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Development of The Rifa'iyah Batik E-module Based on Local Wisdom for Increase Ability Cognitive Student in Batik Learning

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Abstract
Batik learning at SMKN 1 Warungasem is using general materials. The learning are not focusing on integrating local riches of Batang Regency such as Rifa'iyah batik and not using interactive media in the learning process. It resulted in students lack of understanding on Rifa'iyah batik, impacted in late regeneration of Rifa'iyah batik workers. This study aims to develop a Rifa'iyah batik e-module based on local wisdom to improve students' cognitive abilities. The method used is the Research and Development (R&D) ADDIE model through the stages of analysis, design, development, implementation, and evaluation. The product was validated by 3 media experts and 3 material experts; the effectiveness was tested through pre-tests and post-tests on the control class and the experimental class of 70 students. The results showed that the e-module was declared feasible by media experts with an average score of 3.99 and very feasible by material experts with a score of 4.46. The effectiveness test showed an N Gain score of 76% in the experimental class, higher than the control class, and the independent t- test showed a significant difference in learning outcomes after treatment. It can be concluded that the Rifa'iyah batik e-module is valid, feasible, and effective for improving students' cognitive abilities in batik learning.

Keywords: e-module, batik Rifa'iyah, local wisdom, cognitive ability

INTRODUCTION

The batik industry is a creative industry that has made a significant contribution to the Indonesian economy. In 2018, batik exports were valued at USD 52.44 million, equivalent to IDR 734 billion. This figure is expected to increase in the following years (Eskani et al., 2021). Batik is also a cultural heritage designated by UNESCO as a Masterpiece of the Oral and Intangible Heritage of Humanity. October 2, officially designated as National Batik Day, demonstrates Indonesian pride in batik, which has received international recognition and is a cultural heritage worthy of development. Since then, the development of batik has begun to be applied in various regions in Indonesia until now it is at the peak of popularity (Wahyudi et al., 2021).

Batang Regency is one of the regions in Central Java with a rich local culture, one of which is Rifa'iyah batik. Rifa'iyah batik is unique, both in terms of its motifs and its philosophy. Unlike other coastal batiks, The Rifa'iyah batik motif is created following *the rules* in accordance with Islamic teachings that prohibit depicting living creatures (Mustika, 2017). Rooted in spiritual values and Islamic teachings by KH. Ahmad Rifai, Rifa'iyah batik developed as a symbol of cultural resistance as well as a form of religious expression for the local community (Nabilah et al., 2025). Unfortunately, this batik is still little known among the younger generation, including in vocational schools that should be a forum for preserving local culture.

Vocational education plays a crucial role in preparing students to acquire skills relevant to the needs

of the workplace and industry. Vocational school produce skilled graduates thus ready to work, suited to industry needs (Sayekti, 2025). Among the competencies taught in Vocational schools, particularly in the Fashion Design program is batik skills. In this learning context, the integration of technical skills and local cultural values is crucial that students not only develop skills but also develop a deep understanding of the nation's cultural heritage.

At SMKN 1 Warungasem, batik is included in the curriculum of the Fashion Design program. However, several obstacles remain in its implementation. The teaching materials used is too general and not sufficiently highlight local riches, including Rifa'iyah batik. Furthermore, the lack of a teaching module on this subject leading to less effective. Therefore, the development of learning media that is not only technically relevant but also culturally contextual is needed. One strategic step that can be taken is to develop e-modules based on local wisdom. Local wisdom-based e-module was developed to solve this problem

Application of e-modules could enhance student learning outcomes, both cognitive and psychomotor (Fatmi et al., 2021). In the context of vocational education, e-modules play a crucial role in developing students' cognitive abilities to enter the workforce. This is evident in a study conducted by Jafnihirda et al. (2023), which aimed to determine the extent to which module learning media can improve student learning outcomes. The study found that the effectiveness of using module learning media in the learning process was 82.24%, interpreted as effective level. Therefore, the development of a local wisdom-based Rifa'iyah batik e-module in this study is expected to be an effective solution in preparing students to have the necessary knowledge for the batik industry.

Thus, this research aims to develop a local wisdom-based Rifa'iyah batik e-module to be used as a learning medium for the batik subject at SMKN 1 Warungasem, Batang Regency. The development of this e-module is a crucial step in relevant to industry demands, particularly in Batang Regency. It is expected that this e-module development will not only improve the quality of learning but also contribute to the preservation of local culture through education.

METHOD

A descriptive quantitative study was applied using ADDIE (Analysis, Design, Development, Implementation, Evaluation) model. The approach used was descriptive quantitative. This development research was used to produce a specific product and examine the effectiveness (Fayrus & Slamet, 2022).

This research was conducted in Kalipucang Wetan and SMKN 1 Warungasem, Batang. The subjects of this research were XI grade Fashion Design students of SMKN 1 Warungasem and Rifa'iyah batik workers in Batang. In this study, a flipbook-based e-module for Rifa'iyah batik was developed. The independent variable in this research was the Rifa'iyah batik e-module based on local wisdom of Batang Regency. While the dependent variable was the feasibility and effectiveness of the Rifa'iyah batik e-module based on local wisdom of Batang Regency in batik learning at SMKN 1 Warungasem.

The data collection techniques in this study were structured interview instruments, e-module feasibility questionnaires, and e-module effectiveness tests using pre-tests and post-tests. The e-module feasibility instrument was adopted from a relevant previous study (Jatmiko, 2023) that was proven valid and reliable. The effectiveness was measured using pre-test and post-test which questions has also proven valid and reliable. The test was 50 questions adjusted to the Learning Outcomes and Learning Objectives in the Batik subject. The test validity was measured using the Point-Biserial formula. The reliability test using the KR-20 formula obtained a significance result of 0.844 with very high criteria.

The feasibility data was descriptively analysed, then interpreted according to the response score criteria. The effectiveness data was analysed using the N Gain formula and the independent t Test, the data was homogeneous and normally distributed. The test was used to determine the feasibility and effectiveness of using the Rifa'iyah batik e-module in batik learning. Therefore, the results of this analysis served as the basis for answering this research question.

RESULTS AND DISCUSSION

Development of Batik Rifa'iyah E-module

ADDIE development model used in this research was conducted as in the following.

1. Analysis

This analysis stage aimed to identify possible causes of a learning performance gap (Hidayat, 2021). In the analysis stage, the following steps were carried out: needs analysis, teaching materials analysis, material analysis, and curriculum analysis. Based on the results of observations and interviews, it was found that development of appropriate learning media of Rifa'iyah batik that is about to extinct due to lack of regeneration. Moreover, students need interesting learning media thus help students to improve their understanding of Rifa'iyah batik. The need assessment found that batik learning in SMKN 1 Warungasem has not focused on the local wisdom yet.

The analysis of teaching materials found students' lack of understanding about Rifa'iyah batik thus learning outcomes in the batik subject were not optimal. This is because the teaching materials used in learning tend to be general without highlighting local wealth such as Rifa'iyah batik and the learning media used were less interesting and less communicative for students. Some learning media were provided separately in teaching slides thus less flexible. Therefore, there is a need for the development of learning media that could improve student learning motivation.

Material analysis was conducted to determine the learning materials design to be developed. This material analysis was carried out by identifying the main material, collecting and selecting relevant materials, followed by systematic rearrangement. The materials were arranged to meet the demands of Learning Outcomes and Learning Objectives based on the Independent Curriculum. The Rifa'iyah batik e-module includes; (1) History of Rifa'iyah batik; (2) Meaning of Rifa'iyah batik motifs; (3) Making Rifa'iyah batik; and (4) Problem Based Learning (PBL) syntax in batik learning.

Curriculum analysis was used to determine instructional competencies, including an analysis of learning outcomes and learning objectives contained in the e-module. These learning outcomes and learning objectives were adopted from the learning objective flow for the batik subject and adapted to Rifa'iyah's batik material.

2. Design

The design stage is necessary to plan every elements needed in arranging learning media (Anafi et al., 2021). At this stage, some product design components were produced. The e-module design was determined, consisted of material as well as learning outcomes and learning objectives designs. It was started by compiling the material, preparing a storyboard, and arranging the overall script based on previous references and interviews with Rifa'iyah batik workers. This e-module was created using a flipbook maker program contains animations and simulations, equipped with text, audio and video to facilitate understanding and increase student interest. This e-module contains (1) Cover (containing the title, identity, and logo of the agency/institution); (2) Table of Contents; (3) Foreword; (4) Introduction; (5) History of Rifa'iyah Batik; (6) Meaning of Rifa'iyah Batik Motifs; (7) Production of Rifa'iyah Batik; (8) Problem Based Learning (PBL) Syntax; (9) Evaluation; (10) Bibliography and Resource Persons; and (11) Answer Key.

3. Development

a. Development of E-modul Batik Rifa'iyah

The development of this e-module was carried out based on the batik course in the Fashion Design Department, which highlighted the local potential of Batang Regency. The development of this e-module also draws on relevant literature, previous research, and interviews with Rifa'iyah batik workers, which were then compiled and adapted to the learning outcomes and learning objectives of the batik course. The Rifa'iyah batik e-module was also equipped with images and videos to facilitate students' understanding of Rifa'iyah batik, in line with study of Derrydamawati et al. (2024). Figure 1 shows the appearance of the developed Rifa'iyah batik e-module.

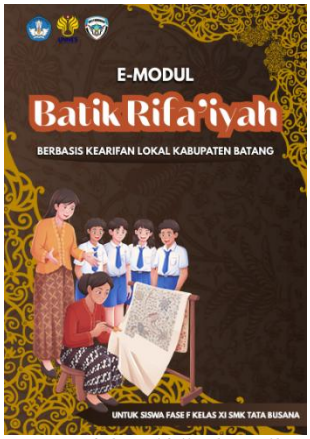
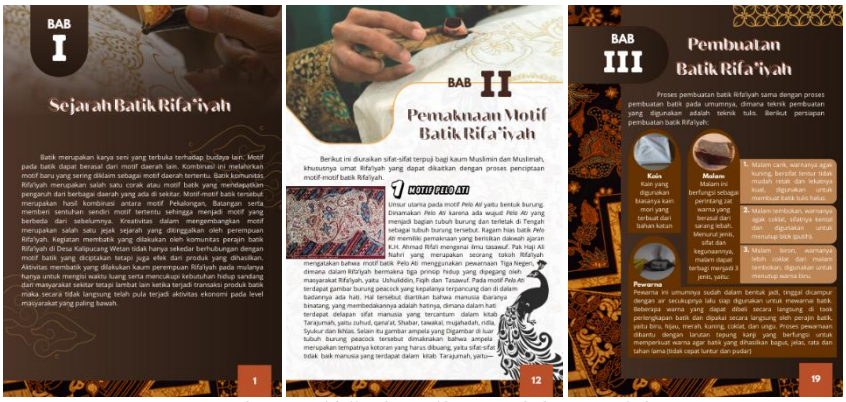


Figure 1. Cover of the Rifa'iyah Batik E-module

Figure 2 shows the table of contents page, consists of five chapters, i.e. the history of Rifa'iyah batik, the meaning of Rifa'iyah batik motifs, the production of Rifa'iyah batik, the syntax of Problem Based Learning (PBL), and evaluation.

Figure 2. Table of Contents of the Rifa'iyah Batik E-module

The material displayed in chapters 1, 2, and 3 related to the history of Rifa'iyah batik, the meaning Rifa'iyah batik motifs, and the production of Rifa'iyah batik, which includes theory, images, and videos. The material can be seen in Figure 3.



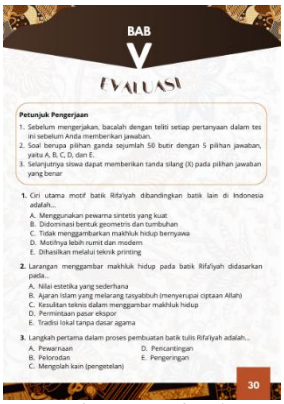
Gambar 3. Rifa'iyah Batik E-module Material

The Problem Based Learning (PBL) syntax page contains the steps for implementing batik learning

in meetings 1 and 2, complete with PBL stages, learning activities, and time allocation. This display can be seen in Figure 4.

Gambar 4. Syntax of Problem Based Learning (PBL)

In the end, there is the evaluation page, which contains practice questions for evaluating the Rifa'iyah batik material. This evaluation section also includes instructions for completing the work, as shown in Figure 5.



Gambar 5. Evaluation

b. Product Validation

This stage was carried out to determine the feasibility of the developed e-module. The feasibility test for the Rifa'iyah batik e-module was conducted by three media expert validators and three material expert validators to obtain suggestions and criticisms regarding the developed product.

c. Product Validation

The data from the assessments by media and material experts was used as a basis for revising the developed e- module as an effort to improve the components of the Rifa'iyah batik e-module before being tested on students. The validated design of the Rifa'iyah batik e-module was then revised based on the experts' input, in this case the revisions made were to the cover, image/illustration content in the e-module, writing, material, and evaluation section.

4. Implementation

This stage was an implementation to 35 students of grade XI Fashion Design 1 as the control class and 35 students of grade XI Fashion Design 2 as the experimental class. Student responses to the assessment sheet could be considered as a test of the effectiveness of the e-module.

a. Pre test

The first application stage involved administering a pre-test to both classes (the control and experimental classes). This test aimed to determine the respondents' initial state before receiving the Rifa'iyah batik e-module for the batik subject. This pre-test was administered once at the beginning of the

study using a Google Form.

b. Treatment with The Rifa'iyah Batik E-module

At this stage, after students complete the pre-test, they were then given treatment in the form of providing an e-module on Rifa'iyah batik to class XI Fashion Design 2 as the experimental class. The e-module provided as treatment was arranged based on learning outcomes and learning objectives in the batik subject in accordance with the Rifa'iyah batik material.

c. Post test

The final stage in testing the effectiveness of the Rifa'iyah batik e-module was to provide a post-test. The post-test assessment sheet was administered after respondents were given the pre-test and provided with learning using the Rifa'iyah batik e-module. This post-test was administered once to both the control and experimental classes. The assessment items on the post-test were identical to those used in the pre-test. It was done to determine the final results by comparing the treatment before and after the e-module was administered.

5. Evaluation

Two evaluations were carried out at this stage, i.e. formative evaluation and summative evaluation. The formative evaluation stage was an assessment carried out by the validator in the stage development, including the development of the Rifa'iyah batik e-module, media expert validation, material expert validation, and revision. This assessment served to ensure that the expected objectives could be achieved and to revise the learning media in the form of the Rifa'iyah batik e-module. While the summative evaluation aimed to determine the effectiveness of the use of the e-module. The e- module could be declared effective if the experimental group's student learning outcomes are significantly higher than the control group. The summative evaluation in this study, the Rifa'iyah batik e-module in the experimental group with N Gain got a score with effective criteria, it agrees with Jafnihirda et al. (2023).

RESULTS AND DISCUSSION

Feasibility of Rifa'iyah Batik E-module

This stage was conducted to determine the feasibility of the developed e-module. The feasibility test for the Rifa'iyah batik e- module was conducted by three media experts and three material experts to obtain validator criticism and suggestions for the product. The feasibility test instrument was adopted from previous research that has been proven valid and reliable. The results of the e-module feasibility analysis by the media experts and material experts can be seen in Table 1.

Tabel 1. Results of the Media Expert E-module Feasibility Test

No	Aspect	Validators			Average	Category
		1	2	3		
1	Screen Design View	3.6	4.1	4	3.9	Feasible
2	User Facilities	4	4	4.25	4.08	Feasible
3	Consistency	4	4	4	4	Feasible
4	Graphic	4	4	4	4	Feasible
5	Benefits	4	4	4	4	Feasible
$\bar{x}$ Overall Expert Average 3.99 (Feasible)						

Based on the data in table 1, it could be seen that the overall average from media experts is 3.99 so that the Rifa'iyah batik e-module is declared valid and feasible by media experts from the aspects of layer design appearance, user friendliness, consistency, graphics, and usefulness. The results of the feasibility test of the Rifa'iyah batik e-module by material experts are shown in table 2.

Tabel 2. Results of the Material Expert E-module Feasibility Test

No	Aspect	Validators			Average	Category
		1	2	3		
1	Content Eligibility	4.46	4.38	4.53	4.46	Very Feasible
2	Language	4.88	4.33	4.22	4.48	Very Feasible
3	Presentation	4.54	4.18	4.63	4.45	Very Feasible
$\bar{x}$ Overall Expert Average 4.46 (Very Feasible)						

Based on table 2, it can be seen that the overall average of the material experts is 4.46 so that the Rifa'iyah batik e-module is declared valid and very appropriate by the material experts in terms of content, language, and presentation feasibility. Thus, it can be concluded that the Rifa'iyah batik e-module is valid and does not require significant revisions and is suitable for use in batik learning in the Fashion Design vocational program.

Effectiveness of Rifa'iyah Batik E-module

The effectiveness of student learning outcomes in the cognitive aspect in this study used the N Gain test and the independent t-test. Before conducting the effectiveness test, prerequisite tests were required, namely normality and homogeneity tests. The results of the normality and homogeneity tests could be seen in Tables 3, 4, and 5.

Tabel 3. Results of Normality Tests

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pretest Control	.138	35	.089	.957	35	.184
Pretest Experiment	.111	35	.200*	.962	35	.267
Post-test Control	.131	35	.137	.931	35	.030
Post-test Experiment	.137	35	.094	.927	35	.024

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

a. Lilliefors Significance Correction

Based on table 3, it can be seen that the normality test of the effectiveness instrument of the Rifa'iyah batik e-module both in the pre-test and post-test in the control class and the experimental class shows a significance score (sig.) > 0.05, so it can be concluded that the data is normally distributed.

Tabel 4. Results of the Pre-test Homogeneity Test

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
Learning Outcomes	Based on Mean	3.528	1	68	.065
	Based on Median	3.327	1	68	.073
	Based on Median and with adjusted df	3.327	1	66.328	.073
	Based on trimmed mean	3.612	1	68	.062

Tabel 5. Results of the Post-test Homogeneity Test

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
Learning Outcomes	Based on Mean	.894	1	68	.348
	Based on Median	.665	1	68	.418
	Based on Median and with adjusted df	.665	1	61.111	.418
	Based on trimmed mean	.881	1	68	.351

Based on table 4 and table 5, the results of the homogeneity test on the pre-test and post-test of the control class and the experimental class obtained a significance value (sig.) > 0.05, so it could be concluded that the data is homogeneous.

After the prerequisite test is carried out, the next step is the N Gain test analysis to find out effectiveness of using the Rifa'iyah batik e-module. The results of the N Gain test can be seen in Table 6.

Tabel 6. Results of the N Gain Test

Descriptive Statistic

	N	*Minimum*	*Maximum*	*Mean*
Experiment N-gain (%)	35	25.00	100.00	76.03
Control	35	00.00	95.00	44.99

N-gain (%)

Based on the table above, it could be concluded that the N-Gain score of the experimental class was 76%, which means that the application of the Rifa'iyah batik e-module was effective in improving students' cognitive abilities.

Next, a follow-up independent t-Test was carried out to determine the differences the control and experimental groups. The results of this test could be seen in tables 7 and 8.

Tabel 7. Results of the Independent t Test Pre Test

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Learning Outcomes Pretest	Equal variances assumed	3.528	.065	-.482	68	.631	-1.505	3.122	-7.734	4.724
	Equal variances not assumed			-.482	63.690	.631	-1.505	3.122	-7.741	4.732

Tabel 8. Results of the Independent t Test Post Test

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Learning Outcomes Post-test	Equal variances assumed	.894	.348	-3.930	68	.000	-7.248	1.844	-10.928	-3.568
	Equal variances not assumed			-3.930	65.926	.000	-7.248	1.844	-10.930	-3.566

Table 7 shows that the learning outcomes between groups obtained a significance result of 0.631, greater than (>) 0.05. It can be concluded that the pre-test learning outcomes between the control and experimental groups did not have a significant difference. This means that the control and experimental groups had the same initial ability in understanding Rifa'iyah batik before receiving the learning treatment.

Meanwhile, table 8 shows that the learning outcomes between groups obtained a significance result of 0.000 which is smaller than (<) 0.05, so it can be concluded that there is a difference in learning outcomes between the control group and the experimental group in understanding Rifa'iyah batik after receiving treatment in the form of providing an e-module for Rifa'iyah batik in learning.

Discussion

The final result of this development research was a Rifa'iyah batik e-module based on the local wisdom of Batang Regency. The e-module development process was carried out in stages to produce a suitable e-module, which underwent a series of validations by media and content experts, as well as user-tested effectiveness.

Flipbook-based e-modules are a form of interactive media that play a vital role in the learning process. The e-module could increase student engagement and provide an engaging and challenging learning experience. The interactivity offered allows students to actively participate in the learning process, such as answering questions, conducting experiments, solving problems, or collaborating with other students (Jafnihirda et al., 2023). E-modules also allow flexible access anytime and anywhere, thus supporting effective independent learning. In addition to presenting material in a structured and systematic manner, e- modules are equipped with simulations, practice questions, and navigation that

facilitate students' deeper understanding of the lessons (Mutia, 2025).

The feasibility study of the e-module development results was based on the results of the assessment sheet of responses from media experts and material experts who are experts in the field of media and fashion design, especially related to batik, while the effectiveness test of the module was obtained from the results of the student pre-test and post-test. The validity of a product resulting from the development could be determined based on the results of the validation activity (Azwar, 2013).

After validation, the results revealed that the Rifa'iyah batik e-module has become a final product that was very suitable to be applied by students to improve their understanding of Rifa'iyah batik. The feasibility conclusion of the Rifa'iyah batik e-module was obtained from the validation results of 3 media experts and 3 material experts, with a score of 3.99 with the criteria of being suitable from media experts and a score of 4.46 with the criteria of being very suitable from material experts. The feasibility assessment of the e-module has been adjusted to aspects that can be used as guidelines in testing the feasibility of the e-module. It was in line with Lastri's (2023) in which good learning e-modules have several characteristics, i.e. self-instruction, self-contained, stand-alone, adaptive and user-friendly.

Based on the effectiveness test stage of the Rifa'iyah batik e-module on N Gain, the results showed that the implementation of the Rifa'iyah batik e-module is effective in improving students' cognitive abilities. Then, the independent t-test showed that the control and experimental classes did not have significant differences before being treated with the Rifa'iyah batik e-module, and there were differences in learning outcomes in understanding Rifa'iyah batik after receiving treatment in the form of providing the Rifa'iyah batik e-module.

The Rifa'iyah batik e-module based on the local wisdom of Batang Regency could be used by Vocational High School students, especially in the field of Fashion Design. This module was categorized as very feasible and effective for improving students' understanding of Rifa'iyah batik. The results of this study agreed with those of Sa'idah et al. (2024), Wardhana et al. (2022), Lubis et al. (2025), dan Nurdiansyah et al. (2025) stated that e-modules can improve students' cognitive abilities in learning, in this study, namely understanding related to Rifa'iyah batik.

CONCLUSION

Based on the results and discussions related to the development of the Rifa'iyah batik e-module based on the local wisdom of Batang Regency in the batik subject, it was concluded that the development of the e-module had been carried out using the ADDIE model with the stages of analysis, design, development, implementation, and evaluation. The feasibility of the Rifa'iyah batik e-module obtained an average result from media experts of 3.99 (feasible) and from material experts of 4.46 (very feasible). It could be concluded that the e-module was valid with revision and does not require significant revision. The Rifa'iyah batik e-module was also declared effective for use in batik learning. It was based on the effectiveness test with pre-test and post-test which obtained an N Gain result of 76%. Thus, it could be concluded that the use of the Rifa'iyah batik e-module plays a role in improving students' cognitive abilities related to Rifa'iyah batik in batik learning.

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