Development of Digital-Based Smart Card Learning Media to Improve the Learning Outcomes of Madrasah Ibtidaiyah Students

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Abstract

This study aims to develop appropriate and effective digital-based smart card learning media for class II students of Al Hidayah Sidomulyo Private Madrasah Ibtidaiyah (MIS). The background of this study is the lack of use of learning media used in learning Indonesian. Teachers only use lecture

methods and learning media that are less supportive. Due to the limited knowledge of teachers in making learning media interesting for students. This type of research is research and development R&D (Research and Development). The development model used in this study is the ADDIE model, which has five stages, namely: (a) analysis; (b) design; (c) development; (d) implementation; (e) evaluation. Data collection techniques in this study were non-test techniques, namely observation, questionnaires, and interviews. The data analysis techniques used in this study are (1) analysis of digital-based smart card learning media; (2) analysis of the effectiveness of digital-based smart card learning media. Based on data analysis, it shows that the digital-based smart card learning media developed is feasible and effective for second-grade students and can improve student learning outcomes.

Keywords: learning media, digital, smart cards, learning outcomes

INTRODUCTION

Education is one component in improving the quality of a nation. As time goes by, technological developments directly demand the world of education to adjust to these developments in improving the quality of education, to create quality human resources. The quality of education depends on the implementation of learning in schools, which can be seen from the success of students in participating in teaching and learning activities in the classroom. The learning process is one step in determining the success of student learning. Therefore, many efforts from teachers to improve student learning success (Ditama et all, 2015).

Current technological advances will make it easier for teachers to teach and learn in the classroom. Teachers can use learning media as a tool in the learning process in the classroom. Learning media is anything that is able to convey or distribute information effectively and efficiently in learning

activities (Hidayatullah, 2021). Adam & Syastra (2015) said that learning media is everything both physical and technical in the learning process that can help teachers to facilitate the delivery of material. Meanwhile, Nababan et all (2023) learning media are one of the ways or tools used in the teaching and learning process. From the explanation above, it can be concluded that learning media is a tool used by teachers in the learning process to stimulate students' thoughts, feelings, and desires to make students interested in learning.

The use of learning media by teachers in the learning process will greatly assist teachers in providing learning materials so that teaching and learning activities can run well. Junaidi (2019) said that the use of learning media at the teaching orientation stage would greatly help the effectiveness of the learning process and the delivery of messages and lesson content at that time. The use of learning media that matches the material is very necessary for classroom learning. Therefore, teachers must choose learning media that are good, interesting, and suitable for the material and students, so that students can understand the material quickly and easily (Kurniati et all, 2022). With the use of learning media in the classroom it is hoped that it can help teachers in teaching and learning activities.

One of the learning media that can attract students' attention in participating in learning is smart card media. Smart cards are innovative and creative learning media, which can be used as a game tool that can make students more responsive. The steps in using smart card media so that smart card media can be used effectively and efficiently, there are several steps or even steps that must be carried out by educators and children, namely: (a)

the preparation stage, the use of smart card game media can run smoothly good if done well if planned preparations are made before utilizing the media, (b) the implementation stage, after the preparation stage is carried out is utilizing the smart card game media with appropriate and varied steps,

Based on the results of observations and interviews that have been conducted by the author with class II teacher MIS Al Hidayah Sidomulyo. These students have low learning outcomes because the teacher only uses lecture methods and learning media that are less supportive. Due to the limited knowledge of teachers in making learning media interesting for students. This goes along with (Bahyyah, 2018) stating that students feel bored learning with the learning methods used by teachers in the classroom, including teachers with lecture, discussion, and exercise methods. So that what is explained by the teacher, students cannot understand it. So that students become lazy to follow the lesson. Likewise (Lestari & Parmiti, 2020) learning that takes place with the lecture method, is less memorable in the minds of students. Students learn by memorizing written material, but a few days later they forget the material they have learned. According to students, learning using the lecture method does not support students' ability to remember, so the learning outcomes obtained are still low. Digital-based smart card learning media is a solution for improving student learning outcomes, especially for class II at MIS Al Hidayah Sidomulyo. This can be seen from previous research on the development of existing smart card learning media, indicating that smart card media in international trade material is stated to be very suitable for use as learning media (Bahyyah, 2018). The advantages of smart card media include: (a) can improve student

learning outcomes, student responses to smart card media are good, (b) practice questions and answers contained in smart cards can be related to learning and everyday life, (c) with the use of student smart cards can solve the problem by themselves.

Previous research conducted by (Muhibbi et al., 2017)said that student learning outcomes have increased and positive student responses. Ainun & Raharjo (2021) said that with smart cards, student learning outcomes increased, and the response of each student was very good (Kinasih et al., 2017) said that physics smart cards can improve science process skills. (Prasiska et al., 2020) said that smart cards have a significant influence on student learning interest. Rosinah (2020) says that the problem based instruction (PBI) model with smart card media, the conclusion of this study, can improve teacher skills, student activities, add student learning outcomes. Tomi et al (2020) said that the learning media developed were feasible to use. Asmarawati (2015) said that the development of character-based science teaching materials for class IV with smart card media is able to increase student activity and student achievement. Emawati & Haka (2022) said that the results of the validation carried out by media experts were 95%, material experts were 98%, and language experts were 94%, which meant that the product was valid and the results of the effectiveness test of using biology smart card media on students obtained a value of 88 % with very good category. Purwaningtyas & Mardati (2020) said that students respond that learning using smart card media is fun and can learn while playing and the material studied is easy to understand. Syuryani (2019) said that using the problem-based instruction learning model with card media in the science

learning process with Energy material can increase student learning activities.

With the explanation above, research will be carried out entitled "Development of Digital Based Smart Card Learning Media to Improve Student Learning Outcomes in Madrasah Ibtidaiyah. The results of the development of Digital-Based Smart Card learning media are expected to be used as alternative learning media that are feasible and effective for teachers to use in the learning process so that they can improve student learning outcomes for class II Private MIS Al Hidayah Sidomulyo.

METHODS

This research is research and development (Research and Development). The Research and Development (R&D) research method is a research method used to produce certain products and test the effectiveness of these methods (Hanafi, 2017). The development model in this study is the ADDIE model. (Sholeh, 2019) states that the ADDIE model is an abbreviation that refers to the main processes of the procedural system development process, namely: Analysis, Design, Development, Implementation, and Evaluation.

This research was conducted at MIS Al Hidayah Sidomulyo. This research was conducted from January to March of the 2021/2022 school year. The subjects in this study were: (1) three expert validators which included Indonesian language experts; digital-based smart card media experts; and material experts; (2) class II teachers of MIS AL Hidayah

Sidomulyo and (3) class II students of MIS Al Hidayah Sidomulyo, totaling 25 people.

Data collection techniques in this study used non-test techniques, namely observation, questionnaires, add interviews. The data analysis techniques used in this study are: (1) analysis of digital-based smart card learning media; (2) analysis of the effectiveness of digital-based smart card learning media. Validation criteria can be seen in table 1.

Table 1. Answer Criteria for Validation Instrument Items

No	Answer	Score
1	Very good	4
2	Well	3
3	Enough	2
4	Not good	1

(Kesumawati et al, 2022)

The formula used to calculate the percentage of digital based smart card learning media validation sheets is:

$$\text{Wow} = \frac{TSe}{TSh} \text{x} 100\% \qquad \text{(Rusadi et al., 2017)}$$

Information:

Wow = expert validation

tse = total achieved an empirical score

Tsh = expected score

Table 2. Product Feasibility Test Classification Criteria

No	Score	Classification	Information
1	90% X < 100%	Very good	Very decent without any revisions
2	80% X < 90%	Well	Decent but revised as necessary
3	70% X < 80%	Enough	Decent but pretty much revised
4	60% X < 70%	Not enough	Not worth it because it has been revised a lot
5	0% X < 60%	Very less	Not feasible

The effectiveness of digital-based smart card learning media used in learning is determined based on the achievement of several indicators, namely as follows:

(1) Student Learning Completeness.

The formula for calculating individual student learning completeness is as follows:

KB =Qx100% (Trianto in Hia, 2013)

Information:

KB : Learning mastery

Q : The number of scores obtained by students

Q_1 : Total score

Criteria:

0%≤KB < 65% students have not finished studying

65%≤KB < 100% students have finished studying

(2) Mastery of Classical Learning

The formula for knowing classical learning mastery is:

PKK = Number of KB students > 65% x 100%

There are many research subjects

(3) Achievement of Learning Indicators

The formula for calculating indicator achievement is:

$$T=\frac{S_i}{S_{Maks}}\ x\ 100\%$$

(Elementary Education in Sustainable Development, 2018)

Information:

Q : percentage achievement indicator

Yes : student's total score for the item I

max : maximum total score for item i

According to Criteria:

0% < T < 65% TPK not achieved

65% < T < 100% TPK achieved

(4) Student Response

The formula for calculating the percentage of student responses is as follows:

$$P = x\ 100\% \frac{\sum(total\ score\ of\ questionnaire\ answers)}{n\ x\ highest\ score\ x\ number\ of\ respondents}$$

(Zunaidah et al in Setiawan in Wailanduw, 2016)

Information:

P : states the percentage of the rating

n : states the number of questionnaire items

RESULTS AND DISCUSSION

The development of digital-based smart card learning media for MIS Al Hidayah Sidomulyo, has gone through several stages, including:

Analysis

Analysis was carried out to analyze the initial conditions of the curriculum, teachers, and students. Based on the results of observations that have been made, it is known that students are not interested in participating in class learning, students feel bored listening to the teacher delivering material, students are not active in class, students are unable to answer questions given by the teacher, student learning outcomes are low. Based on

the results of observations that have been made, researchers are interested in developing digital-based smart card learning media. This pinter card media was developed so that students are interested in participating in learning, and student learning outcomes can increase from before.

Design

At this stage, the researcher has designed the learning media that will be developed. At this stage, the researcher will design digital-based smart card media. Researchers make smart cards by entering material, practicing questions, and answering questions. This aims to make it easier for students to understand the material to be explained, and make it easier for students to complete the exercises given by the teacher.

Researchers have also prepared a questionnaire. Validation questionnaire for 3 experts, namely material experts, language experts, and media experts. These three experts will later validate the product to be developed. This student response questionnaire will contain questions about the use of the product being developed which will demonstrate the quality of digital-based smart card learning media.

Development

At this stage, the development of digital-based smart card learning media has been completed and brought to three validators, namely: linguists, media experts, and material experts for validation. If the product developed has been validated and there are some suggestions and input, the researcher will revise it according to the suggestions and input that have been given by the experts. As for suggestions and input from the validator, namely improving writing and punctuation, inserting pictures, and choosing bright

colors so that students are more interested in using digital-based smart card learning media.

After the researcher has finished revising, then the researcher will meet again with the experts. After the revision is corrected and in accordance with the suggestions and input of the researcher, the product developed has been validated and is suitable for use.

Application

At this stage, the product developed, namely digital-based smart card learning media, was tested in the classroom. Digital-based smart card learning media will be provided to school principals, teachers, and students to be used as learning media. The implementation phase will be carried out on September 5, 2022. Rating Scores from Material Expert Validators can be seen in Table 3.

Table 3. Rating Scores from Material Expert Validators

No	Component	Total score	Percentage (%)	Classification Validity	Eligibility Class
1	Indonesian Material	61	89.71	Very Valid	Very Worth it
2	Presentation eligibility	46	88.46	Very Valid	Very Worth it
3	Language	44	84.62	Very Valid	Very Worth it
	Average	151.00	87.79	Very Valid	Very Worth it

Table 3 shows that the percentage score of the material expert validator's assessment of the Indonesian material sub-component was 89.71, the presentation feasibility sub-component was 88.46, and the language sub-component was 84.62. From each sub-component and the overall average score, it is included in the very valid category. Suggestions and improvements from the validator have been improved and are suitable for use. So the

product developed, namely digital-based smart card learning media, is very feasible to be tested in the field. This is in line with Wahyudi & Jamal (2021) the material expert validation assessment obtained an average score of 3.33 in the fairly decent category. Rahayu (2018) said that the results material expert validation gets a score of 85% including the feasible category. Batul (2018) says that the average percentage of material expert validation is 82.7% with a very decent category. Batul (2018) says that the average percentage value of media expert validation is 84.6%

the results of linguists' validation of the product developed, namely digital-based smart card learning media, can be seen in the table below:

Table 4. Rating Scores from Language Expert Validators

No	Component	Total score	Percentage (%)	Classification Validity	Eligibility Class
1	Language Use	19	79.17	Legitimate	Worthy
2	Language Accuracy	20	100.00	Very Valid	Very Worth it
3	Suitability of Student Development	9	75.00	Legitimate	Worthy
	Average	48.00	85.71	Very Valid	Very Worth it

Table 4 shows that the percentage score obtained from the language validator's assessment of the language use sub-component was 79.17, the language accuracy sub-component was 100.00, and the student development appropriateness sub-component was 75.00. Of the three sub-component and the overall average score, it is a very valid category. Suggestions and improvements from the validator have been improved and are suitable for use. So the product developed, namely digital-based smart card learning media, is very feasible to be tested in the field. This is in line with Emawati

& Haka (2022) linguists at 94%, which means the product is valid and the results of the test of the effectiveness of using biology smart card media on students obtain a score of 88% in the very good category.

The results of the material expert validation of the product developed, namely digital-based smart card learning media, can be seen in the table 5.

Table 5. Teaching Validator Rating Value Material Design Expert

No	Components	Percentage (%)	Eligibility rate
1	Color sharpness	91.55	Very worth it
2	Neatness of typesetting	84.90	Worthy
3	The suitability of digital-based smart card design	90.00	Very worth it

Table 5 shows that the percentage of scores obtained from the assessment of the material expert validator on the color sharpness sub-component was 91.55, the neatness of the typesetting sub-component was 84.90, and the suitability of digital-based smart card design sub-component was 90.00. Of the three sub-components and the overall average score, it is a very valid category. Suggestions and improvements from the validator have been improved and are suitable for use. So that the product developed, namely digital-based smart card learning media, is very feasible to be tested in the field. This is in line with Lestari (2018) saying that the validation of media experts in stage 2 has an aspect of validator 1's assessment with an average value of 4.5 with the "very good" criterion. Peni & Sunarti (2016) said that the assessment of media experts obtained an average score of 3.75 which was included in the good category.

Table 6. Individual Trial Data

Respondent No	KB (%)		*Get score*	N-Get
	Pretest	post		
P01	40	80	40	0.67
P02	40	80	40	0.67
P03	80	100	20	1.00
PKK (%)	33.33	100.00	-	-
Average	53.33	86.67	33.33	0.78
Criteria	-	-	-	Tall

Table 7. Small Group Trial Data

Respondent No	KB (%)		*Get score*	N-Gain
	Pretest	post		
K01	33.33	100.00	66.67	1.00
K02	33.33	66.67	33.33	0.50
K03	66.67	66.67	0.00	0.00
K04	66.67	100.00	33.33	1.00
K05	33.33	33.33	0.00	0.00
K06	66.67	100.00	33.33	1.00
PKK (%)	50.00	83.33	-	-
Average	50.00	77.78	27.78	0.58
Criteria	-	-	-	At the moment

Table 8. Large Group Trial Data

Respondent No	KB (%)		*Get score*	N-Gain
	Pretest	post		
A01	77.78	88.89	11.11	0.50
A02	66.67	88.89	22.22	0.67
A03	33.33	77.78	44.44	0.67
A04	22.22	66.67	44.44	0.57
A05	66.67	88.89	22.22	0.67
A06	22.22	44.44	22.22	0.29
A07	33.33	77.78	44.44	0.67
A08	55.56	100.00	44.44	1.00
A09	11.11	66.67	55.56	0.63
PKK (%)	33.33	88.89	-	-
Average	43.21	77.78	34.57	0.63
Criteria	-	-	-	At the moment

Table 9. First Phase Field Trial Data

Respondent No	KB (%) Pretest	KB (%) post	*Get score*	N-Gain
L01	61.54	92.31	30.77	0.80
L02	69.23	84.62	15.38	0.50
L03	53.85	84.62	30.77	0.67
L04	23.08	61.54	38.46	0.50
L05	38.46	76.92	38.46	0.63
L06	38.46	100.00	61.54	1.00
L07	69.23	92.31	23.08	0.75
L08	53.85	84.62	30.77	0.67
L09	38.46	69.23	30.77	0.50
L10	30.77	76.92	46.15	0.67
L11	46.15	92.31	46.15	0.86
L12	23.08	61.54	38.46	0.50
L13	46.15	61.54	15.38	0.29
L14	53.85	76.92	23.08	0.50
L15	38.46	76.92	38.46	0.63
L16	76.92	100.00	23.08	1.00
L17	38.46	61.54	23.08	0.38
L18	46.15	69.23	23.08	0.43
L19	76.92	92.31	15.38	0.67
L20	69.23	100.00	30.77	1.00
L21	38.46	84.62	46.15	0.75
L22	46.15	92.31	46.15	0.86
L23	23.08	53.85	30.77	0.40
L24	53.85	76.92	23.08	0.50
L25	38.46	61.54	23.08	0.38
L26	38.46	76.92	38.46	0.63
L27	30.77	84.62	53.85	0.78
L28	69.23	92.31	23.08	0.75
L29	76.92	100.00	23.08	1.00
L30	46.15	84.62	38.46	0.71
L31	38.46	100.00	61.54	1.00
L32	23.08	53.85	30.77	0.40
L33	23.08	61.54	38.46	0.50
L34	38.46	76.92	38.46	0.63
L35	76.92	100.00	23.08	1.00
L36	30.77	76.92	46.15	0.67
PKK (%)	22.22	77.78	-	-
Average	46.79	80.34	33.55	0.63
Criteria	-	-	-	Tall

Table 10. Second Phase Field Trial Data

Respondent No	KB (%)		*Get score*	N-Gain
	Pretest	post		
L01	60.71	89.29	28.57	0.73
L02	67.86	100.00	32.14	1.00
L03	67.86	96.43	28.57	0.89
L04	35.71	75.00	39.29	0.61
L05	42.86	82.14	39.29	0.69
L06	25.00	60.71	35.71	0.48
L07	60.71	89.29	28.57	0.73
L08	60.71	96.43	35.71	0.91
L09	53.57	92.86	39.29	0.85
L10	35.71	60.71	25.00	0.39
L11	50.00	89.29	39.29	0.79
L12	32.14	78.57	46.43	0.68
L13	39.29	89.29	50.00	0.82
L14	57.14	92.86	35.71	0.83
L15	39.29	89.29	50.00	0.82
L16	67.86	82.14	14.29	0.44
L17	21.43	53.57	32.14	0.41
L18	60.71	100.00	39.29	1.00
L19	67.86	75.00	7.14	0.22
L20	42.86	82.14	39.29	0.69
L21	50.00	85.71	35.71	0.71
L22	46.43	100.00	53.57	1.00
L23	32.14	82.14	50.00	0.74
L24	42.86	92.86	50.00	0.88
L25	42.86	75.00	32.14	0.56
L26	53.57	85.71	32.14	0.69
L27	39.29	82.14	42.86	0.71
L28	60.71	92.86	32.14	0.82
L29	67.86	96.43	28.57	0.89
L30	46.43	82.14	35.71	0.67
L31	35.71	78.57	42.86	0.67
L32	25.00	60.71	35.71	0.48
L33	42.86	82.14	39.29	0.69
L34	42.86	89.29	46.43	0.81
L35	67.86	96.43	28.57	0.89
L36	39.29	75.00	35.71	0.59
L37	67.86	89.29	21.43	0.67
L38	67.86	100.00	32.14	1.00

Respondent No	KB (%)		*Get score*	N-Gain
	Pretest	post		
L39	71.43	85.71	14.29	0.50
L40	42.86	82.14	39.29	0.69
L41	28.57	71.43	42.86	0.60
L42	50.00	85.71	35.71	0.71
L43	60.71	100.00	39.29	1.00
L44	67.86	100.00	32.14	1.00
L45	35.71	78.57	42.86	0.67
L46	42.86	75.00	32.14	0.56
L47	71.43	100.00	28.57	1.00
L48	53.57	82.14	28.57	0.62
PKK (%)	22.92	91.67	-	-
Average	49.70	85.04	35.34	0.72
Criteria	-	-	-	Tall

Table 11. Learning Indicator Achievement Data

Stages	The number of students	T Score for Each Indicator (%)				
		1	2	3	4	5
Individual trials	3	100	100	100	33.33	-
Small group trial	6	83.33	83.33	66.67	-	-
Large group trials	9	100	77.78	74.07	77.78	-
First field trials	36	83.41	68.33	100	85.19	100
Second field trial	48	100	86.81	84.17	83.68	84.46

The results of student responses to the product developed, namely digital-based smart card learning media, can be seen in the table 12.

Table 12. Data on Student Responses
to Digital-Based Smart Card Learning Media Products

No	Statement	Total score	PRS (%)
1	This smart card learning media makes me happy to learn it	42	87.50
2	Presentation of material in digital-based smart card learning media starts from easy to difficult and from concrete to abstract	39	81.25
3	This digital-based smart card learning media raises questions that encourage me to think	46	95.83
4	Presentation of material in this digital-based smart card learning media encouraged me to discuss with other friends	45	93.75
5	This digital-based smart card learning media stimulates my curiosity	40	83.33

No	Statement	Total score	PRS (%)
6	This digital-based smart card learning media contains questions that can test how far my understanding of the material is	45	93.75
7	The language used is simple and easy to understand	44	89,88
8	Using digital-based smart card learning media makes me more enthusiastic about learning	42	87.50
9	The appearance of this digital-based smart card learning media is interesting	43	89.58
10	By using digital-based smart card learning media, learning is not boring	41	85.42
	Average	**43**	**89.58**

From Table 12 above it is known that the positive response data of students to the product being developed, namely digital-based smart card learning media, is an average of 43. With a percentage of 89.58. From these averages and percentages, it can be concluded that the learning objectives using digital-based smart card learning media have been achieved. This is in line with Agustin (2019) saying that the results of student responses to the products developed, namely digital-based smart card learning media of 92.08% which indicate the criteria of "very good". Mariani (2019). Said that the student response was 92% of the 27 respondents. Based on these results it can be concluded that smart card learning media is stated to be very feasible, very good, and unique and attracts students' interest in participating in learning activities. Adelia et all (2017) said students gave a positive response to the product being developed, namely digital-based smart card learning media with a percentage of 94.20%, so it could be categorized as "very good". Rahmawati et all (2016) student responses obtained a score of 78.45% so it can be concluded that the Sundanese game strategy is effective to use.

CONCLUSION

Based on the results of the research and discussion, several conclusions are obtained, namely as follows: (1) The product developed in this study, namely digital-based smart card learning media, proved to be very valid and very suitable for use by second-grade students. This is based on the percentage of several validators, namely: 87.79% material expert validator, 85.71% linguist validator, and 76.72% media expert validator. Of the three validators, the expert validation score was 83.41% or categorized as very valid. (2) digital-based smart card learning media is very effective for use in class 2 MIS Al Hidayah Sidomulyo, because four indicators of the effectiveness of digital-based smart card learning media in the learning process are: student mastery learning, classical learning mastery, achievement of learning indicators, and student responses. Table 6 the percentage of students' classical completeness is 100% or three students who have completed all studies. In the small group trial, the percentage increase in family planning after using the product was 27.78%, with an N-Gain score of 0.58 or in the moderate improvement category. Table 7. The percentage of students' classical completeness as many as 5 out of 6 students have complete learning criteria. In the large group trial, the average increase in birth control after using the product was 34.57%, with an N-Gain score of 0.63 or a moderate improvement category. Table 8 shows the classical completeness of students as much as 8 out of 9 students have complete learning criteria. In the first stage of the field trial, the percentage increase in family planning after using the product was 33.55%, with an N-Gain score of 0.63, or, categorized as a high increase. Table 9 shows the students'

classical completeness as many as 28 out of 36 students have complete learning criteria. In the second stage of the field trial, the average percentage increase in family planning after using the product was 35.34%, with an N-Gain score of 0.72, or categorized as a high increase. Table 10 shows the students' classical completeness as many as 26 out of 28 students have complete learning criteria. Thus, it is proven that the use of digital-based smart card learning media is very effective for class II students of MIS Al Hidayah Sidomulyo.

CONFESSION

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AUTHOR CONTRIBUTION STATEMENT

The author's contribution in completing the study entitled "Development of Digital-Based Smart Card Learning Media to Improve Student Learning Outcomes in Madrasah Ibtidaiyah" namely: RR contributed to making this research, NR contributed to documentation, PC and AR contributed to translating.

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