DEVELOPMENT OF DIGITAL GAME-BASED LEARNING MEDIA TO INCREASE JAVANESE SCRIPT READING SKILLS

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Abstract
The low learning outcomes and Javanese script reading skills of fifth grade students at SDN Sekaran 02 Semarang City are due to the lack of use of learning media by teachers. This study aims to develop a design, test the feasibility, and test the effectiveness of Digital Game-Based Learning media through the WARAJA application to increase Javanese script reading skills. This type of research is research and development with the ADDIE development model. The analysis techniques used were the normality test, homogeneity test, t-test, and N-Gain. The results showed: 1) the media design used Canva, CorelDRAW 2017, and Smart Apps Creator; 2) the feasibility of the media was declared feasible by media experts, material experts, and educational practitioners with a percentage of 100%, 100%, and 100% with a very feasible category; and 3) the effectiveness of the media was declared effective based on the results of the t-test with a result of 0.000, which means there is a significant difference in learning outcomes before and after. The N-Gain test results in a 0.67 in the moderate category. Based on the results of the study, Digital Game-Based Learning media through the WARAJA application is effective and feasible to increase Javanese script reading skills.

Keywords: Digital Game-Based Learning, Javanese Script, Media, Reading Skills

INTRODUCTION

Local content is one of the subjects that supports the achievement of the 2013 curriculum implementation objectives. [1] on the National Education System states that local content is a curricular activity that is tailored to the characteristics and local potential of each region. Javanese is included in the local content learning stipulated in the 2013 curriculum. This is based on [2], Javanese is a compulsory local language in education units.

Javanese local content subjects at the primary school level in Central Java province consist of Graduate Competency Standards, Content Standards, and a syllabus. Based on the Graduate Competency Standards, students are required to fulfill three aspects: knowledge, attitudes, and skills. [3] states that skills in learning Javanese for elementary school students include five aspects, namely writing, speaking, listening, reading, and literature appreciation. Reading, as one of the skills in language learning, is a basic skill that children need to master. [4] stated that by reading, a person will obtain various types of information that can expand knowledge. A lot of information is presented in various forms of writing, and the only appropriate way to use it is by reading, including reading Javanese script.

Javanese script reading skills in elementary schools begin with the introduction of Javanese script. However, the existence of Javanese script is increasingly eroded by the times and the decreasing use of Javanese as a means of communication. It is not surprising that in today's era, it is rare for students to be skilled in reading Javanese characters. [5] stated that Javanese script is one of the basic competencies that is poorly understood by students because they think that learning Javanese script is something difficult to learn, both from the pronunciation and shape and also from stringing simple words or sentences with Javanese script. In learning Javanese script, students experience many problems, such as a lack of interest in learning Javanese script and difficulty understanding and memorizing Javanese script [6].

This problem was also found at SDN Sekaran 02 in Semarang City. Based on the results of interviews with the fifth grade teacher of SDN Sekaran 02, in the learning process, the teacher tends to use the lecture method. Teachers introducing Javanese characters have not used teaching aids or

learning media that can visualize and attract. Students think that Javanese script material is difficult because they have difficulty distinguishing the shapes of the characters, which has an impact on their reading skills. In addition, supporting data in this study are the learning outcomes of grade V students in Javanese learning content. Of the 28 students, it is known that 19 students (68%) have not reached the Minimum Completeness Criteria (KKM) and 9 students (32%) have reached the KKM. The KKM for Javanese language learning content in grade V at SDN Sekaran 02 Semarang City is 75.

Based on these results, it shows that the fifth grade of SDN Sekaran 02 Semarang City still has not mastered the material in Javanese language subjects, especially Javanese script material. Learning resources for Javanese language learning used by students are limited to textbooks. The use of learning media is also not varied and has not been integrated with technology. [7] state that the use of media is not varied and the delivery of material by monotonous teachers will make students easily bored with learning Javanese characters. One way to overcome these problems is to develop new learning media. Interesting media can arouse student interest so that learning does not become boring [8].

The rapid development of technology requires teachers to change conventional learning media into digital-based learning media. Based on a survey conducted by [9], it proves that digital-based learning media can foster student interest in learning activities by 80%. [10] state that Digital Game-Based Learning (DGBL) is an approach that combines fun activities through games in digital form with educational content. Based on research conducted by [11], DGBL is considered an interesting learning approach to encourage student learning and motivation. DGBL can be used as an effective educational tool that can facilitate and improve students' learning procedures [12]. The DGBL developed in this study is an application called WARAJA.

The objectives of this study are (1) to develop the design of digital game-based learning media through the WARAJA application to increase the Javanese script reading skills of grade V SDN Sekaran 02 Semarang City; (2) to test the feasibility of digital game-based learning media through the WARAJA application to increase the Javanese script reading skills of grade V SDN Sekaran 02 Semarang City; and (3) to test the effectiveness of digital game-based learning media through the WARAJA application to increase the Javanese script reading skills of grade V SDN Sekaran 02 Semarang City.

METHOD

The type of research used in this study is Research and Development (R&D) with the ADDIE development model. [13] states that the stages in the ADDIE development model consist of: (1) analyze; (2) design; (3) develop; (4) implement; and (5) evaluate.

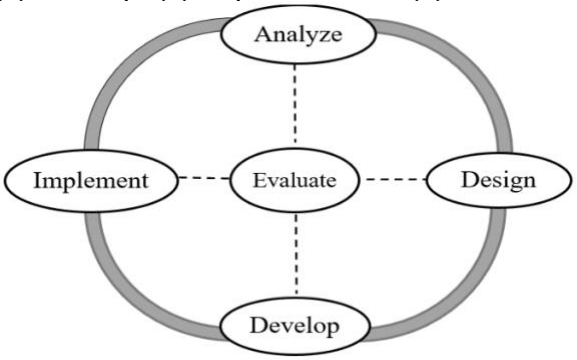

Figure 1. Chart of ADDIE Stages

The subjects in this study were fifth grade students of SDN Sekaran 02, Semarang City, totaling 28 students. The small-scale product trial was conducted on six fifth grade students of SDN Sekaran 02 Semarang City. The large-scale product trial was conducted on 22 fifth grade students of SDN Sekaran 02 Semarang City. The data collection techniques used were interviews,

observations, documentation, questionnaires, and tests. Learning outcome data in the form of pretest and posttest scores were analyzed using preliminary data analysis through the normality test and homogeneity test, and final data analysis using the t-test and N-Gain test. In this study, pretest and posttest questions were different but had the same level of difficulty and indicators. This is in line with the research of [14], which states that pretest and posttest questions are made different to avoid students who tend to memorize answers.

RESULTS AND DISCUSSION

Result

Analyze

At this stage, researchers identified problems at SDN Sekaran 02 in Semarang City through observation, interviews, questionnaires, and documentation. Researchers analyzed the needs of teachers and students through a needs questionnaire to determine the development of learning media that suits their needs so as to increase Javanese reading skills in Javanese learning content. The identification results in more detail can be seen in the following table:

Table 1. Problem Identification

No	Problem Identification	Observation Results	Analysis Solution
1	Interview method	1) Students think that Javanese script is difficult. 2) Students have difficulty memorizing Javanese script forms. 3) Teachers tend to use the lecture method. 4) Limited learning media 5) Lack of teacher innovation in developing learning media	Developing Digital game-based learning media through the WARAJA application
2	Documentation method	1) Student learning outcomes in Javanese language subjects are low 2) 68% of students who have not reached the KKM	

Design

At this stage, the results of the recapitulation of the teacher and student needs questionnaire are used as a basis for making product designs in the form of prototypes. The following is the product design for Digital game-based learning media through the WARAJA application.

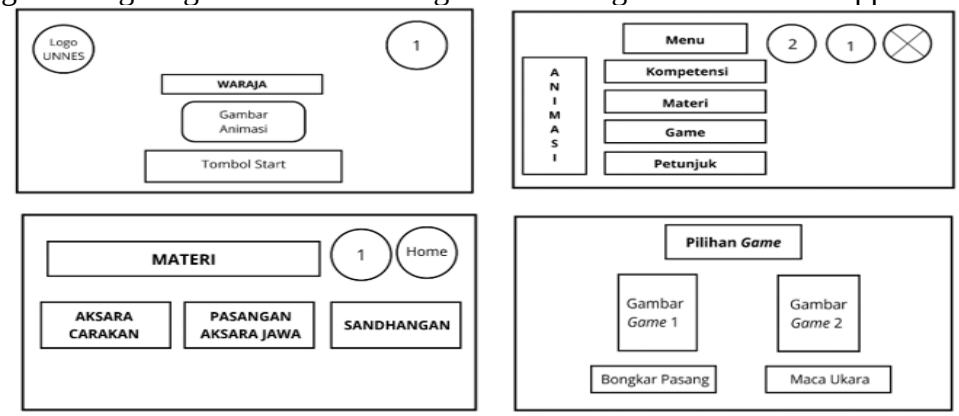

Figure 2. Digital game-based learning media prototype through the WARAJA application

Develop

At this stage, researchers create complete learning media based on the prototype that has been designed. After the learning media is completed, it is tested by material experts, media experts,

and educational practitioners. The following is a display of the results of Digital Game-Based Learning media products through the WARAJA application.

Figure 3. Results of Digital Game-Based Learning Media Development through the WARAJA Application

Implement

In the implementation stage, researchers applied Digital Game-Based Learning media through the WARAJA application. The implementation of product trials was carried out at SDN Sekaran 02, Semarang City. In this study, the trial will be conducted in small and large groups. The small group trial was tested on six students in a heterogeneous class. Participation in this trial was based on student rank in the class, namely 2 early rank students, 2 middle rank students, and 2 low rank students. Meanwhile, the large group trial was conducted in class V of SDN Sekaran 02 with a total of 22 students, without including the 6 students who had been sampled in the small group trial.

Evaluate

The evaluation stage in this research is carried out in every process of developing Digital Game-Based Learning media through the WARAJA application. Evaluation is given in order to produce feasible learning media through validation tests by experts and a series of other trials.

Discussion

Digital Game-Based Learning Media Development Design through WARAJA Application

The development of Digital Game-Based Learning media through the WARAJA application is based on problem identification, data collection results, classroom teacher input, and teacher and student needs questionnaires in accordance with the ADDIE development model. Making products at the design stage involves designing the initial design of learning media in the form of prototypes with the help of the Canva website. At the development stage, the prototype is developed in the form of complete learning media with the help of the Canva website and CorelDraw 2017 application. Finalized product development is converted into an application with the help of Smart Apps Creator software.

Digital Game-Based Learning media through the WARAJA application has a bright green background that can be operated on a laptop. This media consists of a loading page, an opening page, a menu page, a profile page, an instruction page, a competency page, a material page, a game page, and an exit page.

The Feasibility of Digital Game-Based Learning Media Through the WARAJA Application

The results of the assessment of the feasibility of Digital Game-Based Learning media through the WARAJA application on Javanese learning content of Javanese script material for grade V SDN Sekaran 02 Semarang City were carried out by media experts, material experts, and educational practitioners with the following percentage:

Table 2. Validator Assessment Results

Validator	Percentage	Criteria
Media Experts	100%	Very Feasible
Material Experts	100%	Very Feasible
Educational Practitioners	100%	Very Feasible

Based on Table 2, it shows that the feasibility of Digital Game-Based Learning media through the WARAJA application obtained a 100% assessment percentage from media experts, material experts, and educational practitioners. So, it can be concluded that the feasibility of Digital game-based learning media through the WARAJA application is categorized as very feasible to be tested at the trial-use stage by making revisions according to the suggestions and comments of the experts.

These results are in accordance with research conducted by [15], who developed interactive multimedia for javanese literacy lessons with *Sandhangan*. The results of validation assessments conducted by media experts obtained a percentage of 97%. While the validation assessment by material experts obtained a percentage achievement of 72%. Therefore, it can be stated that interactive multimedia is effective and feasible to use in learning to read and write Javanese script with *Sandhangan*.

Effectiveness of Digital Game-Based Learning Media through the WARAJA Application

Normality Test

A normality test is conducted to determine the type of statistics to be used, whether parametric or nonparametric. In this case, the normality test is used to test the normality of the distribution of student learning outcomes data on the pretest and posttest [16]. The normality test in the research in this study used Saphiro-Wilk, assisted by IBM SPSS Statistic 26. Saphiro-Wilk was used in line with the opinion of [17], which states that Shapiro-Wilk is a more appropriate method used in normality tests for small sample sizes, namely less than 50 samples.

Table 3. Test of Normality

Tests of Normality

	Kolmogorov-Smirnov[a]			*Shapiro-Wilk*		
	Statistic	*df*	*Sig.*	*Statistic*	*df*	*Sig.*
Pretest	.134	22	.200*	.938	22	.178
Posttest	.163	22	.133	.929	22	.116

Based on the table, it shows that the pretest and posttest data have sig values. 0.178 and 0.116. The results of the normality test of the pretest and posttest values show that the significance value obtained is greater than 0.050, so the data is normally distributed. Based on the test results, it can be concluded that the pretest and posttest data are normal, so further calculations use parametric statistics.

Homogeneity Test

After knowing that the pretest and posttest data are normally distributed, the next homogeneity test is carried out to determine the level of similarity of the variances of the two variables, namely the pretest and posttest scores [18].

Table 4. Test of Homogeneity

Test of Homogeneity of Variances

		Levene Statistic	*df1*	*df2*	*Sig.*
Pretest	*Based on Mean*	2.406	3	16	.105
	Based on Median	1.857	3	16	.178
	Based on Median and with adjusted df	1.857	3	12.138	.190
	Based on trimmed mean	2.394	3	16	.106

Based on the table, the results of the homogeneity test calculation show that the results of the homogeneity test calculation of the pretest and posttest data are known, and the score of the test results obtained a sig value of 0.105. Based on the results of the homogeneity test, the sig value is 0.105> 0.050, so the pretest and posttest scores have a homogeneous variance.

T-Test

The t test used is the paired sample test, which is conducted to determine the improvement of student learning outcomes after using Digital game-based learning media through the WARAJA application by analyzing pretest and posttest results.

Table 5. *Paired Sample Test*

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Pretest - Posttest	-26.36364	5.53126	1.17927	-28.81606	-23.91121	-22.356	21	.000

Based on table 5, it is obtained that the sig value (2-tailed) is 0.000. The paired sample t-test test criteria are that the sig value (2-tailed) is 0.000 < 0.05, which means that there is a significant difference between the learning outcomes on the pretest and posttest. Based on the results obtained, it can be concluded that there is a difference between Javanese learning outcomes before and after using Digital game-based learning media through the WARAJA application, so the learning media is declared effective to be used to improve Javanese script reading skills.

N-Gain Test

The N-Gain test was conducted to determine the average increase in pretest and posttest results that had been carried out during small group trials and large group trials.

Table 6. N-Gain Test

Group	Average score		*N-Gain*	Criteria
	Pretest	Posttest		
Small group	61,67	89,45	0,71	High
Large group	60,61	86,97	0,67	Medium

Based on the results of the N-Gain test, there was a decrease in the N-Gain score in the small and large group trials. This is because during the large group trial, the learning process was less conducive. Students were divided into 5 groups, with each group consisting of 4-5 students. Each group was provided with a laptop to access Digital Game-Based Learning media through the WARAJA application. Students gained a new experience in learning using laptops, so they were quite enthusiastic and scrambled to operate the laptops. Researchers and teachers gave students the understanding that they should be able to take turns operating the laptop fairly so that each student gets the same opportunity to operate the Digital game-based learning media through the WARAJA application. In the small group trial, six samples of students were divided into two groups, with each group consisting of three students. Learning during the small group trial was more conducive, and the obstacles encountered during the large group trial did not occur. As a result, the N-Gain score of the small group trial was higher than the N-Gain score of the large group trial. This is in line with research conducted by [19] entitled "Development of Traditional Game Modules to Strengthen the Conscience of Children 6–8 Years Old".

The average increase in pretest and posttest scores proves that Digital Game-Based Learning media through the WARAJA application is effective in increasing Javanese script reading skills. This is in accordance with research conducted by [20], who developed android-based educational games in the educational technology domain and obtained an average increase in pretest and posttest scores before using Android-Based Educational Games with a probability of 5% (0.00 <0.05).

CONCLUSION

The conclusion of this study is that researchers have developed a Digital Game-Based Learning media design through the WARAJA application with the ADDIE development model assisted by Canva, CorelDRAW 2017, and Smart Apps Creator applications. The results of the

feasibility test of Digital Game-Based Learning media through the WARAJA application are declared feasible based on the results of the feasibility test by media experts, material experts, and educational practitioners, with a percentage of 100%, 100%, and 100% in the very feasible category. The results of the effectiveness of Digital Game-Based Learning media through the WARAJA application were declared effective based on the results of the t test and the N-Gain test. Based on the results of the t-test conducted using the paired sample t-test, there was a result of 0.000, which means there is a significant difference between the learning outcomes on the pretest and posttest scores. Meanwhile, based on the results of the N-Gain test, it obtained a value of 0.67 in the medium category, which means that there was a moderate average increase in pretest and posttest scores. Therefore, based on the results of the study, it shows that Digital Game-Based Learning media through the WARAJA application is feasible and effective for increasing the reading skills of Javanese characters in class V of SDN Sekaran 02 in Semarang City.

REFERENCES

[1] Pemerintah Indonesia, 'Undang - Undang Nomor 20 Tahun 2003 Pasal 37 tentang Sistem Pendidikan Nasional'. Jakarta, 2003.

[2] Peraturan Gubernur Jawa Tengah, 'Peraturan Daerah Provinsi Jawa Tengah tentang Petunjuk Pelaksanaan Peraturan Daerah Provinsi Jawa Tengah Nomor 9 Tahun 2012 tentang Bahasa, Sastra, dan Aksara Jawa (PERGUB Nomor 57 Tahun 2013)'. Semarang, 2013.

[3] H. Hikmah and Y. Yermiandhoko, 'Pengembangan Media Pembelajaran Makibaja Berbasis Android Materi Aksara Jawa Untuk Siswa Kelas Iv Sekolah Dasar', *JPGSD*, vol. 10, no. 3, pp. 646–657, 2022.

[4] J. S. Wardani, M. R. Aditya, N. Silitonga, R. Amirah, and S. S. Z. Ritonga, 'Analisis Kebiasaan Gemar Membaca Pada Siswa Sekolah Dasar Di Sd Negeri 112321 Kampung Pajak', *TAFAHHAM J. Pendidik. Dan Ris.*, vol. 1, no. 1, pp. 43–49, 2022.

[5] L. D. Suryani, M. Jazeri, and B. Maunah, 'Pengembangan Multimedia Interaktif Berbasis Permainan Tradisional Dakon Dalam Meningkatkan Hasil Belajar Bahasa Jawa Kelas IV SD', *J. Ris. Pendidik. Dasar*, vol. 4, no. 2, pp. 86–98, 2021.

[6] L. Fitriani, K. C. Suryandari, and Moh. Salimi, 'Peningkatan Kemampuan Membaca Aksara Jawa Menggunakan Model Pembelajaran Kooperatif Tipe Make a Match Berbantuan Multimedia', *Khazanah Pendidik.-JIK*, vol. 16, no. 2, pp. 148–155, 2022, doi: 10.30595/jkp.v16i2.14338.

[7] B. J. Widodo and B. 'Arifatul Hanifah, 'Pengembangan Media Monopoli Aksara Jawa Untuk Pembelajaran Membaca Aksara Jawa Di Sekolah Dasar', *J. Ilm. Kontekst-*, vol. 1, no. 2, pp. 19–28, 2020.

[8] W. Maryana, L. Rahmawati, and K. A. Malaya, 'Penggunaan Permainan Puzzle Carakan Dalam Pembelajaran Menulis Aksara Jawa Di Sekolah Dasar', *J. Pendidik. Dasar Nusant.*, vol. 7, no. 1, pp. 173–186, 2021, doi: 10.29407/jpdn.v7i1.16157.

[9] I. Irwan, Z. F. Luthfi, and A. Waldi, 'Efektifitas Penggunaan Kahoot! untuk Meningkatkan Hasil Belajar Siswa', *Pedagog. J. Pendidik.*, vol. 8, no. 1, pp. 95–104, 2019, doi: 10.21070/pedagogia.v8i1.1866.

[10] T. Bouzid, F. Kaddari, H. Darhmaoui, and E. G. Bouzid, 'Enhancing math-class experience throughout digital game-based learning, the case of moroccan elementary public schools', *Int. J. Mod. Educ. Comput. Sci.*, vol. 13, no. 5, pp. 1–13, 2021, doi: 10.5815/ijmecs.2021.05.01.

[11] M. H. Hussein, S. H. Ow, L. S. Cheong, M. K. Thong, and N. Ale Ebrahim, 'Effects of Digital Game-Based Learning on Elementary Science Learning: A Systematic Review', *IEEE Access*, vol. 7, pp. 62465–62478, 2019, doi: 10.1109/ACCESS.2019.2916324.

[12] T. Anastasiadis, G. Lampropoulos, and K. Siakas, 'Digital Game-based Learning and Serious Games in Education', *Int. J. Adv. Sci. Res. Eng.*, vol. 4, no. 12, pp. 139–144, 2018, doi: 10.31695/ijasre.2018.33016.
[13] R. M. Branch, *Instructional Design: The ADDIE Approach*, vol. 53, no. 9. 2009.
[14] I. Titin, S. Sahala, and S. B. Arsyid, 'Remediasi Miskonsepsi Siswa Pada Materi Getaran Menggunakan Model STAD Berbantuan Word Square', *J. Pendidik. Dan Pembelajaran Khatulistiwa*, vol. 7, no. 12, 2018.
[15] W. L. Yusuf, I. N. S. Degeng, and E. P. Adi, 'Pengembangan Multimedia Interaktif Pelajaran Baca Tulis Aksara Jawa dengan Sandhangan', *JINOTEP*, vol. 4, no. 2, pp. 94–98, 2018.
[16] Nuryadi, T. D. Astuti, E. S. Utami, and M. Budiantara, *Dasar-dasar Statistik Penelitian*, 1st ed. Yogyakarta: SIBUKU MEDIA, 2017.
[17] P. Mishra, C. M. Pandey, U. Singh, A. Gupta, C. Sahu, and A. Keshri, 'Descriptive Statistics and Normality Tests for Statistical Data', *Ann. Card. Anaesth.*, vol. 22, no. 1, pp. 67–72, 2019, doi: 10.4103/aca.ACA_157_18.
[18] R. Ananda and M. Fadhli, *Skatistik Pendidikan (Teori dan Praktik Dalam Pendidikan)*. Medan: CV Widya Puspita, 2018.
[19] A. R. W. Pratiwi, G. A. Nugrahanta, and I. Kurniastuti, 'Development of Traditional Game Module to Strengthen the Conscience of Children 6-8 Years Old', *J. Pendidik. Sekol. Dasar*, vol. 4, no. 1, pp. 9–20, 2021.
[20] U. N. Pratama and Haryanto, 'Pengembangan Game Edukasi Berbasis Android Tentang Domain Teknologi Pendidikan', *J. Inov. Teknol. Pendidik.*, vol. 4, no. 2, pp. 167–184, 2017.