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Article

Development of Number Pocket Media and Driking Straws Contexting Moral Creeds to Improve Understanding Number Concepts

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ABSTRACT

Mathematics learning is very important in everyday life as a means of improving mindset in the process of learning mathematics. However, there are still obstacles in the process of learning mathematics, one of which is related to the lack of understanding of students in the material on determining symbols and names of numbers, obstacles related to morals, namely the lack of politeness in the attitudes and behavior of students, and the lack of learning media that support teaching and learning activities. This study aims to (1) determine the validity and reliability of the number bag media and *drinking straws* in the context of faith and morals to improve understanding of number concepts; (2) the practicality of the number bag media and *drinking straws* in the context of faith and morals to improve understanding of number concepts; and (3) to determine the effectiveness of the number bag media and *drinking straws* in the context of faith and morals to improve understanding of number concepts. This type of research is *Research and Development* by taking several steps from the ADDIE model. The study was conducted at MI Ma'arif Patihan Wetan class 1 with a total of 35 students. Where 10 students as a limited scale trial, and 25 students as a large scale trial. The results of this study are (1) The learning media product is declared valid with improvements so that the learning media is suitable for use. (2) The learning media product is declared very practical in learning activities according to the distribution of teacher and student practicality questionnaires. (3) The learning media product is declared quite effective in improving understanding of number concepts according to the results of the Paired Sample T-Test, and the results of the N-Gain score test on the limited scale trial obtained 41% and the large scale test obtained 56%.

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INTRODUCTION

Mathematics has developed rapidly among the basic sciences in terms of content and application in recent years. Mathematics is defined as the science of numbers, relationships between numbers, and operational processes used to solve number problems in Indonesian. As a basic science, mathematics is important for everyday life as well as the advancement of science and technology. This is based on the idea that every student must have a strong understanding of mathematics because of the rapid advancement of technology . Mathematics not only helps students fulfill their educational roles, but

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also helps develop critical and creative thinking skills in students. It is clear that understanding concepts and theories is essential for problem solving when learning mathematics (Akulia, 2019).

Based on the results of observations and interviews with Mrs. Siti Masruroh as the homeroom teacher of class 1 Mi Ma'arif Patihan Wetan, the researcher obtained information that there are problems that are often faced by students during the learning process, one of which is a problem related to mathematics, namely the lack of understanding of students regarding the material on determining symbols and names of numbers , there are also problems related to morals, namely the lack of politeness in terms of attitudes and behavior of students, and the lack of learning media that support increasing understanding of concepts in determining symbols and names of numbers. So that these problems can affect the low understanding of the concept of numbers of students (Masruroh, 2023). According to Widyastuti, education also influences attitudes and behavior in the process of maturing. Therefore, education that teaches Islamic values and can form a personality with character, noble character and civilized is in the lesson of faith and morals (Widyastuti, 2016).

In this study, the researcher developed a learning media based on the needs and analysis of students by focusing on the context of faith and morals on Asmaul Husana. The values of Asmaul Husana can be integrated into the learning process, especially in mathematics learning. In other words, through mathematics learning, religious values can be instilled in students. Therefore, a mathematics learning is needed that integrates Islamic values into school mathematics topics. At least, this learning resource in the form of a number bag is more valuable than other media currently used. One of them is Asmaul Husana which teaches good morals in all things, in line with the educational norms recommended by the Qur'an in the lessons of faith and morals. Especially in developing the habit of memorizing Asmaul Husana, the use of religious-nuanced mathematics media can encourage students to connect mathematics topics and habits that arise in everyday life. In line with the statement above, to optimize learning objectives to maximize students' understanding of the concept of symbols and number names, through fun and interesting learning media and activities, it is hoped that the learning can run conducively, without causing boredom, fatigue, and a sense of coercion in students.

As for the research that is relevant to the background of the problem encountered by the researcher, such as the research conducted by Aida Masruro at the Sunan Ampel State Islamic University, Surabaya. The study stated that Islamic-nuanced mathematics learning media that integrates the verses of the Qur'an on the subject of sets is able to contribute to developing students' knowledge in terms of Islam and can be applied in everyday life, and has been tested for its feasibility by material, media and language experts. Then the results of the study are that mathematical set material can be effectively used in the learning process. The development of this mathematics learning media needs to be continued because it will add variety or form to mathematics itself and the development of students' mathematics learning resources (Masruro, 2019).

Number bag media and *drinking straws* is a wooden media in the form of a box with four pockets that are attached and decorated with various interesting designs. While *the drinking straws* are used as fillers to show how many numbers need to be calculated using the available pockets as a guide. The number pocket media and *drinking straws* help students perform mathematical operations more easily and are useful for understanding the symbols of a number and place value (Latifah, 2020). The choice of material to determine the symbols and names of numbers is a basic concept in mathematics that underlies all branches of mathematics. The material to determine the symbols and names of numbers can train students and is able to improve their general understanding of concepts in number material in the form of concrete truths. Students are expected to be able to link mathematics learning with the Islamic context, so that in learning activities they can improve understanding of the material and furthermore, namely students' understanding of concepts.

Understanding the concept is a very important first step as a basis for learning mathematics. Researchers can conclude that understanding the concept of mathematics is the ability of students to interpret a concept with their own knowledge. In addition, students can determine and explain the relationship between concepts and other concepts. Thus, in the research on the development of number bag media and *drinking straws* in the context of morality, the researcher used the R & D (*Research and Development*) development research method. *Research and Development* (R & D) is a process or steps to develop a new product or improve an existing product. Based on the references I have, this method is a method that shows good results, where in this study it is possible to produce new solutions or innovations that can make a real contribution to overcoming problems that have been identified in

previous studies. This method is considered effective in applying theoretical knowledge into a practical context, and can bridge the gap between what happens in educational research and educational practice where the media products in this study will be implemented into learning in schools. So that it can answer the problems in this study (Sugiyono, 2017) .

Based on the background above, the researcher finally found one of the focal points of learning in Madrasah Ibtidaiyah to develop a product in the form of learning media for number bags and *drinking straws* in the context of faith and morals. The difficulty of combining religious knowledge with mathematics. However, this is necessary because all knowledge is essentially the same, namely originating from Allah SWT, and studying it together in a related way will make it even more beautiful. Therefore, the researcher tried to develop mathematics learning media with a study entitled: "Development of Number Bag Media and *Drinking Straws* in the Context of Faith and Morals to Improve Understanding of Number Concepts in Grade 1 MI Ma'arif Patihan Wetan".

METHOD

This research was conducted in MI Ma'arif Patihan Wetan class 1 with a total of 35 students. Where 10 students as a limited scale trial, and 25 students as a large scale test. In the research on the development of learning models, the researcher used the R&D (*Research and Development*) research and development method. The development model in this study refers to the ADDIE model developed by *Dick and Carry* in Endang Mulyatingsih. The ADDIE research and development model consists of 5 main stages including: 1) *analyze* , which is done by analyzing students' understanding of the material on determining symbols and names of numbers, analyzing students' characters, and analyzing the learning devices or media used. 2) *design* , which is done by creating product designs and compiling research instruments 3) *Development* , which is done by developing learning media and producing media that has been tested for validity 4) *implementation* , testing the resulting product 5) *evaluation* , which is revising the learning media before and after being tested on students according to suggestions and input during validation (Mulyatiningsih, 2012).

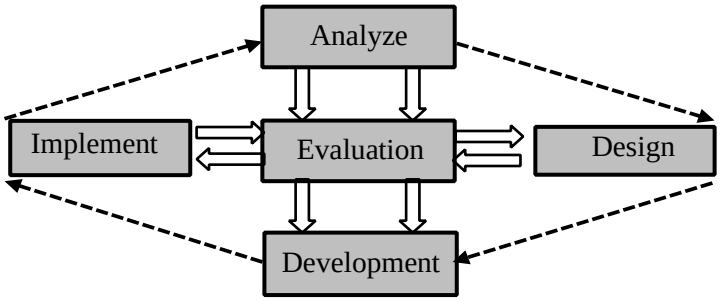

Figure 1. Steps of the ADDIE Model

RESULTS AND DISCUSSION

The implementation steps consist of several stages of expert testing, namely obtaining validation from validators regarding learning media which includes assessing the suitability of learning media for students. The learning media for number bags and *driking straws* in the context of moral beliefs is said to be valid if it has reached the criteria in accordance with *Aiken's table* . The following is a table of *Aiken's V* that must be fulfilled by learning media for number bags and *driking straws* in the context of moral beliefs.

A. Limited Scale Test

1. Classical Assumption Test

a. Normality Test

Before assessing the effectiveness of learning media, data normality tests were carried out using *pretest* and *posttest tests* , with the following hypotheses:

H_o = data is normally distributed

H_a = data is not normally distributed

The following are the results of data normality:

Table 1. Results of Limited Scale Normality Test

Tests of Normality							
		Kolmogorov-Smirnov [a]			Shapiro Wilk		
	Group	Statistics	Df	Sig.	Statistics	Df	Sig.
Mark	Pre-test	,170	10	,200 *	,914	10	,306
	Post test	,164	10	,200 *	,964	10	,827

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

The results of the normality test display a table of *pretest* and *posttest test group values* given displayed in a limited scale trial table. Based on the Kolmogorov-Smirnov test, the *pretest* significance result was 0.200 and the *posttest significance result* was 0.200. While the Shapiro-Wilk test produced a different significance, namely in the *pretest data*, the significance result was 0.306 and the *posttest significance result* was 0.827. The results of both types of tests showed a significance of > 0.05, which means that Ho is accepted with the statement of the hypothesis that the data is normally distributed.

b. Homogeneity Test

Table 2. Limited Scale Homogeneity Test Results

Test of Homogeneity of Variances					
		Levene Statistics	df1	df2	Sig.
Mark	Based on Mean	,336	1	18	,569
	Based on Median	,216	1	18	,648
	Based on Median and with adjusted df	,216	1	16,995	,648
	Based on trimmed mean	,323	1	18	,577

It can be proven that the data is distributed homogeneously which shows the results of the homogeneity test using SPSS *Statistics* as in the table above, the score in the trial class of the limited scale between *the pretest* and *posttest* of students. The *Based On Mean result* of 0.569 is greater than *alpha* (0.569> 0.05). After the necessary testing is complete and assuming both pass, both values can be used in the *Paired Sample T-Test* , which is a technique for hypothesis testing.

2. Hypothesis Testing

a. Paired Sample T-Test

After obtaining normal and homogeneous data, an effectiveness test is carried out using the N-Gain test. The next test applies the *Paired Sample T-Test* before the N-Gain test is carried out, a paired sample T test is used to formulate the hypothesis.

Table 3. Limited Scale T-Test Results

Paired Samples Test									
		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	T	Df	Sig. (2-tailed)
Pair 1	Pretest – Posttest	-22,300	10,833	3,426	-30,049	-14,551	-6,510	9	,000

Based on Paired *Sample T-Test* shows a negative average result, meaning that the average *posttest* is greater than the average *pretest* . Its significance, as determined by the table above, is 0.000 so that the test result <0.05 then Ho is rejected. This shows that the average value has a significant difference between before and after using the media of number bags and *drinking straws* in the context of aqidah and akhlak. Thus, because of the significant difference in the media, the learning media can be used effectively.

b. Finite Scale N-Gain Test

Table 4. Results of Limited Scale N-Gain Score Test

Indicator	Pre Test	Post Test	Post-Pre	Ideal Score	N-Gain Score	N-Gain (%)
Restating a concept	185	200	15	200	1.00	100%
Provide examples and nonexamples of the concept	165	180	15	200	0.43	43%
Classifying objects according to certain properties according to their concepts	145	160	15	200	0.27	27%
Applying problem-solving concepts or algorithms	125	140	15	200	0.20	20%
Relate the concept of numbers in everyday life	105	120	15	200	0.16	16%
Average					**0.41**	**41%**

The average N-Gain score of the limited scale trial class of 41% is included in the less effective category based on the results of the N-Gain score test calculation above according to Table 4 which displays the interpretation category of N-Gain Effectiveness. Based on the results of the N-Gain test, it shows that the average results of the limited scale trial are included in the less effective category, which is because the samples in the limited scale trial are smaller, but in this case it has been revised for improvement. So it can be used for further large-scale trials.

B. Wide Scale

1. Classical assumption test

a. Normality Test

Table 5. Results of Large Scale Normality Test

Tests of Normality

		Kolmogorov-Smirnov [a]			Shapiro Wilk		
	Group	Statistics	Df	Sig.	Statistics	Df	Sig.
Mark	Pretest	,140	25	,200 *	,920	25	,052
	Posttest	,130	25	,200 *	,928	25	,077

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

The results of the normality test display a table of *pretest* and *posttest test group values* given displayed in a limited scale trial table. Based on the Kolmogorov-Smirnov test, the *pretest* significance result was 0.200 and the *posttest significance result* was 0.200. While the Shapiro-Wilk test produced a different significance, namely in the *pretest data* , the significance result was 0.052 and the *posttest significance result* was 0.077. The results of both types of tests showed a significance of > 0.05 which means that Ho $_{is}$ accepted with the statement of the hypothesis that the data is normally distributed.

b. Homogeneity Test

Table 6. Large Scale Homogeneity Test Results

Test of Homogeneity of Variances

		Levene Statistics	df1	df2	Sig.
Mark	Based on Mean	1,673	1	48	,202
	Based on Median	1,342	1	48	,252
	Based on Median and with adjusted df	1,342	1	46,352	,253
	Based on trimmed mean	1,608	1	48	,211

The results of the *pretest* and *posttest scores* of students in the large-scale test class, the results of the homogeneity test using SPSS *Statistics* as in the table above show that the data is distributed homogeneously, with *Based On Mean* The average value obtained is 0.202 greater than *alpha* (0.202> 0.05). After the required testing is complete and assuming both pass, both values can be applied to the Paired Sample *T-Test* , which is a hypothesis testing method.

2. Hypothesis Testing

a. Paired *Sample T Test*

After obtaining normal and homogeneous data, an effectiveness test is carried out using the N-Gain test. The next test applies the *Paired Sample T-Test* before the N-Gain test is carried out, a paired sample T test is used to formulate the hypothesis.

Table 7. Results of the Large Scale T-Test

Paired Samples Test									
		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	T	Df	Sig. (2-tailed)
Pair 1	Pretest Posttest	-22,360	9,451	1,890	-26,261	-18,459	-11,829	24	,000

Based on Paired *Sample T-Test* shows a negative average result, meaning that the average *posttest* is greater than the average *pretest* . Its significance, as determined by the table above, is 0.000 so that the test result <0.05 then Ho is rejected. This shows that the average value has a significant difference between before and after using the media of number bags and *drinking straws* in the context of aqidah and akhlak. Therefore, learning media can be used well because there is a significant difference.

b. Wide Scale N-Gain Test

Table 8. Results of the Wide Scale N-Gain Score Test

Indicator	Pre Test	Post Test	Post-Pre	Ideal Score	N-Gain Score	N-Gain (%)
Restating a concept	465	500	35	500	1.00	100%
Provide examples and nonexamples of the concept	445	480	35	500	0.64	64%
Classifying objects according to certain properties according to their concepts	425	460	35	500	0.47	47%
Applying problem-solving concepts or algorithms	405	440	35	500	0.37	37%
Relate the concept of numbers in everyday life	385	420	35	500	0.30	30%
Average					**0.56**	**56%**

The average value of the N-Gain score for the large-scale test class of 56% is included in the fairly effective category based on the results of the N-Gain score test calculation above according to the interpretation category of N-Gain Effectiveness.

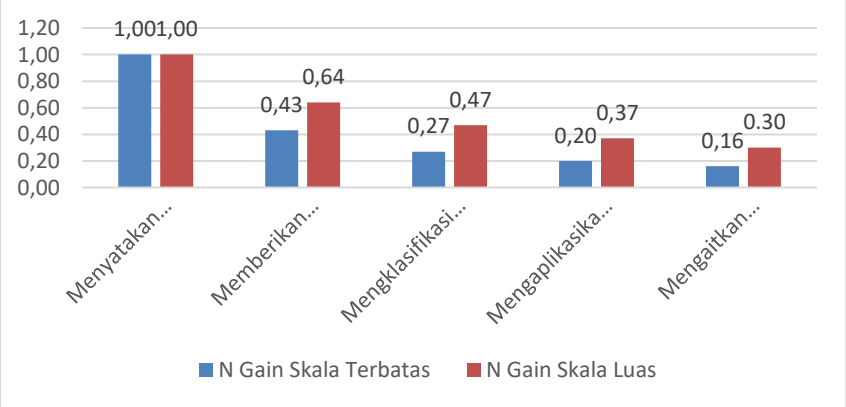

Figure 2. N-Gain Graph of Limited Scale Test and Wide Scale Test

Based on the graphic image above, we can see the N-Gain *pretest* and *posttest test values* on limited scale tests and large scale tests. Based on the N-Gain limited scale test, the average value of the N-Gain calculation was obtained, the first indicator got a result of 1.00; the second indicator 0.43; the third indicator 0.27; the fourth indicator 0.20 and the fifth indicator 0.16. From the results of *the pretest value,* the indicator has a low category.

While in the large-scale test, *the posttest value* obtained the average value from the N-Gain calculation, the first indicator got a result of 1.00; the second indicator 0.64; the third indicator 0.47, the fourth indicator 0.37; and the fifth indicator 0.30. From the results of *the posttest value*, the indicator has a moderate category.

Thus, it can be concluded that before the application of the media of number bags and *drinking straws* with the context of faith and morals, it was less effective in improving the understanding of the concept of numbers of class 1 students of Mi Ma'arif Patihan Wetan. Meanwhile, after the application of the media of number bags and *drinking straws* with the context of faith and morals, it was quite effective in improving the understanding of the concept of numbers of class 1 students of Mi Ma'arif Patihan Wetan.

DISCUSSION

Drinking Straws Media in the Context of Faith and Ethics to Improve Understanding of Number Concepts in Grade 1 MI Ma'arif Patihan Wetan

The first validation from media experts, in this test consists of 3 aspects with 10 indicators . The results of the study showed validity ranging from 0.92 to 1.00 for each component of the learning media creation that was assessed, starting from the presentation, aesthetics, and technical aspects of media creation. As a result, this finding is included in the valid group of the *Aiken's V test* . In the material expert instrument, there are 15 indicators with an *Aiken V test value* of 1.00 in the second validation from the material expert. Each aspect has a high/valid category based on the results of the validity test using the *Aiken's V Test* . The validation of the language expert instrument consists of 8 indicators which is the third validation. Based on the data provided, the validity shows a vulnerability between 0.92 and 1.00. As a result, this finding is included in the valid group of the *Aiken's V test.*

Validation of the teaching module instrument consisting of 4 aspects and six 16 indications is the fourth validation. Starting from the assessment and evaluation aspects of format elements, language, learning activities, and time allocation, the data produces validity ranging from 0.92 - 1.00. As a result, this finding is included in the valid group of the *Aiken's V test* . The fifth validation in the validation of test questions, in this test consists of 3 aspects with 16 indicators. In all aspects assessed starting from the instruction aspect, the material / content aspect, and the language aspect, the data obtained produced a validity that showed a range of 0.92 - 1.00. Based on the validity test using *Aiken's V* , the results showed that each aspect had a high / valid category. This value was obtained by the researcher when the researcher had improved and perfected the instrument based on the recommendations given by the expert validator.

Researchers used the *Cronbach Alpha formula* to conduct reliability testing in addition to validity testing on the test question instrument. The test question instrument is included in the reliable category based on the reliability test by obtaining a score of 0.88. Thus, it can be said that the test question format is suitable for use. If a test is considered valid and reliable, Sugiyono stated that learning sources and tools may be used. In line with Suharsimi Arikunto's opinion, learning materials are said to be acceptable if the results meet the established criteria. This means that the results and established criteria must be in line with each other (Arikunto, 2006).

Practicality of Number Pocket Media and *Drinking Straws* in the Context of Faith and Ethics to Improve Understanding of Number Concepts in Grade 1 MI Ma'arif Patihan Wetan

Based on the results of the practicality test derived from the assessment of grade 1 Mathematics teachers, the learning media of number bags and *drinking straws* in the context of faith and morals developed by the researcher achieved a score of 100. Based on the results of the practicality test derived from the assessment of students, the learning media of number bags and *drinking straws* in the context of faith and morals developed by the researcher achieved a score of 1691. So that the criteria in the practicality table, the score achieved is in the very practical category.

Drinking Straws Media in the Context of Faith and Ethics to Improve Understanding of Number Concepts in Grade 1 MI Ma'arif Patihan Wetan

The results of the pretest significance and the results of the posttest significance in the Kolmogorov-Smirnov test are both 0.200. While in the Shapiro-Wilk test, a different significance was produced, namely in the *pretest data* , the results of the significance were 0.306 and the results of *the posttest significance* were 0.827. Both types of test findings show a significance of > 0.05 which indicates that Ho is accepted along with the hypothesis that the data is normally distributed. Based on

the findings of the large-scale normality test, it shows that the test group completed *the pretest* and *posttest* . In the Kolmogorov-Smirnov test, the *pretest significance result* was 0.200 and the *posttest significance result* was 0.200. While in the Shapiro-Wilk test, a different significance was produced, namely in the *pretest data* , the significance result was 0.052 and the *posttest significance result* was 0.077. Both types of test findings show a significance of > 0.05 which indicates that Ho is accepted along with the hypothesis that the data is normally distributed.

The second value between *the pretest* and *posttest* of students in the limited scale trial class and the large scale trial class shows homogeneously distributed data based on the findings of the homogeneity test using SPSS Statistics , where the *Based On Mean value* of the limited scale trial is 0.569 more than *alpha* (0.569> 0.05). While the *Based On Mean value* in the large scale test is 0.202 greater than *alpha* (0.202> 0.05). After the necessary testing is complete and assuming both pass, both values can be used in the *Paired Sample T-Test* namely the hypothesis testing method. In the effectiveness test of the media of number bags and *drinking straws* in the context of aqidah and akhlak, it can be seen from whether there is a difference in understanding ability after using media development. The *Paired Sample T-Test* is a parametric test used in the limited scale trial stage and the large scale test. The results of both show that the significance value <alpha 0.001 is 0.000 so that H0 $_{is}$ rejected. Based on this study, the understanding of the concept of numbers of grade 1 students of Mi Ma'arif Patihan Wetan has a significant difference before and after using the media of number bags and *drinking straws* in the context of aqidah and akhlak .

In addition, the limited scale test is included in the less effective category with an average value of 41% according to the N-Gain score test. While the large scale test is in the fairly effective category with an average value of 56%. In the details of the N-Gain score results for each indicator, the results obtained in the limited scale test are the first indicator gets a result of 1.00; the second indicator 0.43; the third indicator 0.27; the fourth indicator 0.20 and the fifth indicator 0.16 which means that the indicator results have a low category. Then, in the large scale test, the first indicator gets a result of 1.00; the second indicator 0.64; the third indicator 0.47, the fourth indicator 0.37; and the fifth indicator 0.30 which means that the indicator results have a moderate category.

Thus, it can be concluded from the data collected by class 1 students Mi Ma'arif Patihan Wetan has a fairly effective understanding significantly when using the use of number bag media and *drinking straws* in the context of faith and morals. This is in accordance with the view of *Van den Akker* in Haviz who argues that a development product is considered effective if it produces results that are in accordance with the learning objectives determined through the assessment of students' conceptual understanding skills (Akker, 2006) .

CONCLUSION

Based on research conducted on the development of number bag media and *drinking straws* in the context of moral beliefs to improve the understanding of the concept of numbers in class 1 of Mi Ma'arif Patihan Wetan, it can be concluded as follows:

1. The products developed, namely number bag media and *drinking straws* in the context of aqidah and akhlak, were declared valid and reliable after being revised according to the input of expert validators, so that they can be declared suitable for use as learning media and used as a support to improve students' understanding of concepts.
2. The products developed, namely number bag media and *drinking straws* in the context of akhlak and creed, were declared practical for use in learning activities by distributing practicality questionnaires to teachers and students in limited-scale trials and large-scale trials, with the practicality category found to be very practical.
3. The products developed, namely the media of number bags and *drinking straws* with the context of faith and morals, are quite effective in improving the understanding of the concept of numbers in grade 1 of Mi Ma'arif Patihan Wetan. This is in accordance with the learning media product stated as quite effective in improving the understanding of the concept of numbers according to the results of the *Paired Sample T-Test,* and the results of the N-Gain score test on a limited scale trial obtained 41% and a large scale test obtained a result of 56%. So it can be concluded that the media of number bags and *drinking straws* with the

context of faith and morals are quite effective in improving the understanding of the concept of numbers in grade 1 of Mi Ma'arif Patihan Wetan.

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