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E-Learning Adaptation to Merdeka Curriculum Based on Microsite to Improve Mastery of Rukhsah Concept in School

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Abstract: E-Learning Adaptation to Merdeka Curriculum Based on Microsite to Improve Mastery of Rukhsah Concept in School. Learning activities during the day and the insufficiency of the media used are obstacles for PAI educators at SMP 1 Kudus which causes low attention of students and has implications for students' mastery of the concept of learning material. This article presents a novelty in the form of developing e-learning media based on Microsite S.Id. as an innovative solution that is interactive, interesting, and aligned with the Merdeka Curriculum. The purpose of this article is to describe the development procedure, test the validity of media feasibility, and measure the effectiveness of media in improving students' mastery of the concept of Rukhsah. This research uses the R&D method with the ADDIE model, involving 27 students in class 7H SMP 1 Kudus and experts as validators. Data collection techniques include tests (pre-test and post-test) and non-tests (questionnaires, observations, interviews, and documentation). The findings show that the media is classified as "Very Feasible" from the aspects of material, media, teaching modules, and assessment. While the results of the effectiveness test through the Wilcoxon Test obtained a significance value of 0.000 (<0.05) accompanied by the acquisition of an N-Gain Score of 0,8793 and an N-Gain Percent of 87.93% which is included in the "High" and "Very Effective" categories. Thus, this article indicates that this e-learning media is proven to be able to significantly improve students' concept mastery and is worth recommending as an adaptive solution for learning PAI that is more enjoyable, especially at less conducive learning times such as during the day. This article also recommends the use of digital-based media in other studies and suggests further research with a wider range of materials and education levels.

Keywords: E-Learning Media, Merdeka Curriculum, Microsite S.Id., Concept Mastery, Rukhsah.

Abstrak: Adaptasi E-Learning pada Kurikulum Merdeka Berbasis Microsite untuk Meningkatkan Penguasaan Konsep Rukhsah di Sekolah. Kegiatan pembelajaran pada siang hari dan insufisiensi media yang digunakan menjadi kendala pendidik PAI di SMP 1 Kudus yang menyebabkan rendahnya atensi peserta didik dan berimplikasi pada penguasaan konsep peserta didik terhadap materi pembelajaran. Artikel ini menghadirkan novelty berupa pengembangan media e-learning berbasis Microsite S.Id. sebagai solusi inovatif yang interaktif, menarik, dan selaras dengan Kurikulum Merdeka. Tujuan artikel ini untuk mendeskripsikan prosedur pengembangan, menguji validitas kelayakan media, serta mengukur efektivitas media dalam meningkatkan penguasaan konsep Rukhsah peserta didik. Penelitian ini memakai metode R&D

dengan model ADDIE, melibatkan 27 peserta didik kelas 7H SMP 1 Kudus serta para ahli sebagai validator. Teknik pengumpulan data meliputi tes (pre-test dan post-test) serta non-tes (angket, observasi, wawancara, dan dokumentasi). Hasil temuan menunjukkan bahwa media tergolong "Sangat Layak" dari aspek materi, media, modul ajar, dan asesmen. Sementara hasil uji efektivitas melalui Uji Wilcoxon memperoleh nilai signifikansi 0,000 ($< 0,05$) disertai perolehan N-Gain Score sebesar 0,8793 dan N-Gain Persen 87,93% yang termasuk kategori "Tinggi" dan "Sangat Efektif". Dengan demikian, artikel ini mengindikasikan bahwa media e-learning ini terbukti mampu meningkatkan penguasaan konsep peserta didik secara signifikan dan layak direkomendasikan sebagai solusi adaptif pembelajaran PAI yang lebih menyenangkan, terutama pada waktu belajar yang kurang kondusif seperti siang hari. Artikel ini juga merekomendasikan digunakan sebagai pemanfaatan media berbasis digital pada studi lainnya serta menyarankan penelitian lanjutan dengan cakupan materi dan jenjang pendidikan yang lebih luas.

Kata kunci: E-Learning, Kurikulum Merdeka, Microsite S.Id., Penguasaan Konsep, Rukhsah

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INTRODUCTION

Departing from the social reality that technology is advancing along with the times (Lubis et al., 2023). Handphone as part of sophisticated technological developments can be a support in various human activities in the current digital era including in education (Aeni et al., 2024; Ranti et al., 2024; Reddy et al., 2023). This technological advancement needs to be utilized properly (Husain et al., 2025; Wahyudi et al., 2025). But in reality, educators still do not utilize technology optimally (Farha et al., 2020; Reksiana et al., 2024). Various actions have been undertaken to raise educational standards, including efforts to develop digital-based learning media (Cecep & Daddy, 2023; Degner et al., 2022; Setiawan & Rahman, 2025). This can help students increase learning motivation, creativity, critical thinking, and successful mastery of learning material concepts (Agus et al., 2024; Daryanes et al., 2023; Mahendra & Agustiana, 2024; Rohles et al., 2022).

Observation studies at SMP 1 Kudus still found some conventional learning limited to book media so that students tend to get bored and sleepy. In facing this challenge, it is necessary to breakthrough innovation in the form of digital-based learning adaptations to actively involve student interaction during learning (Anafi et al., 2021). One of the relevant efforts is digital-based media known as e-learning which makes students feel the interaction of learning experiences directly and dynamically with learning materials in depth (Han, 2025; Reffiane et al., 2024; Tianyi, 2025). The phenomenon of using learning platforms in the form of e-learning media as learning media is increasingly in demand by students in schools (Nusaibah & Khusniyah, 2024; Safitri & Susilo, 2024). This is because currently students interact more with technology-based media than conventional media (Hamdi et al., 2024; Rizal et al., 2025). Taking this step has the potential to realize interesting and interactive learning so as to motivate and involve them in mastering the understanding of the concepts of learning materials (Akram et al., 2022; Valverde-Berrocoso et al., 2021).

The adaptation of digital-based media in education is currently being developed gradually from year to year which is considered to create a new model of education in improving learning (Mhlongo et al., 2023; Susanti et al., 2024). The necessity for quality education has led to the implementation of digital-based learning tools that are applicable across all educational stages and areas, particularly in Islamic Religious Education (PAI) so that educators need to utilize it optimally in responding to the challenges of digital era learning (Gutierrez et al., 2023; Partono, 2020). The use of this media has been aligned with the Merdeka Curriculum because it is more humanistic with the characteristics and learning needs of students (Winangun, 2024). The Merdeka Curriculum offers diverse learning experiences to provide learners with sufficient time to deepen their mastery of learning material concepts independently (Nurani et al., 2022). This is because this curriculum has the main foundation of freedom in learning to foster independence in the learning process that is relevant to the digital era (Noptario et al., 2024; Rizal et al., 2025). Thus, educators are fully in charge of implementing the Merdeka Curriculum including the selection of learning media, so the process of developing e-learning media is crucial in learning by adjusting the characteristics of students (Hamdi et al., 2024; Sutikno, 2021).

Moving on from the above problems, one of the e-learning media innovations that researchers present is the utilization of websites in PAI learning. Website media can facilitate students in learning without space and time constraints while studying at school or independently at home (Faishol et al., 2022). Websites have been shown to enhance educational quality through the integration of internet technology into the learning process (Nurhayati & Kurniati, 2025). Over time, the website has experienced significant development. In the midst of the proliferation of website technology, there are still some websites that require coding skills in their development. In this context, researchers

develop media based on mini websites or microsities that are still rarely used in the scope of education. Microsite has several advantages. First, it is in the form of a mini website that can be developed instantly and easily, without the need for any coding skills. Secondly, the features can be customized according to the needs and characteristics of the users. Third, the link can be shortened to the S.Id. web code followed by the microsite name code that the developer wants. Fourth, microsities also have a wide selection of complete components accompanied by editor panels that are easily accessible by various devices, ranging from cellphones, tablets, to desktops (Aeni et al., 2024; Mingot & Marín, 2024; Nurfalah & Rahayu, 2023). The integration of microsite-oriented e-learning platforms offers potential for teachers and educational stakeholders in advancing learning effectiveness. Microsite-based learning media can deliver content in visual, audio, and audiovisual formats which plays a strategic role in delivering material to students and creating an innovative, interactive, and fun learning atmosphere.

Many studies have examined the utilization of e-learning media in learning which can be classified into three categories. First, studies that focus on learning outcomes through the use of elearning, both website and application-based. These studies show that the application of digital media can significantly improve learners' academic achievement in the context of PAI learning and other learning (Aeni et al., 2024; Alirahman et al., 2023; Hanafi et al., 2020; Mardiana & Anggraini, 2019). Second, studies that highlight students' learning interest in e-learning media with an emphasis on interactivity and media attractiveness to generate learning motivation (Khairial et al., 2022; Rohmah & Tegeh, 2022; Uliyandari et al., 2021; Yuniar & Nurdyansyah, 2023). Third, studies that specifically measure concept mastery through digital media in learning, both in general fields of study such as science and mathematics and in the context of PAI learning (Barlian et al., 2022; Juneli et al., 2022; Mustofa, 2019). However, until now, no studies have been found that specifically develop and test elearning media based on the microsite S.Id to improve mastery of the concept of Rukhsah material on the topic "Rukhsah: Kemudahan dari Allah SWT dalam Beribadah kepada-Nya" which is integrated with the Merdeka Curriculum. This reason is the crucial basis for the need for this research to be carried out.

This article is directed to answer the void of previous studies by presenting an e-learning media development model based on microsite S.Id named "Rukhsah Smart Learning". To support the implementation of the Merdeka Curriculum in junior high school Islamic Education (PAI), this article focuses on developing microsite-based e-learning media using S.Id, validating its feasibility through expert assessment, and evaluating its effectiveness in enhancing students' mastery of the Rukhsah concept. By using the Research and Development (R&D) method through the ADDIE development model, this article offers a new perspective that distinguishes it from previous studies, both in terms of material focus, type of media, and the context of its implementation at the formal education level at the secondary level in responding to the challenges of religious education in the digital era.

METHOD

This research uses the Research & Development (R&D) method which focuses on producing certain products whose results will be tested and examined for the feasibility validity and effectiveness of the products developed (Sugiyono, 2023). The final product is an e-learning medium based on the S.Id microsite, designed to support the implementation of the Merdeka Curriculum in junior high school Islamic Education

(PAI). The One Group Pretest-Posttest Design approach is used to conduct field testing of media development (Rafli et al., 2024). Operationally, this approach is carried out with one group of subjects. At the beginning of learning, a pre-test is carried out first, followed by giving treatment with the developed media, finally a post-test is carried out with the same instrument (Neolaka, 2016). The development process is in line with the ADDIE Model (Analyze - Design - Develop - Implement Evaluate) (Sucipto et al., 2022). The following is the flow of the ADDIE model implemented:

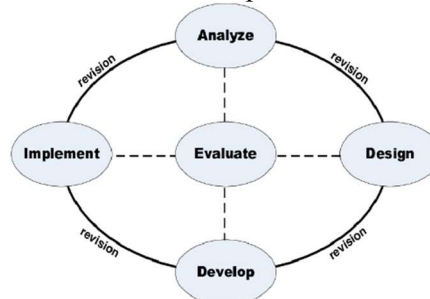


Figure 1. Flow of the ADDIE Model

The ADDIE model process starts: (1) Analyze, involves conducting observations and interviews with PAI teachers and grade 7H students. This phase includes three types of analysis: identifying students' needs, reviewing the curriculum, and assessing available infrastructure. (2) Design, designing products developed through the process of designing material content, media components, and media design content according to the results of the analysis. (3) Develop, develop e-learning media based on microsite S.Id, then validated by material, media, teaching module and assessment experts. (4) Implement, apply media trials to students from the revised results of the experts' validation to determine the increase in mastery of the concept of Rukhsah material at school. (5) Evaluate, conduct an evaluation to measure how much students improve mastery of the material concept through the results of the pre-test and post-test in learning.

Furthermore, the subjects in this study were students of class 7H SMP 1 Kudus totaling 27 people consisting of 10 boys and 17 girls. Other participants were PAI teachers and experts who acted as validators. The trial was conducted for two meetings (a total of 3 JP) on April 17 and 21, 2025. While the time span of this research began in March to June 2025, which was located in SMP 1 Kudus. Data collection techniques included test (pre-test and post-test) and non-test (questionnaire, observation, interview, and documentation) techniques. The instruments used include validity and effectiveness instruments (Leny et al., 2024). This validity instrument uses a type of validity analysis to measure the feasibility of media that refers to four indicators, namely material, media, teaching modules, and assessment. Material validators consisted of lecturers from the Islamic Education Program at UIN Sunan Kudus and Islamic Education teachers at SMP 1 Kudus. Media validators are two lecturers of Islamic Education Program of UIN Sunan Kudus. Teaching module validators consisted of lecturers from the Islamic Education Program at UIN Sunan Kudus and Islamic Education teachers at SMP 1 Kudus. The assessment validator involved two lecturers of the Islamic Education Program of UIN Sunan Kudus. Meanwhile, in analyzing the assessment of media feasibility using a Likert scale that refers to (Nadawiyah & Anggraeni, 2021; N. Sari et al., 2024) with an assessment = $\frac{\text{Skor Didapatkan}}{\text{Skor Maksimal}} \times 100\%$ with a validation rating scale as below:

21

Table 1. Validation Rating Scale

Value	Feasibility Category
5	Very Good
4	Good
3	Good Enough
2	Less Good
1	Not Good

111

After the above assessment is obtained, the next step is to convert the assessment results into a scale of media feasibility achievement levels. This conversion is carried out to determine the feasibility category based on the percentage of achievement scores that refer to (Nadawiyah & Anggraeni, 2021; N. Sari et al., 2024) as follows:

110

39

Table 2. Feasibility Achievement Score

Percentage of Achievement Score (%)	Category
81 – 100	Very Feasible
61 – 80	Feasible
41 - 60	Feasible Enough
21 – 40	Less Feasible
0 – 20	Not Feasible

20

89

68

While the effectiveness instrument was analyzed using the type of effectiveness analysis (type of statistical test) through Normality Test, Non-Parametrix Test in the form of Wilcoxon Test, and N-Gain Test in measuring the success of a lesson with the help of statistical analysis on SPSS. Then the results of the N-Gain Test are used in determining the level of effectiveness of the product developed, referring to (Nadawiyah & Anggraeni, 2021; N. Sari et al., 2024) with the assessment score category formula and effectiveness score below:

Table 3. N-Gain Assessment Score

Value	Category
$(G) > 0,7$	High
$0,3 < (G) \leq 0,7$	Medium
$(G) < 0,3$	Low

8

Table 4. N-Gain Effectiveness Score

Percentage of Achievement Score (%)	Effectiveness Level Category
76 – 100	Very Effective
51 – 75	Effective
26 – 50	Less Effective
0 – 25	Not Effective

32

▪ **RESULT AND DISCUSSION**

Result

Development of E-Learning Media Based on Microsite S.Id

The process of developing e-learning media based on Microsite S.Id uses ADDIE development model. The results obtained by researchers are as follows:

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Analyze

This analysis stage is divided by researchers into 3 analyses, including needs analysis, curriculum and materials and infrastructure. First, is a needs analysis. The

researcher started his research study on March 8, 2025 by conducting observations at SMP 1 Kudus and interviews with PAI Teachers of Class 7H SMP 1 Kudus. **The results of the needs analysis are presented in Table 5.**

Table 5. Results of Needs Analysis

Analysis	Findings	Result
Learning Style	Diverse with more dominant in visual	The existence of this media development can facilitate the needs of diverse learning styles ranging from visual, audiovisual, and kinesthetic
Intelligence of Learners	Tendency at multiple intelligences visual part	The presence of this media makes learners are more interested in the presentation of animation, color, writing, images, and visual videos that support the process of understanding the material
Learners' Cognitive Development	Cognitive mastery starts at the C1 - C4 level	It is necessary to conduct an assessment through the presence of this media in the form of diagnostic assessment, formative assessment (Rukhsah Crossword Puzzle) and summative (Quizizz)
Characteristics of Learners	Classified as active and responsive	The presence of this media seeks to accommodate the characteristics of their needs by actively involving the learning process by inviting thinking, discussing, and mastering the material directly in class interaction. through formative assessment (Rukhsah Crossword Puzzle)

Second, curriculum and material analysis. PAI learning at SMP 1 Kudus has followed the Merdeka Curriculum policy **in line with the Ministry of Education and Culture's** 2022 policy since the last three years, precisely in 2022. While the results of material analysis, researchers chose the material "*Rukhsah: Kemudahan Dari Allah Swt Dalam Beribadah Kepada-Nya*" in Chapter 9 which is taught in class 7H (Phase D) **to develop e-learning media based on** Microsite S.Id. **The selection of this material is based on the consideration** and direction of **the** 7th grade PAI teacher that this material is still unfamiliar to students so it is still quite difficult to improve mastery **of the concept of material** so that it **needs** interesting, innovative, **and interactive media**. Researchers also analyzed the material against **learning outcomes and learning objectives** according **to the** official platform **of the** Ministry of Primary and Secondary Education, namely guru.kemdikbud.go.id and datadikdasmen.com on the Merdeka Curriculum.

Third, is the analysis of infrastructure facilities. The facilities available at SMP 1 Kudus are quite complete, especially in supporting the implementation of digital-based learning. This is evidenced in making observations to the class directly in class 7H which is equipped with a projector. So the results of this observation condition, researchers are

trying to develop digitally integrated media in the form of e-learning based on Microsite S.Id because it is supported by the availability of facilities and infrastructure at SMP 1 Kudus.

Design

The design stage of the researcher designs the product made through 3 aspects including material content, media components, and media design content according to the results of the analysis. In this aspect of material content, researchers use the learning outcomes of phase D (grade 7) of the Merdeka Curriculum, which reads “Peserta didik memahami internalisasi nilai-nilai dalam sujud dan ibadah salat, memahami konsep mu’amalah, riba, rukhsah, serta mengenal beberapa mazhab fikih, dan ketentuan mengenai ibadah qurban”. While the content of the main material in the form of “Rukhsah: Kemudahan Dari Allah Swt Dalam Beribadah Kepada-Nya”. The content of the material includes learning objectives developed by researchers, which read “(1) Peserta didik dapat memahami makna rukhsah dalam ibadah. (2) Peserta didik dapat memahami hukum rukhsah dalam ibadah. (3) Peserta didik dapat memahami alasan diperbolehkan rukhsah dalam ibadah. (4) Peserta didik dapat mengklasifikasikan macam-macam rukhsah dalam ibadah. (5) Peserta didik dapat menerapkan macam-macam rukhsah dan hikmah rukhsah dalam melaksanakan ibadah.” In addition, the content of the material as a whole can be accessed in teaching modules and flipbook teaching materials that are integrated into e-learning media to make it easier for students to master the content of the material anytime and anywhere.

In the component aspect, it consists of media identity, teaching modules according to the CP & TP of the Merdeka Curriculum, deeper introduction by media users through non-cognitive & cognitive diagnostic assessments, exciting flipbook-based rukhsah subject matter teaching materials, additional materials, and Youtube-based learning videos as well as formative assessment evaluations in the form of Rukhsah Crossword Puzzle and summative assessments in the form of Quizizz. In addition, it is equipped with a media developer profile and social media from the media developer. While the design content aspect, researchers started by creating non-cognitive diagnostic assessment components, formative assessments, and flipbook teaching materials through Canva design. While the components of the teaching module & cognitive diagnostic assessment, and additional materials were made through Microsoft Office. Researchers also made summative assessments through Quizizz and sorted out Youtube-based learning videos that matched the content of the material. After all components are collected, the design content design is continued by creating and designing it through the microsite S.Id. platform. by designing a storyboard first. The storyboard description in this media design can be seen from the following figure:

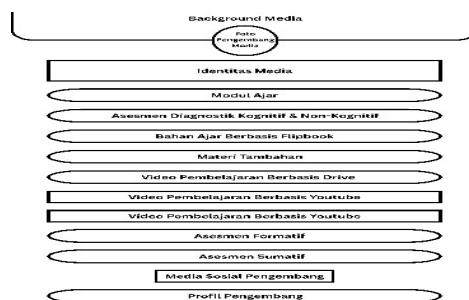


Figure 2. Storyboard of E-Learning Media Based on Microsite S.Id

Develop

This development stage is by making e-learning media products based on *Microsite S.Id*. The finished product is carried out feasibility testing in advance in the form of expert validation. Here the feasibility test to material, media, teaching modules, and assessment experts to find out how much the feasibility results of this media development. After getting the results of the feasibility test of the experts, the researcher revised and developed the product before applying the trial at SMP 1 Kudus to students. In this development in more detail can be accessed through <https://s.id/rukhsahsmartlearning> or through the following barcode:



Figure 3. Barcode of E-Learning Media Based on Microsite S.Id

The following is the result of the development stage in the form of e-learning media visualization ready to be tested on students at SMP 1 Kudus.

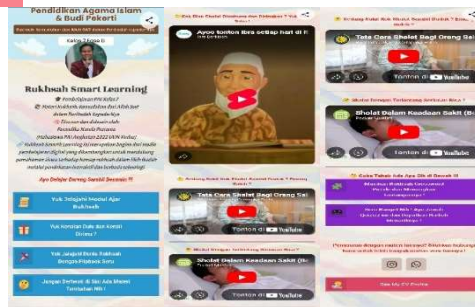


Figure 4. Media Display

Implement

Media products that have been revised and developed are then carried out field trial implementation in class 7H SMP 1 Kudus using One Group Pretest-Posttest Design for 2 meetings totaling 3 JP on Thursday, April 17, 2025 in hours 7 & 8. (11.40 - 13.00) and Monday, April 21, 2025 at hour 6 (10.40 - 11.20). Researchers used the cooperative learning model with the teams games tournament method at the first meeting through formative assessment in the form of Rukhsah Crossword Puzzle followed by the game-based learning method at the second meeting through summative assessment (post-test) in the form of Quizizz. At the first meeting, students were asked to do a cognitive diagnostic assessment (pre-test) to assess the level of mastery of the concept of Rukhsah material for students. Furthermore, at the end of the meeting they were asked to do a summative assessment (post-test) in the form of Quizizz to measure the increase in mastery of the concept of learning material. This trial has been successfully implemented with 27 students in class 7H. Overall in this learning, students are so enthusiastic and happy to learn by being actively involved because they have never previously participated in digital integrated learning that is interesting and interactive as in this e-learning media.

Evaluation

This evaluation stage is to measure how much students improve their mastery of material concepts through the results of pre-test and post-test in learning. The results of this evaluation consist of 2 aspects, namely perception evaluation and performance evaluation. First, is the perception evaluation. This evaluation is obtained from the results of learner response questionnaire data during the implementation stage. Based on

students' comments in general, this media is acceptable and makes it easier for them to understand the material presented. This is evidenced by the statement of AA who argues "The presentation / means of learning is exciting, fun, and not boring". Then AKK also added "Fun and easy to understand". A student named AFF also gave a positive affirmation which revealed "It's really nice to study with IAIN seniors, it's easier to understand the material. Of course very excited". Meanwhile, SD expressed his gratitude "I am grateful to Kak Nanda because I can understand the rukhsah material easily and easily remembered". A student named VT also added "It's good and suitable to be a teacher. The problem is that it's good to be taught by you, you understand better". Thus, it can be concluded from the results of the perception evaluation, their response was so interested and enthusiastic about this media that it indicated that this media could support students in making it easier for them to master the concept of learning material even though the material was still quite unfamiliar to students.

Second, is the performance evaluation. This evaluation is obtained from the results of researcher observations when implementing field trials of this e-learning media in class 7H with the implementation of evaluations on diagnostic, formative and summative assessments. The existence of formative assessments in the form of Rukhsah Crossword Puzzle in groups shows the active involvement of students in discussing and thinking critically when completing LKPD. While the evaluation of diagnostic (pre-test) and summative (post-test) assessments is used to determine the effectiveness of the e-learning media developed in solving the LKPD. e-learning media developed in improving the understanding of the concept of Rukhsah material through prerequisite tests with normality tests, non-parametrix tests (Wilcoxon tests) and N-Gain tests.

Feasibility of E-Learning Media Based on *Microsite S.Id*

In assessing the feasibility of the developed media, it is necessary to conduct validation obtained from experts. These experts consist of material, media, and teaching module experts. This data acquisition includes qualitative data in the form of suggestions, input, or comments from experts through the distribution of questionnaires and quantitative data in the form of the results of the validation questionnaire assessment of material, media, and teaching module experts. In addition, researchers involved assessment experts to validate the assessment instruments used, to ensure the validity of the instruments in measuring students' mastery of concepts after the implementation of diagnostic (pre-test) and summative (post-test) assessment trials. The results of the experts' assessment of the e-learning media developed are presented as follows:

Table 6. Material Expert Validation Results

No	Aspect	Validator Score 1	Validator Score 2
1	Material Content	21	23
2	Presentation	23	25
3	Evaluation	23	23
Total Score		67	71
Maximal Score		75	75
Percentage		89,3%	94,7%
Category		"Very Feasible"	"Very Feasible"

Based on the table above, the average results of material experts resulted in 92% with a qualitative conversion assessment, namely the "Very Feasible" category obtained from the results of Material Expert 1 (Lecturer of PAI Program at UIN Sunan Kudus) of 89.3% and Material Expert 2 (PAI Teacher of SMP 1 Kudus) of 94.6%.

99

Table 7. Media Expert Validation Results

No	Aspect	Validator Score 1	Validator Score 2
1	Media Presentation	23	24
2	Content Presentation	23	21
3	Effectiveness	23	25
Total Score		69	70
Maximum Score		75	75
Percentage		92%	93,3%
Category		“Very Feasible”	“Very Feasible”

59

124

Based on the table above, the average result of media experts is 92.65% with a qualitative conversion assessment, namely the “Very Feasible” category obtained from the results of Media Expert 1 (Lecturer in PAI Program at UIN Sunan Kudus) of 92% and Media Expert 2 (Lecturer in PAI Program at UIN Sunan Kudus) of 93.3%.

Table 8. Teaching Module Expert Validation Results

No	Aspect	Validator Score 1	Validator Score 2
1	General Information Component	47	53
2	Core Competency Component	81	102
3	Appendix Component	12	15
Total Score		140	170
Maximum Score		175	175
Percentage		80%	97,1%
Category		“Feasible”	“Very Feasible”

120

Based on the table above, the average assessment results from teaching module experts show a percentage of 88.6% with a qualitative conversion category of “Very Feasible”, obtained from Teaching Module Expert 1 (Lecturer of PAI Program at UIN Sunan Kudus) of 80% and Teaching Module Expert 2 (PAI Teacher of SMP 1 Kudus) of 97.1%. Furthermore, in an effort to ensure the validity of the assessment instruments used in measuring students’ mastery of concepts after the implementation of the diagnostic assessment (pre-test) and summative assessment (post-test) trials, researchers also involved assessment experts in the validation process. The assessment results from the assessment experts are presented in the following table:

42

64

Table 9. Assessment Expert Validation Results

No	Aspect	Validator Score 1	Validator Score 2
1	Understand the meaning of rukhsah in worship	18	19
2	Understand the law of rukhsah in worship	5	5
3	Understand the reasons for allowing rukhsah in worship	17	20
4	Classify the kinds of rukhsah in acts of worship	17	20
5	Apply various kinds of rukhsah in worship and the wisdom of rukhsah in performing acts of worship	34	29
Total Score		91	93
Maximum Score		100	100
Percentage		91%	93%
Category		“Very Feasible”	“Very Feasible”

66

Based on the table above, the average result of the assessment expert shows a percentage of 92% with a qualitative conversion category of “Very Feasible”, obtained

from the results of Media Expert 1 (Lecturer of PAI Program at UIN Sunan Kudus) of 91% and Media Expert 2 (Lecturer of PAI Program at UIN Sunan Kudus) of 93%.

Based on these results, it can be concluded that the S.id Microsite-based e-learning media developed is included in the "Very Feasible" category to be used as an alternative solution in PAI learning at the junior high school level. This media is considered innovative because it has never been applied in PAI learning, especially on the concept of Rukhsah material.

Effectiveness of E-Learning Media Based on Microsite S.Id

Researchers processed the data results of students' pre-test and post-test scores of Rukhsah material to determine the statistical average results, as presented in Table 10. below:

Table 10. Results of Descriptive Statistical Analysis of Pre-Test and Post-Test

	Descriptive Statistics						
	N	Range	Minimum	Maximum	Mean	Std. Deviation	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic
PRETEST	27	65	30	95	48.89	3.023	15.710
POSTTEST	27	20	80	100	94.44	1.111	5.774
Valid N (listwise)	27						

Based on the table above, it can be seen that the average pre-test result is 48.89 and the posttest is 94.44 using SPSS. There is a difference between the two reaching 45.55 which indicates an increase in mastery of the concept of Rukhsah material in students after using e-learning media.

Furthermore, researchers analyzed the results of data before using Microsite S.Id based e-learning media (Pre-Test) and the results of data after using Microsite S.Id based e-learning media (Post-Test) to determine whether the data obtained were normally distributed or not with the Prerequisite Test in the form of Normality Test using Shapiro-Wilk, considering that the sample size was less than 50 respondents, namely 27 students. The level of significance used is 0.05 with the provision that if the Sig. value <0.05 then the data is not normally distributed, and vice versa if Sig. > 0.05 then the data is normally distributed. The results of the normality test are presented in Table 11. below:

Table 11. Normality Test Data Results

	Tests of Normality					
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
PRETEST	.200	27	.007	.877	27	.004
POSTTEST	.239	27	.000	.844	27	.001

a. Lilliefors Significance Correction

Based on the results above, the significance value (Sig.) in both Shapiro-Wilk shows <0.05 for pre-test and post-test. Thus, the data is not normally distributed, so the analysis continues with a nonparametric test, namely the Wilcoxon Test. In this Wilcoxon test, the hypothesis H0: there is no increase in concept mastery after using the media, and H1: there is an increase in concept mastery after using the media. Then the decision-making criteria are determined based on the significance value ($\alpha = 0.05$), provided that if Asymp. Sig. < 0.05 then H0 is rejected and H1 is accepted. The results of the Wilcoxon Test are presented in Table 12. below:

Table 12. Non Parametrix Test Data Results with Wilcoxon Test Test Statistics^a

POSTTEST – PRETEST	
Z	-4.546 ^b
Asymp. Sig. (2-tailed)	.000

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

Based on these results, the Asymp. Sig. value of $0.000 < 0.05$, so that H_0 is rejected and H_1 is accepted, which means that there is a significant increase in the mastery of the concept of students after using e-learning media based on Microsite S.Id. This indicates that the media developed is proven effective in helping students improve mastery of the concept of Rukhsah material.

Furthermore, to find out how much the effectiveness of the media in improving mastery of concepts, an analysis was carried out using the N-Gain test. The results of the analysis are presented in Table 13. below:

Table 13. N-Gain Test Results

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
NGAIN SCORE	27	.56	1.00	.8793	.13263
NGAIN PERSEN	27	55.56	100.00	87.9294	13.26333
Valid N (listwise)	27				

Based on these results, the average value of N-Gain Score is $0.8793 > 0.7$, which is included in the “High” effectiveness category. Meanwhile, the average value of N-Gain Percent is $87.93\% > 76\%$, indicating the level of effectiveness in the “Highly Effective” category. These findings indicate that the S.id Microsite-based e-learning media developed is able to have a significant positive impact in improving students' mastery of concepts, especially on the material “Rukhsah: Kemudahan dari Allah Swt dalam Beribadah kepada-Nya”.

Discussion

The results showed that the development of e-learning media based on Microsite S.Id. with the ADDIE model was able to have a significant positive impact on improving students' mastery of concepts on Rukhsah material. The results of statistical analysis obtained an average pre-test at 48.89 increased to 94.44 in the post-test resulting in an increase difference of 45.55. This increase is reinforced by the results of the Wilcoxon test of 0.000 (< 0.05), which indicates a significant difference between the scores before and after using the media. This finding is also supported by the results of the N-Gain Score test of 0.8793 which is included in the “High” effectiveness category and the N-Gain Percent Test of 87.92% in the “Highly Effective” category which indicates that the media developed is not only attractive in appearance, but also effective in supporting the achievement of PAI learning objectives, especially Rukhsah material at the junior high school level with high effectiveness. This finding is consistent with studies (Aeni et al., 2024; Alirahman et al., 2023; Hanafi et al., 2020) which confirmed that the use of website-based e-learning or applications can improve the achievement of student learning outcomes.

The use of e-learning as a forum for delivering material, implementing the learning process, and learning assessments allows for flexible, independent, interactive,

and fun learning in response to the need for PAI learning innovation in accordance with the proximity of technology for the current generation of students in the Merdeka curriculum. The learning objectives designed are also in accordance with phase D grade 7 with learning activities that involve independence, as well as assessments that attract their learning interests as a concrete form of implementing the independent curriculum. This finding is in line with the study (Hamdi et al., 2024; Noptario et al., 2024; Nurani et al., 2022) that Merdeka Curriculum learning needs to provide space for students to explore knowledge actively and independently. The realization of the characteristics of this independent learning curriculum requires flexible and attractive digital-based learning media that can accommodate their diverse learning needs and styles. Therefore, the development of digital-based learning media such as elearning is very necessary (Aeni et al., 2024; Rizal et al., 2025). The media development process certainly goes through the stages of validation by experts with results that show the feasibility of media, both from material, media, teaching module structure, and assessment. All of them were answered with the results of expert validation in the "very feasible" category, namely the average of the two material experts 92%, the two media experts 92.65%, the two teaching module experts 88.6%, and the two assessment experts 92%. These results are in line with studies (Nadawiyah & Anggraeni, 2021; Ramansyah et al., 2021; N. Sari et al., 2024) which emphasize that the quality of the validity of good media feasibility will have an impact on the success of students' concept mastery.

The presence of this media is of course inseparable from the uniqueness of the S.Id. Microsite media, which is flexible and easy to use without programming skills in its development. The presentation of multimedia-based content integrated with e-module features, flipbooks, Youtube-based learning videos, interactive LKPD, and Quizizz for learning assessment is the main attraction that makes the learning process more interesting, visual, and easily accessible anytime and anywhere (Winangun, 2024). These characteristics are in accordance with the needs of students who tend to have visual and kinesthetic learning styles. In addition, the cooperative learning model applied with the combination of teams games tournament method and game-based learning method has been proven effective in strengthening their active involvement, increasing enthusiasm, and developing critical thinking skills collaboratively and competitively. These findings are in line with studies (Jalinus et al., 2022; Sukmasari & Rosana, 2017) that emphasize the importance of collaborative-based digital learning media in increasing activeness and problem-solving skills in teamwork. This is also reinforced by the findings of (Lumbantoruan & Manalu, 2024) which show that the use of digital-based media in the form of emodules combined with cooperative learning models can significantly improve learning effectiveness, student involvement, and concept understanding in learning materials at school. In this context, active and participatory learning can be an important indicator to improve students' learning outcomes in presenting relevant learning media innovations (Anwar et al., 2022).

Furthermore, the findings of this study are in line with previous research which shows that digital-based media such as flipbooks, digital comics, e-modules, and other media can improve students' concept mastery. Studies (Barlian et al., 2022; Fendi et al., 2025; Ikhlas et al., 2025; Juneli et al., 2022; Rosnata et al., 2021; A. R. Sari et al., 2023) state that the use of digital-based media can improve students' engagement and learning outcomes. Meanwhile, (Aeni et al., 2024; Nurfalah & Rahayu, 2023; Nurhayati & Kurniati, 2025) have confirmed that S.Id. based Microsite media is very suitable for learning media because its development is not too difficult, easily accessible, cost-effective, and flexible to be used by teachers at various levels of education. Therefore,

the development of S.Id. Microsite-based e-learning media can be considered as a real contribution in improving students' learning outcomes in the context of PAI learning.

Based on the findings, it can be concluded that the contribution of e-learning media development based on Microsite S.Id. is not only valid and very feasible to use, but also effective in improving students' concept mastery on Rukhsah material at the junior high school level. This media is able to present a learning experience that is interactive, fun, and adaptive to their learning style. The significant increase in learning outcomes shows that this media development is successful in becoming an excellent learning alternative, especially in supporting PAI learning which is often monotonous and less attractive. In addition to improving concept mastery, this media also facilitates their active engagement through the integration of multimedia features with a combination of collaborative and participatory cooperative learning models. Therefore, this result provides real implications for the development of PAI learning in the Merdeka Curriculum which requires the presence of learning that is independent, flexible, and relevant to technological developments for today's students.

However, this article has limitations in terms of the scope of research which is still limited to one material, one grade level, and one school so that it cannot be generalized to a wider learning context. In addition, the limited access to mobile phones in schools and internet networks is also a limitation that needs to be anticipated if this media is to be applied on a larger and more diverse scale. The implications of these limitations open up opportunities for future research that can include the development of similar media for other PAI clusters and other fields of study in enriching the learning experience of students. Thus, this e-learning media has great potential to be further adapted as a PAI learning innovation that is responsive and transformative to the demands of Merdeka Curriculum.

▪ CONCLUSION

The important finding of this research is that the use of e-learning media based on Microsite S.Id is significantly able to improve students' concept mastery on Rukhsah material. This media is proven to be valid, feasible, and effective to be applied so that it contributes significantly to filling the void of S.Id. Microsite utilization at the junior high school level. The research results can open a new discussion about the potential of digitizing PAI learning while challenging the old assumption that PAI learning tends to be monotonous, boring, and only effective when done conventionally. Scientifically, this article strengthens previous findings on the effectiveness of digital media while introducing the S.Id Microsite as an alternative innovation relevant to the Merdeka Curriculum by emphasizing learning independence and the diversity of students' learning styles. The effectiveness of the media is evidenced by a statistically significant increase in the average pre-test and post-test scores in the form of Wilcoxon test results with a significance value of 0.000 (<0.05) and an N-Gain value of 0.8793 which is included in the "High" category and 87.93% in the "Highly Effective" category. Thus, PAI teachers are advised to utilize this e-learning media in carrying out learning activities that are more interactive, interesting, and easily accessible to students. On the other hand, the integration between digital media and active and collaborative learning approaches needs to be expanded so that the learning process becomes more meaningful and relevant to the needs of today's learners. This study has limitations such as focusing on one material and one class so the results cannot be widely generalized. Therefore, the recommendation for further research is that researchers can expand the scope and deepen the analysis, so that similar media development is more adaptive to the needs of education in the digital era.

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