DEVELOPMENT OF SMOJO.AI WEBSITE-BASED MATH LEARNING MEDIA ON THE TOPIC OF 3D FLAT SHAPES TO IMPROVE STUDENT LEARNING OUTCOMES

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Abstract

Student learning outcomes in the field of mathematics are still relatively low with several contributing factors such as the quality of teachers, the use of technology and the lack of understanding of basic mathematical concepts. Teachers can improve student learning outcomes by utilizing technology-based learning materials. One of the media that can be used is website-based learning media, namely media that provides learning materials, learning activities and various other supporting features to support the learning process. Smojo.Ai is an example of website-based learning media that can be used by teachers in the classroom. This study aims to produce a smojo.ai website-based math learning media product on the topic of 3D flat shapes that is feasible, effective and can improve student learning outcomes in the cognitive aspect. The results showed that the learning media products produced were categorized as feasible to use based on the validation assessment by media experts with a percentage assessment of 80% with a good category and an assessment by material experts with a percentage assessment of 89.4% with a very good category. The resulting media product is considered effective based on the results of the teacher practicality test assessment and student response questionnaire with a score of 95% and 86.25% with a very practical category. This learning media product is also proven to be able to improve student learning outcomes on cognitive aspects with an average pre-test score of 34.86 and an average post-test score of 74.89.

Keywords: mathematics learning media, smojo.ai website, 3D flat shapes, student learning outcomes.

Abstrak

Hasil belajar siswa pada bidang matematika masih tergolong rendah dengan beberapa faktor penyebab seperti kualitas guru, penggunaan teknologi dan kurangnya pemahaman konsep dasar matematika. Guru dapat meningkatkan hasil belajar siswa dengan memanfaatkan materi pembelajaran berbasis teknologi. Salah satu media yang bisa digunakan adalah media pembelajaran berbasis website, yaitu suatu media yang menyediakan materi pembelajaran, aktivitas pembelajaran, dan berbagai fitur pendukung lainnya untuk menunjang proses pembelajaran. Smojo.Ai merupakan salahsatu contoh media pembelajaran berbasis website yang dapat digunakan oleh guru di kelas. Penelitian ini bertujuan untuk menghasilkan sebuah produk media pembelajaran matematika berbasis website smojo.ai pada materi bangun ruang sisi datar yang layak, efektif dan dapat meningkatkan hasil belajar siswa pada aspek kognitif. Hasil penelitian menunjukkan bahwa produk media pembelajaran yang dihasilkan dikategorikan layak digunakan berdasarkan penilaian validasi oleh ahli media dengan presentase penilaian sebesar 80% dengan kategori baik dan penilaian oleh ahli materi dengan presentase penilaian sebesar 89,4% dengan kategori sangat baik. Produk media yang dihasilkan dinilai efektif berdasarkan hasil penilaian uji kepraktisan guru dan angket respon siswa dengan perolehan nilai sebesar 95% dan 86,25% dengan kategori sangat praktis. Produk media pembelajaran ini juga terbukti dapat meningkatkan hasil belajar siswa pada aspek kognitif dengan rata-rata nilai pre-test 34,86 dan rata-rata nilai post-test sebesar 74,89.

Kata kunci: media pembelajaran matematika, *website smojo.ai*, bangun ruang sisi datar, hasil belajar siswa.

INTRODUCTION

Mathematics learning is very important to improve students' ability to think logically and analytically as well as their critical and analytical abilities in solving problems in various areas of life, such as technology, science, economics and business. Apart from that, mathematics also involves logic and deduction, which helps in honing one's logical and analytical thinking skills. However, students often have difficulty understanding abstract mathematical concepts and this can lead to poor mathematics learning outcomes for them. According to Nabillah & Abadi (2019) poor mathematics learning outcomes are influenced by two things. The first consists of internal factors, which are caused by the students themselves and include things such as a lack of desire and interest in mathematics education. The second consists of external factors, such as the teacher's lack of interest in students. According to Hudojo (2015) the quality of mathematics teachers, including understanding concepts, mastery of material, and good teaching skills, is very important in improving students' mathematics abilities. According to Fauzan (2018) the use of technology can increase students' interest and understanding in learning mathematics. However, lack of access and limited use of technology in schools can be an obstacle in improving student mathematics learning outcomes. Soedjadi (2017) states that one of the factors why students fail in mathematics is a lack of understanding of basic concepts. Wardani et al., (2022) also stated that the lack of innovative learning media can cause the implementation of learning to become monotonous and have a negative impact on the development of students' mathematical communication skills. Of course, some of the causes described can also influence low student learning outcomes.

Putri et al. (2022) stated that learning media is an important part of learning because it helps teachers convey material in a way that is easy to understand and simple. Website-based learning media itself is a media that provides learning materials, learning activities, and various other supporting features to support the learning process. Some examples of website-based learning media include: Khan Academy, Google Classroom, Edmodo, Moodle, Smojo.AI and so on.

Smojo.ai is an online learning media that provides various tools and features to support interesting and interactive learning. By utilizing sophisticated web technology, website-based learning media can present mathematics materials visually, interactively, and easily accessible

to students. This can make it easier for students to understand mathematical topic such as 3D flat shapes. According to the KBBI, a 3D flat shape is a shape whose entire side is a flat plane. Rosmiati (2021) says that "3D flat shapes are shapes where each surface is a polygon and can be grouped into three types, namely polyhedrons, prisms and pyramids. Satriawati, Dwirahayu and Mardiyah (2021) describes a flat shapes as a 3D that has volume or content and is flat, not curved.

Based on the background above, the formulation and limitations of the problem to be studied are: What is the feasibility, effectiveness and whether the development of mathematics learning media based on the website smojo.ai can improve student learning outcomes in the cognitive aspect?

Based on the problem formulation and limitations, the objectives of this research are: To determine the feasibility, effectiveness and whether the development of mathematics learning media is based website smojo.ai. This can improve student learning outcomes in the cognitive aspect.

Some of the research benefits that will be obtained include: (1) By utilizing mathematics-based learning media website smojo.ai. It is hoped that this will help develop more modern and effective learning, increase student learning motivation, increase the accessibility of mathematics education, and provide a research platform for the development of mathematics learning theory and methodology; (2) It is hoped that the results of this research can help improve the quality, efficiency and engagement in mathematics learning, as well as strengthen educational inclusion and student learning experiences.

METHODS

The subjects in this research were class VIII students at SMPN Satu Atap 02 Jasinga with a total of 36 students. This research is the development of mathematics based learning media website smojo.ai with various supporting features such as providing materials, explanatory videos, calculating machines, and quizzes. The research design and procedures in this study used the ADDIE research design. The abbreviation ADDIE itself refers to five main stages in the development process namely Analyze, Design, Development, Implementation and Evaluation.

The instruments used include interview texts, test instruments, expert validation questionnaires and practitioner test questionnaires with data analysis using the Shapiro-Wilk

normality test and hypothesis testing using the Paired Sample-T-Test with a total sample of 36 class VIII students at SMPN Satu Atap 02 Jasinga.

RESULTS AND DISCUSSION

The results of the interview show that at SMPN Satu Atap 02 Jasinga they still use the 2013 curriculum and some of the current learning needs are teaching materials that use technology that are interesting, practical and help students learn independently. The product developed is mathematics-based learning media website smojo.ai on the topic of 3D flat shapes which provides topic starting from the definition, characteristics, nets, surface area and volume of 3D flat shapes starting from cube, cuboid, triangular prism, triangular pyramid and square pyramid. In addition, an automatic calculator calculation feature is provided to calculate the surface area, volume and blanket area of 3D flat shapes and provides explanatory video references on the topic of 3D flat shapes taken from YouTube. Complete learning media can be accessed using the following link: https://app.smojo.org/anggiardini13/PenelitianUntirta2024

Here are some media displays resulting learning:

Figure 1. Opening of Learning Media

Figure 2. Main Menu Display

Figure 3. Cube Material Menu Display

Figure 4. Prism Material Menu Display
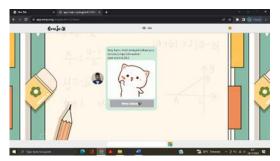

Figure 5. Calculation Menu Display

Figure 6. Closing view of learning media

The resulting learning media is categorized as Very Good and suitable for use with a material expert validation assessment percentage of 89.4% with a total score of 85 and a media expert validation assessment percentage of 80% with a total score of 80. The results of the practicality assessment show that the media that has been created is categorized as Very Practical with an assessment score of 57 with an assessment percentage of 95%. The results

of the validity test assessment by material experts and media experts can be seen in the table below:

Table 1. Material Expert Assessment

Number	Indicator	Score	%	Criteria
1	Appropriateness Contents	49	89%	Very Good
2	Appropriateness Presentation	18	90%	Very Good
3	Appropriateness Language	18	90%	Very Good
	Total			85
	Percentage			89,4%
	Category			**Very Good**

Table 1. Media Expert Assessment

Number	Indicator	Score	%	Criteria
1	Programming	49	89%	Good
2	Graphics	18	90%	Good
3	Convenience	18	90%	Good
	Total			80
	Percentage			80%
	Category			**Good**

The results of the validity test of the test instrument from the 25 questions tested showed that 20 questions were categorized as valid with a percentage of (80%). And the questions that were categorized as invalid were 5 questions with a percentage of (20%). The reliability test results of 20 valid test items found value Cronbach's Alpha amounting to 0.833 and this value is greater than 0.70 so that the item can be categorized as reliable. The differentiating power of the questions, of the 25 items presented, most of them were categorized as good, item numbers 5, 7 and 13 were in the quite good category, item numbers 3, 6, 8 and 12 were in the bad category, and item number 14 is in the very bad category. And it is known that each question has a medium level of difficulty and only question number 14 is included in the easy category. The results of data analysis testing can be seen in the table below:

Table 2. Validity Test of Test Instruments

Validity	Question Items	Total	%
Valid	1, 2, 4, 5, 7, 9, 10, 11, 13, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24.	20	80%
No Valid	3, 6, 8, 12, 14	5	20%

Table 3. Reliability Test of Test Instruments

Amount Question	Cronbach's Alpha	r_{table}	Explanation
20	0,833	0,70	**Reliable**

Table 4. Differential Power of Test Instrument Questions

Different Power	Question Items
Very Bad	14
Bad	3, 6, 8, 12
Enough	5, 7, 13
Good	1, 2, 4, 9, 10, 11, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25
Very Good	-

Table 5. Test Instrument Difficulty Index

Index Difficulty	Question Items
Easy	14
Medium	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17. 18, 19, 20, 21, 22, 23, 24, 25
Hard	-

Based on the results of the normality test, it is known that the value is significant in the results pre-test obtained a significance value of 0.562 and at value post-test obtained a significant value of 0.119. These results show that the value is significant pre-test and posttest > 0.05, with this the data tested is normally distributed. The results of the normality test can be seen in the table below:

Table 6. Normality Test Results

Test	Shapiro-Wilk		
	Stats.	df	Sig.
Pre-test	.975	36	.562
Post-test	.952	36	.119

The results of hypothesis testing show that there are significant differences in learning outcomes regarding the use of mathematics-based learning media website smojo.ai before

and after. Based on the results of test analysis paired sample t-test, then the result can be obtained that h > namely 25.765 > 2.030108 then with the result. This 0 rejected and 1accepted. Based on the table image above, it shows that the mean value at pre-test of 34.86 and the mean value at post-test amounting to 73.89 with a 2 tailed significance value of 0.000 < 0.05. The test results table can be seen in the image below:

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre_Test	34.86	36	15.189	2.531
	Post_Test	73.89	36	11.471	1.912

Figure 7. Paired Sample T Test Statistics

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Pre_Test & Post_Test	36	.803	.000

Figure 8. Paired Sample T Test Correlation

It can be concluded that there is a significant influence from the use of mathematics-based learning media website smojo.ai to improve student learning outcomes in cognitive aspects.

Apart from that, based on the results of the student response questionnaire assessment, a total score of 3105 was obtained with an assessment percentage of 86.25%. With these results, the practicality test assessment of mathematics learning media is based website smojo.ai categorized as Very Practical and easy to use in the learning process. The results of the practicality test can be seen in the table below:

Table 7. Practicality Test Results

Number	Indicator	Score	%	Criteria
1	Satisfaction and Effectiveness	937	89%	Very Good
2	Creative and Interactive	776	90%	Very Good
3	Efficient and Usefulness	1088	90%	Very Good
4	Learning	304	80%	Good
	Total			3105
	Percentage			86,25%
	Category			**Very Praktis**

CONCLUSION

The learning needs of students at SMPN Satu Atap 02 Jasinga are still not sufficient to be said to be met based on the results of the interviews. This research produces a mathematics-based learning media product website smojo.ai on the topic of 3D flat shapes. The resulting product is categorized as valid and suitable for use with a media expert assessment percentage of 80% in the good category and a material expert assessment percentage of 89.4% in the very good assessment category. The learning media developed was proven to be effective in assisting the learning process for students with a percentage of product practicality value of 95% in the very practical category and a percentage of practicality value from student responses of 86.25% in the very practical category. The resulting learning media has been proven to improve student learning outcomes in the cognitive aspect. Proven by the results of data collection research pre-test and post-test between before and after using mathematics learning media based on the Smojo.AI website. Results pre-test shows that the average score of students before using the resulting learning media product is 34.86 out of 100 and the average score post-test after using learning media products the result was 73.89 out of 100. This shows a significant increase in student learning outcomes in the cognitive aspect.

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