: 3) the notion of monopoly is the media wrapped in games played by 2-4 students and modified according to the concept of the material being taught. The tools of this game are a set of rupiah denomination toys, a set of general knowledge cards, a set of chance cards, a set of dice, a set of toy houses and hotels, a set of pioneers, and a set of modified rules of the game. The rules of this monopoly game are played by 2-5 people around the monopoly board and the player has a piece that will be played based on the number of dice that are thrown if the eye of the chest is the same, then will get one more chance, starting from the starting box.

The purpose of the monopoly game itself according to Husna (2009: 152) is to teach business and know trade activities, such as paying taxes, how to sell and pawning land. The rules of this monopoly game according to Husna (2009:

151) each player is given money by the bank with the same amount, each player throws two dice in turn to move the pieces, if he lands on a plot that is not yet owned by his opponent, then the player can buy these plots in accordance with the prices listed. If the plot is already owned by the co-star, the player must pay a fixed amount of rent. If a player stops on a public fund or chance card then they take the top card and follow the instructions.

In everyday life indirectly requires skills in arithmetic. Mathematics is a subject that is available at every stage of the school. Especially in elementary school, students learn basic mathematics in their daily lives. Likewise, according to Wahid (2013: 28) revealed mathematics is a science that studies abstract science that is deductively patterned and can also be proven valid.

Mathematics has its own language consisting of numbers and symbols. Piaget (in Pitadjeng, 2015: 37) learning mathematics has several stages to be developed, namely: (a) Concrete, the stage undertaken by children to utilize direct experience or use real objects, (b) Semi-concrete, a stage that is no longer need to use real objects again, but enough with a description of the object in question, (c) Semi-abstract, the stage of seeing symbols instead of images to be able to think abstractly, and (d) Abstract, the stage of seeing signs or symbols, reading or listening with verbal way and no need to use concrete objects.

Mathematics is the same as other subjects that have their own learning goals. The purpose of mathematics is to give students the ability to think rationally, systematically, critically, and creatively. In addition, the Mathematical Sciences Education Board-National Research Council (in Wijaya, 2011: 7) revealed the purpose of mathematics is for the purpose of practical development of students in applying mathematics in solving everyday problems, social goals to develop student competencies for active participation in social life, this professional goal is oriented to prepare students in the world of work, the purpose of culture is to make students part of a human culture so that it plays a role in developing culture. As we know that the objects in mathematics are abstract, thus enabling the attainment of different stages of people.

Improving learning outcomes is a measure of how far students master learning that has already taken place. Learning outcomes are something that students get after participating in the learning process. According to Kunandar (2007) "learning outcomes are the ability of students to meet a stage of achieving the learning experience in one basic

competency". According to Abdurrahman (2003), "learning outcomes are abilities acquired by children after going through learning activities". Meanwhile according to Romiszowski (in Abdurrahman, 2003) states that: "Learning outcomes are the output (output) of an input processing system (input). Input from the system in the form of a variety of information while the output is an act or performance (performance)".

According to Bloom (in Suprijono, 2011) states that: Learning outcomes include cognitive, affective, and psychomotor abilities. The cognitive domain is knowledge (knowledge, memory), comprehension (understanding, explaining, summarizing, examples), application (applying), analysis (describing, determining relationships), synthesis (organizing, planning, shaping, new buildings), and evaluating (evaluating). Affective domain is receiving (receiving), responding (giving response), valuing (value), organization (organization), characterization (characteristics). The psychomotor domain includes productive, technical, physical, social, managerial, and intellectual skills.

III. RESEARCH METHOD

This research uses the Research and Development (R&D) method which is the result of this research in the form of a product or testing the effectiveness of the product (Sugiyono, 2015: 407). The product developed in this study is in the form of instructional media in the form of a smart mathematics monopoly. The place of research is at SD Negeri Adiarsa Barat II, Jalan Cisokan Raya, Adiarsa Barat Village, Karawang Barat District, Karawang Regency.

The steps applied in this research in developing smart mathematics monopoly learning media are limited to the 6th step that has been modified by Sugiyono namely, 1) Potential and Problems; 2) Data Collection; 3) Product Design; 4) Design Validation; 5) Design Revision; 6) Product Testing and Final Results.

The instrument used in this study was the expert test questionnaire and student responses were given based on the instrument grid. Data collection techniques in this study used a questionnaire, tests, interviews, and documentation. Data analysis of the process of developing learning media in the form of Monopoly Smart mathematics, namely analyzing the feasibility of expert testing, analyzing student responses, and analyzing learning outcomes.

Penelitian ini menggunakan metode *Research and Development (R&D)* yang merupakan hasil dari penelitian ini berbentuk produk atau menguji keefektifan produk (Sugiyono, 2015: 407). Produk yang dikembangkan dalam penelitian ini berupa media pembelajaran yaitu berbentuk monopoli *smart mathematics*. Tempat penelitian adalah di SD Negeri Adiarsa Barat II Jalan Cisokan Raya Kelurahan Adiarsa Barat Kecamatan Karawang Barat Kabupaten Karawang.

Langkah-langkah yang diterapkan dalam penelitian ini dalam mengembangkan media pembelajaran monopoli *smart mathematics* dibatasi sampai langkah ke-6 yang telah dimodifikasi oleh Sugiyono yaitu, 1) Potensi dan Masalah; 2) Pengumpulan Data; 3) Desain Produk; 4) Validasi Desain; 5) Revisi Desain; 6) Uji Coba Produk dan Hasil Akhir.

Instrumen yang digunakan dalam penelitian ini adalah angket uji ahli dan respon siswa ini diberikan berdasarkan kisi-kisi instrumen. Teknik pengumpulan data dalam penelitian ini menggunakan angket, tes, wawancara, dan dokumentasi. Analisis data proses pengembangan media pembelajaran dalam bentuk Monopoli *Smart mathematics* yaitu menganalisis kelayakan uji ahli, menganalisis respon siswa, dan menganalisis hasil belajar.

IV. RESULTS AND DISCUSSION

This smart mathematics monopoly media was developed through several steps, starting from finding potentials and existing problems, collecting data by giving questionnaires to student responses, interviews with class teachers, learning achievement tests, product design, product design validation, product design revisions, trials products, and the final result, namely the smart mathematics monopoly learning media, is suitable for the learning of class IV flat material. The results of the design validation test for material and media experts are as follows.

Table 1. Expert Validation Results

Result Validation	Percentage (%)	Category
Material Expert	72	Decent
Media Expert	84	Very Decent
Average score of	**78**	**is decent**

The table above shows the results of expert validation based on the average percentage. On the results of the validation of material experts by 72% included in the category "Eligible" meaning that the material in the learning media of smart mathematics monopoly is in accordance with the subject matter implemented by the teacher and in accordance with the expected learning objectives. The results of the media expert validation of 84% are included in the "Very Eligible" category. This means that the smart mathematics monopoly media can be used as a medium in the learning process and has interesting rules that are adjusted to the development of students in elementary schools.

Furthermore, this product trial is carried out to determine the extent of the feasibility of the product developed by researchers. In this trial, students are given a questionnaire of student responses to the learning media of smart mathematics monopoly. The following data are the results of student responses.

Table 2. Data on Student Response Results

Criteria	Evaluating Student Responses
Conformity with Material	491
Ease of understanding	476
Attractive shapes and colours	498
Ease of use	486
The concept of learning while playing	510
Explanation of material in flat shape can be understood	476

Active learning	338
Total score	**3275**
Average score	**467,86**
Score percentage (%)	**91%**
Material Quality Category	**Very Decent**

Based on the results of the table above, the total score of student responses is 3275 out of 20 questions and form 36 students. The average score of 467.86 and a high percentage of scores which is 91% included in the category "Very Eligible". Filling out the student response questionnaire after students play the smart mathematics monopoly.

This learning outcome data obtained from the results of the pre-test and post-test. Pre-test before students use the smart mathematics monopoly media and post-test after students use the smart mathematics monopoly media. The following data are student learning outcomes before and after using smart mathematics monopoly learning media.

a.   Pre-test data

Tabel 3. *Pre-test* Data

No	score	Total Student	Persentase
1	30	2	6%
2	35	2	6%
3	40	6	17%
4	50	2	6%
5	55	1	3%
6	60	1	3%
7	65	3	8%
8	70	10	28%
9	75	3	8%
10	80	5	14%
11	85	1	3%
Total	**2190**	**36**	

Average	**60,83**

From the data obtained, the average value of students reached 60.83 with a minimum completeness criterion of 75. The number of students who reached KKM were 9 students with a percentage of 25% and those who had not yet reached KKM were 27 students with a percentage of 75%.

b.   Post-test data

Tabel 4. *Post-test* Data

No	score	Total Student	Persentase
1	50	2	6%
2	55	2	6%
3	60	6	17%
4	65	2	6%
5	75	1	3%
6	80	1	3%
7	85	3	8%
8	90	10	28%
9	95	3	8%
Total	**2930**	**36**	
Average			**81,39**

From the data obtained the average value of students reached 81.39 with a minimum completeness criterion of 75. The number of students who reached KKM was 29 students with a percentage of 81% and students who had not yet reached KKM were 7 students with a percentage of 19%.

The development of the smart mathematics monopoly learning media on flat grade IV grade material in SD Adiarsa Barat II can be categorized as "Eligible" to be used in the field with a percentage of 78% and can improve learning outcomes by 81.39 with a percentage value of 81% of students getting a grade of ≥ 75 Development of learning media for smart mathematics monopoly facilitates teachers in learning. It is hoped that by using this media students can easily understand class IV flat material. This research produces a product in the form of learning media that is developed in accordance with the problems that exist in elementary school education units, especially in class IV. The resulting product

is called the Monopoly Smart Mathematics media which is devoted to the flat grade IV grade material of elementary schools. The concept of the Smart Mathematics Monopoly media is almost the same as the monopoly game in general, but what distinguishes it from the general monopoly is that every game carried out by students is related to the subject matter of mathematics on the material flat build. With the Smart Mathematics Monopoly learning media can improve student learning outcomes in mathematics subject matter flat build, this is because students feel better understand the material being studied with the help of interesting media and students are directly involved in it in a game.

V. RECOMMENDATION

Based on the development of this smart mathematics monopoly learning media product, the researcher makes the following recommendations:

1. Teachers are expected to design creative and innovative learning media so that students do not feel bored during the learning process, and can improve student learning outcomes especially in mathematics,

2. The teacher must create an interesting learning process for students by using innovative learning media in accordance with the progress of science and technology that is increasingly developing.

3. Principals or leaders of educational institutions should facilitate teachers and students in learning in order to have quality human resources.

VI. CONCLUSION

The monopolistic learning media of smart mathematics in this flat structure material can improve mathematics learning outcomes in flat figure material class IV SD Negeri Adiarsa Barat II with an average value of 81.39 and with a percentage value of 81% of students who get a score of $\geq$ 75 while the pre- test scores grade IV-A students at SD Adiarsa Barat II Elementary School have an average value of 60.83 with a percentage value of 25% of students who scored $\geq$

75. And from the results of these student learning, it can be concluded that the learning media monopoly in smart mathematics in flat class material IV, feasible and can improve mathematics learning outcomes flat material grade IV SD Negeri Adiarsa Barat II.

To improve student learning outcomes, especially in mathematics, teachers are expected to use innovative media so that students do not feel bored quickly when studying. To get a pleasant learning experience for students, teachers or prospective teachers should prepare a learning design and innovative learning media in accordance with the progress of this increasingly advanced science and technology. To provide a pleasant learning experience, it is expected that school principals or leaders of educational institutions should facilitate teachers and students in learning in order to have quality human resources.

REFERENCES

[1]   Abdurrahman, M. (2003). Education for Children with Learning Difficulties.
[2]   Jakarta: PT Rineka Cipta.
[3]   Anitah, S. (2010). Learning Media. Surakarta: Yuma Reader
[4]   Azizah, N, and Julianto. (2013). The Application of Monopoly Media to Improve Student Learning Outcomes in Science Subjects in Primary Schools. JPGSD UNESA. 1 (2) 1-12
[5]   Hamdani. (2011). Teaching and Learning Strategies. Bandung: Loyal Reader. Husna, A. (2009). 100+ Traditional Games. Yogyakarta: CV Andi Offset.

[6]   Kunandar. (2007). Professional Teachers Implement Education Unit Level Curriculum (SBC) and Succeed in Teacher Certification. Jakarta: PT RajaGrafindo Persada.

[7]   Kustandi, C and Bambang Sutjipto. (2011). Learning Media: Manual and Digital.

[8]   Bogor: Ghalia Indonesia

[9]   Pitadjeng. (2015). Fun Mathematics Learning. Yogyakarta: Graha Science. Sanjaya, W. (2013). Standardized Process Education Learning Process. Jakarta:

[10]   Kencana Prenadamedia Group.

[11]   Sudjana, N and Ahmad Rivai. (2017). Teaching Media. Bandung: Sinar Baru Algensindo.

[12]   Sugiyono (2015). Educational Research Methods Quantitative, Qualitative, and R&D Approaches. Bandung: Alfabeta.

[13]   Suprijono, A. (2011). Cooperative Learning (Theory and Application of PAIKEM). Yogyakarta: Student Library.

[14]   Susilana, R and Cepi Riyana. 2007. The Nature of Learning Media, Development.

[15]   Utilization and Assessment. Bandung: CV. Prima Discourse.

[16]   Wahid, A. M. (2013). Improving Mathematics Learning Outcomes in Fractional Materials Through the Application of the Pakematic Approach of Grade V Students of SD Negeri 1 Pengasih, Kulon Progo Regency. Thesis. Yogyakarta: Yogyakarta State University.

[17]   Wijaya, A. (2011). Realistic Mathematics Education, An Alternative Approach to Mathematics Learning. Yogyakarta: Graha Science.