DEVELOPMENT OF ANDROID-BASED EDUCATIONAL MEDIA TO IMPROVE THE CALISTUNG ABILITY OF GRADE 2 ELEMENTARY SCHOOL STUDENTS

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Abstrak: Semakin pesatnya perkembangan zaman, arus globalisasi pun kian mempengaruhi segala aspek pada setiap sendi-sendi kehidupan manusia, utamanya pada dunia pendidikan. Pasalnya perkembangan IPTEK telah memiliki peran yang sangat penting terhadap proses belajar siswa di sekolah . Maka dari itu, penelitian dilakukan guna menjawab tantangan dalam pemahaman literasi digital yang masih rendah dengan fokus peningkatan kemampuan calistung. Penelitian menggunakan metode ADDIE dengan analisis data deskriptif-kuantitatif. Subjek ujicoba penelitian dilakukan kepada siswa sekolah dasar kelas II SDN Cimekar dan SDN Mekarwangi yang berada di Kecamatan Cileunyi, Kabupaten Bandung. Data dikumpulkan melalui tahap observasi lapangan, tes tulis berupa pemberian soal pretest & posttest pada siswa serta hak angket pada tokoh ahli. Pada penelitian ini menghasilkan nilai persentase 92.86% dengan kategori yang sangat baik oleh dosen ahli media serta nilai presentase 90% yang memiliki kategori baik walau revisi disampaikan oleh ahli materi pada tampilan aplikasi dan kosakata materi. Soal pretest & posttest mendapatkan nilai interpretasi "cukup" serta semua soal yang diujikan dinyatakan valid. Penelitian ini menggunakan metode pengujian analisis statistik non-parametrik. Lebih tepatnya yakni menggunakan uji korelasi rank spearman serta uji Wilcoxon yang diolah menggunakan software SPSS Versi 24. Hasil penelitian menunjukan bahwa Media edukasi berbasis android berpengaruh positif dan signifikan terhadap peningkatan kemampuan calistung kelas 2 serta Hasil uji coba pretest menunjukkan rata-rata 68.18 dan hasil uji coba posttest menunjukkan rata-rata 80.91. Sehingga, dapat disimpulkan bahwa media yang dikembangan layak digunakan sebagai sarana edukasi serta dapat meningkatkan kemampuan calistung dalam kompetensi belajar para siswa.

Kata-kata Kunci: Pembelajaran, Aplikasi, Calistung, Edukasi.

Abstract: The rapid development of the times, the flow of globalization is increasingly affecting all aspects of every aspect of human life, especially in the world of education. This is because the development of science and technology has played a very important role in the learning process of students at school. Therefore, research was conducted to answer challenges in understanding digital literacy which is still low with a focus on increasing calistung abilities. The study used the ADDIE method with descriptive-quantitative data analysis. The subject of the research trial was carried out to grade II elementary school students at SDN Cimekar and SDN Mekarwangi in Cileunyi District, Bandung Regency. Data was collected through field observation stages, written tests in the form of giving

pretest & posttest questions to students and questionnaires to expert figures. In this study, it produced a percentage value of 92.86% in a very good category by media expert lecturers and a percentage value of 90% which had a good category even though revisions were delivered by material experts on the application display and material vocabulary. The pretest & posttest questions received an interpretation value of "enough" and all the questions tested were declared valid. This study uses a non-parametric statistical analysis test method. More precisely, using the Spearman rank correlation test and the Wilcoxon test which cawas processed using SPSS Version 24 software. The results showed that Android-based educational media had a positive and significant effect on increasing the ability of grade 2 calistung and the results of the pretest trial showed an average of 68.18 and test results try the posttest show an average of 80.91. So, it can be concluded that the developed media is suitable for use as an educational tool and can improve calistung abilities in students' learning competencies.

Keywords: : *Learning, Application, Calistung, Education.*

INTRODUCTION

The method used The rapid development of the times, the current of globalization is increasingly affecting all aspects of every aspect of human life, especially in the world of education. Technological developments in the era of Revolution 4.0 and Society 5.0 also accompany and demand this aspect of education to use renewable technology. Especially after Covid 19, government policy recommends learning activities to be carried out at home (BDR). This is increasingly becoming a big challenge to the development of student learning.

One aspect that cannot be separated when learning takes place is the interaction between educators and their students. In the interaction of students with educators, they are required to be active and bring up visionary thoughts in order to achieve their goals. Thus, various ways and efforts were made by the school to be able to organize learning. Of course with the aim that students can receive lessons optimally.

One product created from technology-based learning is online or online learning. Online learning is learning that in practice requires a stable and adequate internet network, online learning is a teaching-learning process that is carried out without meeting directly but using other existing platforms. Online learning activities are something new for schools. This causes learning patterns to change technically with various considerationsn Both from the conditions of students and teachers. (Prijanto &; Kock, 2021.)

This will not be realized perfectly without direction from educators in learning. The main task of a teacher is to encourage students to be actively involved in activities or learning processes (Oktaviani &; Rokmanah, 2022).

Educators have a very important role in the creation of the process of acquiring knowledge, developing skills, and strengthening the character of students. So that teachers are often used as the spearhead of education. (Rini et al., 2022)

Especially at this time the choice of the right learning media is the main step besides understanding related to digital literacy that must be possessed. Learning media is a tool that can be used to help the learning process and can clarify a meaning or purpose to be conveyed. (Apriyani &; Sitohang, 2022)

But in fact, the main purpose of schools organizing online learning, namely students can receive learning well, is not entirely as expected. Learning done by the lecture method in zoom meetings or even just giving intrusion on Whatsapp to learn and do assignments in books makes children bored and bored. Moreover, educators who lack digital literacy so that they cannot use the right learning media increasingly make the development of students hampered, especially in cognitive development.

Cognitive development is part of science that includes all developmental mental activities that include all mental activities (brain). According to Bloom, All efforts are all efforts related to brain activity which are divided into 6 levels which are included in the cognitive realm. This domain is related to the ability to think, which includes the ability to memorize, understand, apply, analyze, synthesize, and evaluate (Herlita et al., 2022.)

One of the effects of inhibiting cognitive development is the inhibition of children's Calistung abilities in elementary school. Calistung is the ability or competence of reading, writing and arithmetic as the basic ability of students to be able to follow the next learning.

Reading is an ability that can be said to be complex, because in it there are several aspects, namely remembering, understanding, comparing, finding, analyzing, coordinating and finally being able to apply or apply what is contained in the reading. Reading is an ability that can be said to be complex, because in it there are several aspects, namely remembering, understanding, comparing, finding, analyzing, coordinating and finally being able to apply or apply what is contained in the reading.

Writing is an activity carried out by students in order to express or reflect on the thoughts they have in the form of writing. to express and reflect on the thoughts that students have in written form.

Counting is a skill possessed by students in operating numbers, namely in the form of addition, subtraction, division and multiplication operations.

Therefore, a technology-based educational media is needed that quickly encourages and motivates students to be able to master Calistung competencies. In order to Learning The loss they experience can be handled and students can continue to follow learning smoothly and optimally.

Previous research conducted by (Soraya et al., 2018) showed that there was an increase in the average pretest & posttest scores by 30.65%, this was reinforced by research conducted with Sig (2-tailed) results 0.00 t-table 2.086 with the conclusion that the influence of the model was effective in improving student learning outcomes. (Susanto et al.,2022)

Therefore, this study was conducted to answer the challenges of understanding digital literacy that is still low and the use of technology, especially in elementary school children using the android-based application "MABAR" using SPSS software version 24 with a focus on improving calistung skills in grade II students.

RESEARCH METHODS

The method used in this study is using ADDIE (analysis, Design, Development, implementation, Evaluation). This method has systematically structured components as a learning design flow to improve learning problems that are in line with the relationship between learning characteristics (Qolbiyah, 2022) starting from the first stage to the fifth stage, this method can also do continuous improvement or revision and evaluation in its application. The ADDIE model according to (Purnamasari, 2019) has 5 stages, namely:

1. Analysis stage

    The first stage is the stage of searching for data and interviews on research subjects by looking at facts in the field and thinking about products that will be made later.

2. Design Stage

    The second stage is product design before being transferred before making application products. This stage will result in the display of the application interface with canva media for application design using SAC (Smart Apps Creator) software

3. Development Phase

    The third stage is to realize the design that has been made into the form of an application using SAC (Smart Apps Creator) software.

4. Implementation

    The fourth stage is product testing of research subjects starting from application features, appearance and validation from media experts and material experts.

5. Evaluation

    This stage is the stage of the process carried out to be able to find out whether the product that has been made is successful in accordance with initial expectations or not.
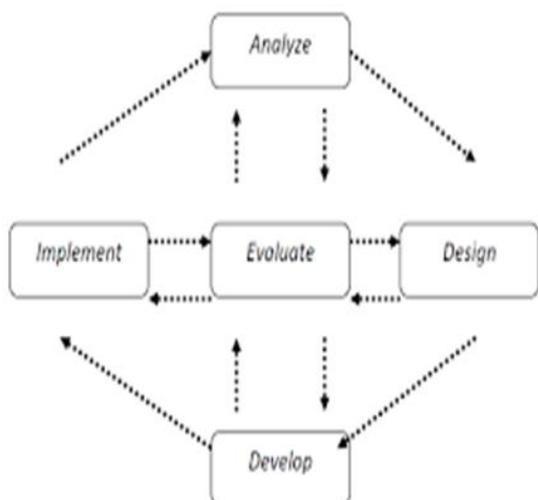
Picture 1.0 ADDIE Structure

This research was carried out in 2 schools, namely SDN Cimekar and SDN Mekarwangi which are both located in Cileunyi District, Bandung Regency. The students who participated in this study amounted to 58 students divided into 3 research groups, namely small, limited and large groups, each totaling 7 children, 18 children and 33 children with the time of the research carried out on February 6, 2023 to February 10, 2023.

The datacollected in this study included written test instruments, interviews and questionnaires. The pretest and posttest written tests carried out by large group students of grade II SDN Mekarwangi are in the form of multiple choice with a total of 10 questions made of 2 types, namely type A and type B. The questions used as instruments were previously arranged first, starting from the stages of making the grid that was used as a reference for problem making. The selection of questions used before and after learning will be chosen randomly. then interview instruments were given to grade II students of SDN Cimekar as small group and limited group tests. Then the questionnaire rights are given to research validators.

Judging from the problem being discussed, researchers use descriptive-quantitative methods that can be interpreted as research models based on the philosophy of positivism this method, used to examine certain populations or samples, data collected using research instruments. Data analysis is quantitative or statistical, which describes the calculated data and then obtained the results of temporary conjectures or hypotheses that have been determined before it (Mulyana et al., 2013).

RESULTS AND DISCUSSION

This research was developed as a companion tool in improving thinking skills in every student who uses, this application consists of various calistung materials, namely, reading, writing, counting and there are practice questions equipped with a good user interface and user experience to support the experience of female students when using the application easily. The application development process uses stages that have been adjusted to the stages of the ADDIE method, which are as follows: (1) Data analysis and research stage (2) Design making stage (3) Stage product manufacturing (4) Validation &; implementation stage (5) Evaluation stage. The stages of this research carried out and implemented are as follows:

1. **Data analysis and research stage**

    At the beginning of the analysis phase, the study began by analyzing the basic needs of students who had difficulty in understanding and following learning. Also supported by observation and conducting research related to the devices used by students. The results found several problems, namely students are less able to string together words, difficult to understand the text read and basic counting there are still errors. In addition, the results of research on the device found that some of the devices owned are in accordance with the standards for running this Android-based "MABAR" application, researchers suggest that the device can at least meet the detailed specifications (Minimum requirements) so that it is easy to run the application with the following details:

    a. OS version: android 6 or higher
    b. RAM: 1GB minimum, 3 GB recommended
    c. Storage Space: 500 mb or higher
    d. Browser: Chrome version 104.0.5112 or higher, at least version 103.0 for firefox

e. Connection: 3G or higher specifications

f. Display: 5' (inch) or higher

2. Design creation stage

After analyzing the needs to be achieved, the next step is to make a product design that is adjusted by grade II elementary school students while still paying attention to content standards for children aged 8-10 years and refer to the curriculum (curriculum 2013) used.

Researchers made application designs using Canva media, starting with the design of the initial page display, a menu display designed so that students can choose what material they want to learn, on alphabet display and short stories which will then be integrated into the SAC (Smart Apps Creator) application later by inserting the start button and there are buttons, sounds, and other interactions.

Picture 1.1 Application View

3. Product manufacturing stage

After the display design process using Canva is complete, the next stage is the integration of the design with the application. The design that has been made is exported with a png file which is then imported into the SAC application. The next stage is to create an object slide and embed the design drawings that have been made. After that, it added the interaction of buttons, sounds, and animation effects after completion of the application exported and generated an APK file (Application Package File) that can be installed directly on the students' devices.

4. Validation & implementation phase

This validation & implementation requires several stages, namely: the product is validated by two lecturers, namely material experts and media experts as a reference for whether or not the application is feasible as the right learning medium for students, there is a revision from the material expert as a validator in this study in the form of uppercase vocabulary at the beginning of the reading menu, the placement of correct answers that should be able to vary in placement and in the part of the image that should be able to represent the number of counts and the number of members of a set. Although the results of expert validation show a very decent number (>90%) after being improved by researchers, the application can run as desired. The following table shows the results obtained from these validations in table 1.0.

Table 1.0 Media and Material Expert Validity Test

Action	Executive	Result
Media Expert Lecturer	Ali Ismail, M.Pd.	92.86%
Material Expert Lecturer	Riana Irawati, M. Si	90 %

Overall, the results collected from validators in the field of media and material experts resulted in media expert validation of 9, 2.86%, and learning material expert validation of 90%, both of which are included in the "very feasible" category. Referring to these results, it can be said that the application made is feasible to be used to be a learning medium for elementary school students in grade II.

After the product went through a validation process from experts on the material or content and functional of the product, then the researcher conducted a trial on students of SDN Mekarwangi and students of SDN Cimekar, the number of students involved was divided into 3, namely small groups, limited groups and large groups.

The trial began in a small group of 7 students with an interview scheme, before they got an introduction to the feature application product and interaction for 10 minutes and then the researcher asked questions to 7 students simultaneously about their impressions of using this "MABAR"

application product. Below is a table of the results of trials to small groups that have been carried out can be seen in table 1.1.

Table 1.1 Small Group Trials

Act	Sum	Result
Small Groups	7 Person	91.4%

Trials conducted with small groups resulted in a score of 91.4% with a status of "very good". The average student answered happy and easy to understand the material in the "MABAR" application. Then the trial continued in a limited group with the same method of product introduction and interview simultaneously for 10 minutes. The data can be seen in table 1.2

Table 1.2 Limited group Trials

Action	Sum	Result
Limited Groups	18 Person	88.9%

Tests conducted with a limited group produced a value of "88.9%" with a status of "good". On average, the students answered that they were happy and easy to understand the material and design in the "MABAR" application they used. Furthermore, the trial continued in large groups with a scheme of giving pretest & posttest questions to students of SDN Mekarwangi. Starting with an introduction and reading prayers before starting the lesson, then continued with the presentation of the material to be studied for 10 minutes and then given pretest questions to test the initial abilities of the Mekarwangi SDN students.

5. Results and evaluation

a. Validity Test

The validity test is carried out to find out whether the question instrument given to students is valid or not. A question can be said to be valid when the significant value is less than 0.05. The validity test results on the pretest questions can be seen in Table 1.4

Table 1.3 Uji Validitas Pada Soal Pretest

Number	Pearson correlation	sig.	Conclusion	Interpretation
1	0.445	0.009	VALID	Enough
2	0.434	0.012	VALID	Cukup
3	0.466	0.006	VALID	Cukup
4	0.404	0.020	VALID	Cukup
5	0.591	0.000	VALID	Cukup
6	0.610	0.000	VALID	Tinggi
7	0.472	0.006	VALID	Cukup
8	0.557	0.001	VALID	Cukup
9	0.574	0.000	VALID	Cukup
10	0.369	0.035	VALID	Low

The test with the pretest question obtained a sig value when referring to the level of significance α = 0.05 obtained a good number because it was still far from the error tolerance number of the reference value and was declared VALID. Then the pearson correlation value gets a correlation with the number 0.200-0.399 this states that the interpretation of validity is low while the value korelasi pada rentang nilai 0.400-0,599 dinyatakan cukup dan 0,600-0.799 dinyatakan memiliki interpretasi validitas yang tinggi. Uji Validitas dilakukan pula pada soal posttest mengasilkan data sebagai berikut:

Table 1.4 Uji Validitas pada soal posttest

Number	Pearson correlation	sig.	Conclusion	Interpretation
1	0.495	0.003	VALID	Cukup
2	0.408	0.018	VALID	Cukup
3	0.495	0.003	VALID	Cukup
4	0.426	0.013	VALID	Cukup
5	0.547	0.001	VALID	Cukup
6	0.470	0.006	VALID	Cukup
7	0.382	0.028	VALID	Rendah
8	0.393	0.024	VALID	Rendah
9	0.468	0.006	VALID	Cukup
10	0.350	0.046	VALID	Rendah

The validity test of the posttest questions obtained a sig value if referring to the level of significance α = 0.05 obtained a good number because it was still far from the error tolerance number of the reference value and was declared VALID. Then the pearson correlation value gets a correlation with this number 0.200-0.399 states that the validity interpretation is low while the correlation value in the value range of 0.400-0.599 states that the validity interpretation value is sufficient.

b. Reliability Test

Researchers conduct reliability tests

that are useful in determining that instruments can be used more than once. The test is carried out using Cronbach's Alpha, then the test results will be compared with the minimum reliability coefficient value received. If the resulting value is greater than 0.6, then the instrument in the study can be said to be reliable. However, if the value of Cronbach's Alpha is smaller than 0.6, then the instrument is not reliable (Fanani et al., 2016) the results of the value of Cronbach's pretest can be seen in table 1.6

Table 1.6 Hasil Uji Cronbach's Preetest

Cronbach's alpha	N of items
.652	10

In the table above, N is the number of questions tested while the Cronbach's alpha value in the pretest is 0.652 with a reliable status because the Alpha value is > 0.6 from what has been set. Continuing reliability testing on posttest questions to see the rules Return Alpha value < 0.6 in table 1.7

Table 1.7 Cronbach's Posttest Test Results

Cronbach's alpha	N of items
.529	10

The table above obtained N is the number of questions tested while Cronbach's alpha value on the postest is 0.529 with a reliable status of "sufficient" because the Alpha value < 0.6 of the predetermined.

c. Normality Test

Test the normality test to see which variables are on normal or abnormal distribution pathways. The normality test can be said to be normally distributed if the significance value of the data that has been tested is greater than 0.05, while if the data significance value is smaller than 0.05 then the data is abnormally distributed. (Artha et al., 2021)

Table 1.8 Normality Test

Tests of Normality			
	Shapiro-Wilk		
kelas	Statistic	df	Sig.
hasil	.899	33	.005
	.873	33	.001

a. Lilliefors Significance Correction

The normality test used is the shapiro-wilk test, this is because the sample used is less than 100. In the table above, the sig value on the pretest question is 0.005 and on the posttest, it is 0.01 with a significance value status smaller than 0.05. Then the data status is not normally distributed.

d. Spearman Rank Correlation

Researchers used the spearman's rho test to determine the relationship of android-based educational media to improving the calistung ability of grade II students. To test the presence or absence of a relationship by comparing between sig values. (2-tailed) α (0.05). if the significance value in the tested data is less than 0.05 then Ho is accepted and if the significance value of the data is greater than 0.05 then Ho is rejected. Results can be seen in Table 1.9

Table 1.9 Hasil Spearman's rho

Correlations			Pretest Mekar wangi	Postest Mekar wangi
Spearman's rho	Pretest Mekarwangi	Correlation Coefficient	1.000	.878**
		Sig. (2-tailed)	.	.000
		N	33	33
	Postest Mekarwangi	Correlation Coefficient	.878**	1.000
		Sig. (2-tailed)	.000	.
		N	33	33

Based on the table, it is known that the value of Sig. (2-tailed) is 0.000. Because of the data, the significance value is less than 0.05. It can be concluded that there is a significant relationship or correlationbetween Android-based educational media and the improvement of the calistung ability of grade II students. The correlation coefficient number of 0.878 is also obtained which can be interpreted as the level of correlation strength or the relationship is very perfect. The number of correlation coefficients obtained is positive so that it can be said that the relationship between the two variables is unidirectional. So it can be concluded that

educational media is influential Positive for the improvement of Calistung ability.

e. Uji Wilcoxon

Researchers conducted the Wilcoxon test which is included in a non-parametric statistical analysis used to compare the effect of the results of two variables so as to produce data in the form of descriptive statistics, rankings and Wilcoxon gynification results that produce hypotests whether H1 or H0 is accepted (Windi et al., 2022). If the if the results of Sig. (2-tailed) smaller than 0.05 then there is a difference between educational media and increased calistung ability.

Table 2.0 Wilcoxon Test Results

Test Statistics[a]	
	Postest Mekarwangi - Pretest Mekarwangi
Z	-4.572[b]
Asymp. Sig. (2-tailed)	.000
a. Wilcoxon Signed Ranks Test	
b. Based on negative ranks.	

Based on the test data above, Sig. (2-tailed) values of 0.000 < 0.05 were obtained. So it can be concluded that there is a difference between educational media and improving the ability of calistung.

f. Average Test

The test is used to determine the improvement between the results of the pretest and postest done by students. If the average postest result is different from the preetest, there is an increase in ability. However, if the pretest results are greater than the postest, there is a decrease in ability or the research is unsuccessful.

Table 2.1 Descriptive Statistics Results

Descriptive Statistics					
	N	Min	Max	Mean	Std. Deviation
Pretest Mekar-wangi	33	10	100	68.18	22.002
Postest Mekar-wangi	33	30	100	80.91	17.023
Valid N (listwise)	33				

Based on the table above, the average pretest and posttest results show improvement. In the pretest results, students' scores had an average of 68.18. Then in the posttest results, students' scores had an average of 80.91. From the data The average posttest activity is better, so it can be concluded that there is a significant increase in students' calistung ability when using Android-based educational media in the form of the "MABAR" application.

CONCLUSION

1. Conclusions

The research activity of developing an android-based application "MABAR" carried out at SDN Cimekar and SDN Mekarwangi proved feasible and effective for use by grade II students. this was proven in the Validation by two validators of material experts and media who stated that the application was worth using, then the average score of the pretest and posttest questions which each got a score of 68.18 &; 80.91 experienced a significant increase and was supported by direct interviews with students who stated that the Android-based "MABAR" application was easy to use which had a direct impact on their understanding, especially concepts Calistung that was assessed at the beginning is still low.

2. Recommendations

Based on the results of the discussion that has been described, there are suggestions for the development of this research, which are as follows: (1) for students, it is hoped that the development of the "MABAR" application can provide good enthusiasm and understanding for understanding the material matri next. (2) for teachers and schools, it is hoped that the "MABAR" application will become a supporting medium in the use of school digitalization (3) for further researchers it is expected to be able to use application media more effectively and with more interesting features so that students are more enthusiastic to learn and develop their competencies continuously.

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