

Development of Differentiated Learning-Based Interactive E-Modules to Facilitate Student Learning Styles in Indonesian History Courses Islamic Period


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ARTICLE INFO	ABSTRACT
Article history <i>Received May 22, 2024</i> <i>Revised Dec 6, 2024</i> <i>Accepted Dec 10, 2024</i>	<p>This study aims to develop e-modules tailored to students' learning styles to improve learning effectiveness. A mixed-methods approach was employed, using the ADDIE model, which includes analysis, design, development, implementation, and evaluation stages. A needs analysis was conducted through student interviews to identify their learning preferences. In the design phase, a prototype e-module was created using the Flip Book Maker application to accommodate various learning styles. During development, the e-module was validated by subject matter and media experts and tested with both small and large student groups. The effectiveness of the e-modules was assessed through learning outcome tests and statistical analysis. The research subjects were 30 students enrolled in an Islamic History course at Medan State University. Data collection included questionnaires, interviews, and essay tests. Qualitative techniques were used to analyse interview data, while quantitative methods were applied to questionnaire and essay test data. The results showed a significant improvement in student understanding and engagement. Validation from subject matter experts resulted in an average score of 4.0 (Good), while media experts gave an average score of 3.8 (Fairly Good). Student trials produced an average score of 4.02 (Good). Learning outcomes improved significantly, with the average score rising from 62.33 to 79. The paired sample t-test showed a t-value of -27.55 and a p-value of 0.000, indicating a statistically significant difference. In conclusion, the e-modules effectively improved learning quality, underscoring the need for personalised and adaptive learning approaches.</p>
Keywords <i>Interactive e-module</i> <i>Differentiated learning</i> <i>Learning styles</i> <i>Indonesian history</i>	

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I. Introduction

The 21st century has witnessed significant transformations in education, mainly due to advancements in technology and information (Andy, 2018; Aslamiah et al., 2021; Warikandwa et al., 2023). The shift from conventional to technology-based tools, such as computer-based media, has made information retrieval and enrichment easier. Consequently, the role of educators has evolved from being the central focus of learning to becoming facilitators who support student-centred learning through various approaches, models, and strategies (Kim et al., 2019; Szabo et al., 2020).

Higher education, as a key component in human resource development, must create more liberating and innovative learning environments (Butnaru et al., 2021; Castro & Tumibay, 2021; Chachage, 2023; Gonçalves et al., 2020). However, challenges remain in the

Implementation of learning, such as the continued use of conventional media and educator-centered, theoretical teaching methods that limit students' critical thinking abilities (Kwangmuang et al., 2021; Lapuz & Fulgencio, 2020; Razak et al., 2022; Rini et al., 2020). This is where technology plays a crucial role.

The use of technology in higher education is essential to optimise learning (Bergdahl et al., 2020; Ching Yang, 2009; Hardhienata et al., 2021). One form of communication in learning is interactive teaching materials, which increase student engagement through activities like quizzes, simulations, and educational games. Interactive learning materials also provide immediate feedback, enhance material understanding and retention, and support independent learning and technology skills (Nabilah & Lutfi, 2022; Pala, 2024; Yu et al., 2021; Yustiana & Sari, 2022). From an evaluation perspective, these materials make tracking student progress easier, allowing for more effective adjustments to teaching

methods and improving communication and cooperation skills through student collaboration.

Additionally, there are four key competencies that students must develop in the digital era: critical thinking, problem-solving, creativity, and the ability to communicate and collaborate (Bergdahl et al., 2020; Geber & Hefner, 2019; Hardhienata et al., 2021; Van Laar et al., 2020). E-modules are digital learning materials systematically designed to meet independent learning needs by combining text, images, audio, and video (Johan et al., 2022; Syahrial et al., 2022). These modules are more interactive than printed materials equipped with animations, audio, and formative assessments with automatic feedback (Soraya et al., 2023; Yaniawati, 2021). The use of interactive e-modules can facilitate the development of these four competencies.

Each individual learns differently, and learning styles are key to improving performance in various learning contexts (Nurmalisa et al., 2023; Yotta, 2023). Therefore, developing interactive e-modules that accommodate students' learning styles is critical. Interactive e-modules based on Differentiated Learning are materials tailored to student's learning styles, allowing for more effective comprehension of content (Aufa et al., 2021; Fonda & Sumargiyani, 2018; Simaremare & Thesalonika, 2022). By addressing various learning styles, these modules make learning more meaningful and in-depth (Munthe et al., 2019).

Differentiated learning is a strategy designed to meet the individual learning needs of each student (Dalila et al., 2022; Mukhibat, 2023). It involves modifying content, processes, products, and learning environments (El-Sabagh, 2021), allowing students to learn according to their abilities and interests (Reis & Renzulli, 2023). This strategy is particularly relevant in developing interactive e-modules to improve learning effectiveness.

Previous research, such as that conducted by Fatmianeri et al. (2021), Aufa et al. (2021), and Soraya et al. (2023), has shown the advantages of electronic modules in enhancing the efficacy of learning. However, there remains a gap in research focused on developing e-modules that cater to diverse learning styles, particularly in the context of historical studies. Therefore, developing interactive e-modules based on differentiated learning is crucial for studying Indonesian history during the Islamic period. This era is characterised by its complexity and cultural diversity, requiring an adaptable and individualised learning approach. The Islamic era in Indonesian history was a pivotal period that brought significant political, social, cultural, and religious changes. Understanding this period enables students to develop a deep appreciation for the cultural and historical legacy that shapes Indonesia's national identity.

This study uses the Flip Book Maker application to support the development of an interactive e-module tailored to students' learning styles. Flip Book Maker facilitates engaging and accessible e-modules by integrating interactive elements such as text, images, animations, and audio. This tool enables the creation of modules that cater to diverse learning needs, promoting independent learning through content customised to individual learning styles.

This study aims to develop an interactive e-module that caters to different student learning preferences in the context of Indonesian history during the Islamic period. This project aims to enhance the quality of learning by employing a personalised and adaptive approach. Thus, developing an e-module based on differentiated learning is vital to supporting 21st-century education, particularly in history courses at Medan State University.

II. Method

This research was structured systematically to ensure the success of developing interactive e-modules based on differentiated learning. This research uses the ADDIE development model, which consists of five main stages: Analysis, Planning, Development, Implementation, and Evaluation. The first stage is analysis, which was conducted by interviewing seven students. The purposive sampling method was used to select respondents to ensure that various important population characteristics were represented. Selection criteria include learning readiness, interest in courses, and learning style. The results of interviews with students show that although some students have a good initial understanding of the topic of Islamic History, many of them feel the need to improve their study skills, especially in critical analysis and academic writing. Most students show high motivation to study Islamic History, driven by personal interest and a desire to understand the role of Islam in Indonesian history. Varied learning preferences, with most students favouring visual and kinesthetic methods such as videos and group discussions, demonstrate the need for interactive and varied materials. In addition, students expressed the importance of lecturer support through constructive feedback and interactive digital teaching materials. Based on these findings, the development of interactive e-modules adapted to various learning styles and student needs is necessary to increase learning effectiveness and student engagement in Islamic History courses.

The second level is design, where researchers designed an interactive e-module prototype based on differentiated learning based on the results of the needs mapping. The modules are prepared using the Flip Book Maker application, with attractive designs for visual learning styles, voice recordings for auditory learning styles, and videos and problem-solving practices for kinesthetic learning styles. At this stage, researchers also determine learning outcomes (CP), specific objectives for using e-

modules, and software selection. The e-module design is shown in Table 1.

The third level is development, which involves creating electronic modules based on differentiated learning that are tailored to student learning styles. The validation process is carried out by material experts for content and media experts for the design, layout, or layout of interactive e-modules, using a questionnaire as a validation instrument. The selection of experts was carried out carefully to ensure that the e-modules met high-quality standards both in terms of content and design. Material experts were chosen because they have a strong academic background in Islamic history or history education and experience teaching and assessing the quality of learning materials. They ensure that the information in the e-module is accurate, relevant, and in line with the learning outcomes that have been set.

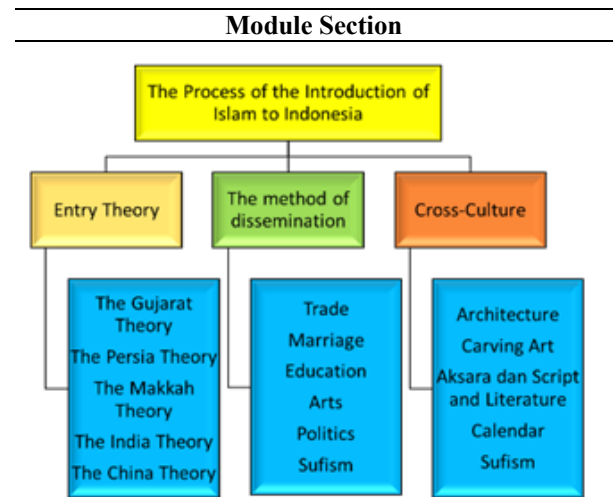
Table 1. Interactive E-Module Design Based on Differentiated Learning

Module Section	
DAFTAR ISI	
DAFTAR ISI.....	i
GLOSARIUM.....	ii
PETA KONSEP.....	iii
PENDAHULUAN.....	1
A. Identitas Modul.....	1
B. Capaian Pembelajaran.....	1
C. Deskripsi Singkat Materi.....	1
D. Petunjuk Penggunaan Modul.....	3
E. Materi Pembelajaran.....	3
KEGIATAN BELAJAR 1.....	4
TEORI MASUKNYA ISLAM DI INDONESIA.....	4
A. Capaian Pembelajaran Mata Kuliah.....	4
B. Uraian Materi.....	4
C. Rangkuman.....	27
D. Latihan Soal.....	28
E. Penilaian Diri.....	31
F. Evaluasi.....	32
G. Daftar Pustaka.....	35

E-Module Components



E-Module cover page



E-Module Concept Map



Directions for Use

Meanwhile, media experts are selected because of their expertise in graphic design, educational technology, or multimedia. They ensure that e-modules are visually attractive, user-friendly, and effectively support student learning processes. This research obtained diverse and comprehensive perspectives on e-module evaluation by involving two material experts and two media experts. This number was chosen to increase the reliability of validation results through confirmation from more than one expert source. The validation data is used to improve the developed e-module product draft so that the module can provide an optimal learning experience for students.

The fourth level is implementation, carried out by testing the validated e-module in a small group involving five students to get initial feedback, followed by testing in a larger group involving 30 students to see the effectiveness of the e-module on a wider scale. This implementation was carried out to observe the application

of the module in real learning situations and obtain initial data regarding student acceptance of the module.

The fifth and final stage is evaluation, which aims to assess the effectiveness of the modules developed. Evaluation is carried out by measuring the success of interactive e-modules based on differentiated learning

through student learning outcomes tests and other evaluation data collection. The results of this evaluation provide an idea of how effective the module is in improving the quality of learning according to student's learning styles. The series of development stages is presented in Figure 1

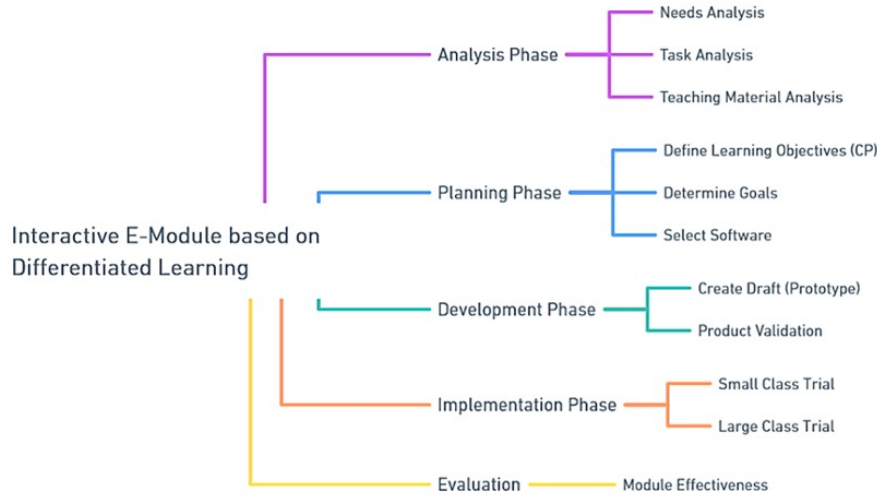


Fig. 1. Stages of E-Module Development

A. Research subject

The research subjects consisted of 30 students enrolled in Islamic History courses at Medan State University. This selection is highly relevant, as the study aims to develop an interactive e-module based on differentiated learning specifically tailored to Islamic History content. These students possess the necessary foundational knowledge and context to evaluate the effectiveness of the e-module being developed.

Medan State University was chosen as the research site due to its diverse student population, which provides a representative sample for examining the effectiveness of the interactive e-module. The university offers a conducive environment for studying Islamic History, with students already familiar with the subject matter and possessing varying learning preferences, making it an ideal setting for testing a differentiated learning approach. Furthermore, the institution's emphasis on utilising innovative educational tools aligns with the objectives of this research, which seeks to enhance the learning experience using technology-based materials. By involving students currently enrolled in the Islamic History course, the study ensures that the feedback provided is relevant and timely for improving the e-module. This also helps to continuously adapt the module to the specific learning needs of this population. The sample size of 30 students is sufficient for conducting valid statistical analysis, allowing for measuring the e-module's effectiveness with high confidence and producing generalisable findings. Thus, the selection of Medan State University as the research location is optimal, ensuring that the results of this study will be applicable and

beneficial for the development of e-modules tailored to the needs of students in similar academic contexts.

B. Research Data Analysis Instruments and Techniques

This research collected data using three main methods: questionnaires, interviews, and tests. The instruments used include questionnaires, question list sheets, and essay tests. Questionnaires are used to obtain quantitative data from respondents, including material experts, media experts, and students. Several types of questionnaires are distributed, namely the Material Validation Questionnaire, which is addressed to material experts to assess the suitability of the material used in electronic modules, including content suitability, presentation suitability, linguistic suitability, and contextual aspects. Media Validation Questionnaire, used by media experts to evaluate the graphic aspects of electronic modules, with indicators including module size, layout design, and electronic module content design.

Meanwhile, the Student Assessment Questionnaire is used to collect student opinions regarding the modules used, with indicators including interest, suitability of the material, and the language used in the module. In addition, essay tests are used to measure student learning outcomes after using electronic modules, designed to evaluate the extent to which students understand and master the material presented through the module. The following is a grid of the questionnaire instruments used in this research. Table 2 shows a grid of instruments used by experts for material validation. This grid is a guide in evaluating various aspects of the learning material being developed.

The appropriateness aspect of the content includes an assessment of the suitability of the material with learning outcomes, the accuracy of the information, the up-to-dateness of the material, and its ability to stimulate student curiosity.

1) *Material Validation Questionnaire*

Table 2. Material Expert Instrument Grid

No	Criteria	Indicator
1	Content Qualifying Aspects	Suitability of Material to Learning Outcomes Accuracy of Material Update of Material Encourage Curiosity
2	Aspects of Feasibility of Presentation	Presentation Techniques Presentation Support Facilitating Learning Styles Coherence and Sequence of Thought Flow
3	Aspects of Linguistic Feasibility	grains Communicative Dialogic and Interactive Suitability to Student Development Conformity to Language Rules
4	Contextual Aspect	Contextual Facts Contextual Component

Aspects of appropriateness of presentation include presentation techniques, visual support such as pictures and graphs, the material's ability to facilitate various student learning styles (visual, auditory, kinesthetic), and coherence and sequence of thought flow. Apart from that, aspects of linguistic appropriateness are assessed based on the clarity and accuracy of language use, the ability of the material to convey messages effectively, the level of interactivity and dialogue, the suitability of the language with students' cognitive development, and compliance with standard grammatical rules. Lastly, the contextual aspect assesses the extent to which the material reflects the real context and is relevant to students' daily lives, as well as the contextual components used in the material, such as applicable examples. Next, the media validation questionnaire grid is presented in Table 3.

2) *Media Validation Questionnaire*

Table 3. Grid of Media Expert Instruments

Criteria	Indicator
Aspects of Graphical Qualification	Electronic Module Size Electronic Module Layout Design Electronic Module Content Design

Table 3 shows a grid of instruments used by experts for media validation. This instrument is designed to evaluate the graphic aspects of the electronic module being developed. The graphic feasibility aspect includes three

main indicators, namely the size of the electronic module, the layout design of the electronic module, and the design of the contents of the electronic module. Electronic module size assesses whether the module's dimensions comply with standards that make it easier for users to read and understand the material. Electronic module layout design evaluates the orderliness and aesthetics of the module layout, ensuring that the visual elements are arranged neatly and attractively. Electronic module content design assesses the quality of the module's content display, including the use of images, graphics, and other visual elements that support understanding of the material. This evaluation is important to ensure that electronic modules are informative, interesting, and easy for students to use. Apart from validation by experts, the development of this E-Module also involves assessments from students to assess the practicality of the E-Module. The assessment questionnaire grid by students is presented in Table 4.

3) *Assessment Questionnaire by students*

Table 4. Student Assessment Instrument Grid

Criteria	Indicator
Student Response	Interest Material Suitability Language

Table 4 shows a grid of instruments used for assessment by students. This instrument evaluates student responses to electronic modules used in the learning process. This assessment includes three main criteria: interest, suitability of the material, and language. Interest measures how interesting the electronic module is for students, which is important to know whether the module can motivate students to study further. Material suitability assesses whether the material presented in electronic modules meets students' needs and expectations, helping to ensure that the content presented is relevant and useful for the learning process.

Language assesses the clarity and understandability of the language used in electronic modules, ensuring that it is easily understood by students and appropriate to their level of cognitive development. By using this instrument, researchers can collect comprehensive data regarding student perceptions of electronic modules so that improvements can be made to improve the quality and effectiveness of learning. Next, the effectiveness of the module is tested through an essay test. The essay test grid refers to Bloom's Taxonomy, a framework used to classify different levels of cognitive skills that students need to master in the learning process. The essay test grid is presented in Table 5.

Table 5. Essay Test Grid

No.	Basic competencies	Indicator	Cognitive Level	Scoring System
1	Understanding the Role of Islamic History in Indonesia	Explains the role of centres, such as Pagaruyung and Demak, in spreading Islam in the archipelago.	C2 (Understand)	Scale 1-5 (1: very poor, 5: very good)
		Analysing the contribution of main figures in the development of Islam in Indonesia.	C4 (Analyze)	Scale 1-5 (1: very poor, 5: very good)
2	Analysing the Influence of Islam on the Government System in the Archipelago	Explains changes in government structure and practices due to the arrival of Islam in the kingdoms of the archipelago.	C2 (Understand)	Scale 1-5 (1: very poor, 5: very good)
		Provides concrete examples of changes in government systems in several Indonesian kingdoms due to the influence of Islam.	C3 (Apply)	Scale 1-5 (1: very poor, 5: very good)
3	Comparing the Development of Islam in Various Regions of Indonesia	Identify the main factors that influenced the development of Islam in Sumatra and Java in the 15th and 16th centuries.	C4 (Analyze)	Scale 1-5 (1: very poor, 5: very good)
		Analyse the differences and similarities in how Islam is accepted and integrated into local communities in various regions.	C4 (Analyze)	Scale 1-5 (1: very poor, 5: very good)
4	Evaluating the Role of Sufism in the Spread of Islam in Indonesia	Explains the teachings of Sufism and how it was received in Indonesia.	C2 (Understand)	Scale 1-5 (1: very poor, 5: very good)
		Analysing the contribution of Sufi orders in the spread of Islam in various regions of Indonesia.	C4 (Analyze)	Scale 1-5 (1: very poor, 5: very good)
5	Criticising the Economic and Social Impact of the Spread of Islam in Indonesia	Describes the economic impact of the spread of Islam, including changes in the trade system and economic life of society.	C4 (Analyze)	Scale 1-5 (1: very poor, 5: very good)
		Analyse the socio-cultural impact of the spread of Islam, including changes in local communities' traditions, customs, and daily life.	C4 (Analyze)	Scale 1-5 (1: very poor, 5: very good)

C. Detailed Scoring System

- Score 5 (Excellent): Very deep understanding, accurate and relevant information, strong and structured analysis, logical arguments, and supported by strong evidence.
- Score 4 (Good): Good understanding, information mostly accurate, analysis quite strong, logical arguments with sufficient evidence support.
- Score 3 (Fair): Fair understanding, some misinformation, adequate analysis, logical arguments with less evidentiary support.
- Score 2 (Poor): Lack of understanding, inaccurate information, weak analysis, arguments lacking logic, and lack of support from adequate evidence.
- Score 1 (Very Poor): Understanding is very poor, and information is inaccurate, analysis is very weak or non-existent, arguments are illogical and not supported by evidence.

D. Data analysis technique

Data analysis techniques in this research include qualitative and quantitative analysis. Qualitative data was obtained from in-depth interviews with students. Product

feasibility analysis is based on quantitative data from questionnaires distributed to material experts, media experts, and students. This data is analysed using descriptive statistics to calculate the validity percentage, which is adjusted to the predetermined eligibility criteria. Product feasibility data is analysed using the following formula:

$$P = \frac{\sum x}{\sum x^i} \times 100\%$$

Information:

P = percentage figure (Percentage of validity)

$\sum x$ = score achieved

$\sum x^i$ = overall total/ideal score

Next, the results are adjusted to the following criteria: Table 6.

Table 6. Module eligibility criteria

Percentage Range (%)	Assessment criteria
80-100	Very Worth It
60-79	Worth it
40-59	Decent Enough
20-39	Not Worth It
0-19	Very inadequate

^a Source: Sugiyono (2016)

Furthermore, to measure the effectiveness of the e-module, an essay test is used to evaluate student learning outcomes before and after using the module. Test result data is analysed using descriptive statistics to calculate the average score, highest score, and lowest score, as well as using inferential statistical tests such as the t-test to identify significant differences between the results of the initial test and the final test. Using these inferential statistical tests helps ensure that the observed improvements in learning outcomes are a real effect of the module intervention, not the result of chance. The formula for the effectiveness of learning products is as follows:

$$P = \frac{F}{N} \times 100$$

Information

P = Percentage achieved

F = total score obtained

N = total ideal score

100 = constant

The results obtained are then computed using the following criteria IN Table 7.

Table 7. Criteria for module effectiveness

Percentage Value	Assessment criteria
80-100	Very effective
70-79	Effective
50-69	Less effective
0-49	Ineffective

^b Source: Sudjono (2012).

III. Results and Discussion

A. Interactive e-module Feasibility Analysis

The material expert assessment was carried out to validate interactive e-modules on the history of Indonesia during the Islamic period, which were developed based on content.

Table 8. Material Expert Validation Results

No	Aspect	Score	Criteria
1	Content feasibility	4.25	Good
2	Presentation feasibility	3.75	Passably
3	Linguistic feasibility	4	Good
	average	4	Good

^c Source: Research Results, 2023

Material experts are assessed to validate interactive e-modules developed based on content. The validation results show that the content feasibility aspect obtained a score of 4.25, which is included in the good category. This shows that the e-module content has met the expected standards in relevance, accuracy, and depth of material to help students achieve the specified learning outcomes. This validation includes evaluating whether the material presented is appropriate to Indonesian history during the Islamic period, whether the information provided is

accurate and up to date, and whether the material is arranged logically and structured.

The feasibility aspect of the presentation received a score of 3.75, which is included in the Fairly Good category. A lower score in this aspect indicates that there are several areas in the presentation of material that need to be improved, such as the use of less attractive visuals. This layout may not be optimal or a way of presenting information that may not fully support active and interactive learning. A good presentation must attract students' attention, facilitate better understanding, and motivate them to be actively involved in the learning process.

The linguistic appropriateness aspect received a score of 4 and was included in the good category. This shows that the language used in the e-module is determined by the rules of good and correct language, communication, and the student's level of development and understanding. Good language is very important to ensure students can easily understand the material without confusion or misunderstanding. This validation includes evaluating the appropriate use of terms, instruction clarity, and language style suitability to the academic and learning context.

The average score for all aspects is 4, and it is included in the good category. Overall, these results indicate that the interactive e-module developed has met good feasibility standards according to the assessment of material experts. Although several areas still need improvement, especially in presentation, these results show that the module is on the right track to becoming an effective and quality learning aid. A more in-depth and detailed assessment from material experts is very important to strengthen the validity and credibility of research results. By improving the presentation aspect and ensuring that the content and language used remain relevant and accurate, this interactive e-module can be more effective in helping students understand the history of Indonesia during the Islamic era and achieve the specified learning outcomes.

The next stage after the material expert's assessment is the media expert's assessment. In the context of this research, validating interactive e-modules based on differentiated learning requires the involvement of experts with special qualifications to ensure the validity and credibility of the results. The subject matter experts involved should have a strong academic background, such as a master's or doctoral degree in education, history, or a related field. A minimum of five years of experience teaching or conducting research in the history of education, especially the history of Indonesia during the Islamic period, as well as scientific publications in reputable journals, will strengthen the validity of their assessment. Material experts are tasked with assessing the suitability of the content, presentation, and language of the e-module, ensuring that the content presented is accurate, relevant, and in line with the specified learning outcomes.

Meanwhile, media experts must have a master's or doctoral degree in graphic design, educational technology, or a related field, with at least five years of experience in learning media design or developing digital teaching materials. Technical expertise in interactive media design and development software and a project portfolio that shows the ability to design interesting and effective learning media is highly required. The media expert is responsible for assessing the graphic design, layout, and interactivity aspects of the e-module, ensuring that the module is attractive, easy to use, and conforms to instructional design principles.

By involving experts with the right qualifications, the e-module validation process will be more comprehensive and credible. An in-depth and detailed assessment from material and media experts will ensure that this interactive e-module is not only content-worthy but also visually interesting and effective so that it can provide optimal benefits for students in understanding the history of Indonesia during the Islamic era. This is important to strengthen confidence in research results and ensure that the developed products meet diverse learning needs.

Media experts assess the limitations of text and writing, the display quality of teaching materials, ease of use, accuracy of colour selection, and accuracy of image use.

Table 9. Media Expert Validation Results

No	Indicator	Score	Criteria
1	Electronic module size	4	Good
2	Electronic module layout design	4	Good
3	Electronic module content design	4	Good
4	Colour selection accuracy	3	Passably
5	Image usage accuracy	4	Good
	average	3.8	Passably

^d Source: Research Results, 2023

Assessment by media experts of differentiated learning-based interactive e-modules shows varying results, with most indicators getting good scores. The electronic module size, layout design, and module content design all received a score of 4, indicating that the module has been well-designed and meets the required comfort and readability standards. Good design in these three aspects is very important to ensure that the module is easy to use and that students can navigate between module sections smoothly. Apart from that, the accuracy of using images also received a score of 4, indicating that the images used in the module are relevant and support the material presented, helping to visualise concepts that are difficult to understand through text alone.

However, the accuracy of colour selection received a score of 3, which is included in the good category. This shows that there is room for improvement in the colour selection, which may lack contrast or not attract enough attention. Choosing the right colour is essential to ensure the module is visually appealing and comfortable for the user's eyes, thus improving the readability and overall appeal of the module. The average score of all indicators is 3.8, which indicates that overall, the module is rated quite well, but certain aspects still need to be improved to achieve higher quality.

In conclusion, the validation results by media experts show that interactive e-modules already have a strong foundation in design and content presentation. However, to increase the effectiveness and visual appeal of the module, improvements need to be made to the colour selection aspect. With appropriate adjustments, this e-module can provide a more optimal and enjoyable learning experience for students, thereby improving their learning outcomes. This validation is important to ensure that the module not only presents good content but is also supported by an attractive and user-friendly design so that it can provide maximum benefits in learning Indonesian history during the Islamic period.

B. Student Response Analysis

In the interactive e-module product trial, 30 students were conducted. The trial results can be seen in Figure 2. Figure 2 shows the results of student response trials to interactive e-modules based on differentiated learning with more interesting and colourful visualisations. From this graph, it can be concluded that the indicator of ease in understanding the material obtained an average score of 4.06. This shows that this module is considered good in helping students understand the material presented. Presentations that are appropriate to learning outcomes received a score of 3.9, which is in the quite good category, which indicates the need to better align the material with the learning objectives that have been set.

The presentation indicator that encourages students to think actively received a score of 4.26, indicating the module's success in facilitating critical thinking among students. However, presentations that encouraged information exploration only scored 3.6, indicating that although the module effectively motivated further exploration, there was significant room for improvement.

The presentation of images that aid understanding received a score of 4.0, which shows the effectiveness of using images in clarifying and enriching learning content. Presentations containing cases received a score of 3.7, indicating that although quite good, there is potential to increase student engagement through more relevant and interesting case studies.

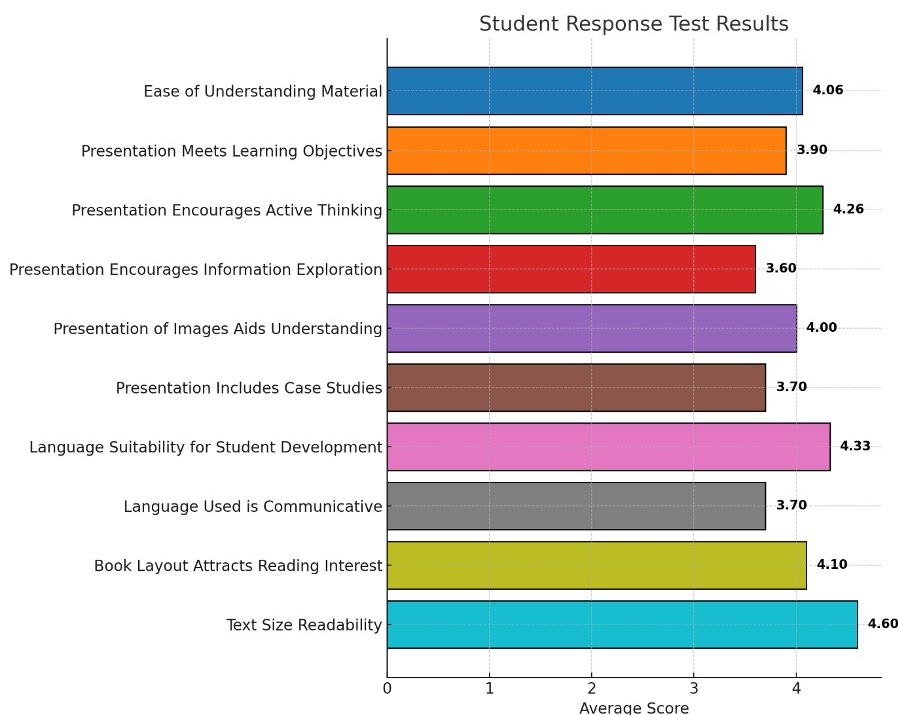


Fig. 2. e-module product trial.

The suitability of the language to the student's development received a score of 4.33, indicating that the language used in the module is very appropriate to the student's level of cognitive development. The communicative language received a score of 3.7, indicating that although quite good, there is room for improvement in more effective and interesting communication. The appearance of the module that attracts reading interest received a score of 4.1, indicating that the visual design of the module is quite attractive to students. The readable text size received the highest score of 4.6, indicating that the text size is very easy to read and comfortable for students, which is an important aspect of the design of learning modules.

Overall, the average score of all indicators is 4.02, which is in the good category. These results indicate that interactive e-modules based on differentiated learning are generally well-received by students. However, some areas, such as presentation, encourage the exploration of information and the use of more communicative language that require improvement to increase the overall effectiveness of the module. Presenting data in the form of coloured graphs helps in understanding and analysing student responses more easily and clearly and provides valuable insights for further development of this e-module, ensuring that this module can meet diverse learning needs more optimally.

C. Analysis of data on the effectiveness of interactive e-modules

To test the effectiveness of learning products, researchers conducted tests of student learning outcomes

in essay tests with five questions. The test data for student learning outcomes can be seen in Table 10.

Table 10. Initial test scores

Total score	1867
Average	62.33
Highest score	73
Lowest score	62

^c Source: Research Results, 2023

Based on the data presented in Table 10, the initial test results show that the total score obtained by students is 1867, with an average score of 62.33. The highest student score was 73, while the lowest was 62. These results indicate that students' initial understanding of the material taught through differentiated learning-based interactive e-modules is still relatively low. The average score of 62.33 reflects that most students have inadequate mastery of the material to achieve optimal learning outcomes.

The high score, which reached 73, shows that although some students can understand the material better, most still have difficulty understanding it. The lowest score of 62 indicates that a group of students has a very limited understanding of the material being taught. These results provide an important initial picture of students' abilities before implementing the interactive e-module, which will then become the basis for evaluating the module's effectiveness in improving student learning outcomes.

These initial test results highlight the need for more effective learning interventions and personalisation in delivering material. The use of interactive e-modules based on differentiated learning can overcome this challenge by providing a more adaptive learning

experience and by students' individual needs to improve their understanding and learning outcomes significantly. Thus, these initial test results serve as a baseline for evaluating the effectiveness of the e-module and provide critical insight for developing more effective learning strategies in the future.

Furthermore, the researchers tested student learning outcomes after going through the learning program of Indonesian Islamic history courses using interactive e-modules. The student test learning outcomes can be seen in Table 11.

Table 11. Final test scores

Total score	2370
Average	79
Highest score	85
Lowest score	73

^f Source: Research Results, 2022

The final student test results in Table 11 show a total score of 2370, with an average score of 79. The highest score achieved by students was 85, while the lowest score was 73. This data indicates that after implementing interactive e-modules based on differentiated learning, there is a significant increase in student learning outcomes. The average score of 79 reflects that most students can achieve a good level of understanding of the material presented through the e-module. The highest score of 85 indicates that some students achieve a very high understanding, close to the maximum, of the content provided. On the other hand, the lowest score of 73, although lower than the highest score, still shows that all students are above the minimum expected threshold of understanding.

This increase in average scores can be attributed to using e-modules designed to accommodate various student learning styles, providing material presented interactively and interestingly. This reflects the effectiveness of the module in increasing student understanding and involvement. Various multimedia elements, such as images, videos, and interactive assignments, have helped students assimilate information better and retain the knowledge gained. In addition, the systematic and directed e-module structure allows students to study independently and adjust their learning rhythm according to individual needs.

A paired sample t-test was carried out to determine whether there is a significant influence on the use of Interactive E-Modules. The test results are presented in Table 12.

Table 12. Paired Sample Test results

Paired Differences	t	df	Sig. (2-tailed)
Pre-test - Post-test	-27.55	29	0.000

The T-test results show a significant difference between the student's pre-test and post-test results after using differentiated learning-based electronic modules. With a t value of -27.55 and degrees of freedom (df) of 29, the two-way significance value (Sig. 2-tailed) is 0.000. The p-value, far below 0.05, shows that the difference between the pre-test and post-test is statistically significant, indicating that the module effectively improves student learning outcomes.

Overall, these results confirm that interactive e-modules based on differentiated learning effectively improve student learning outcomes. Further analysis is needed to identify the specific aspects of e-modules that most contribute to these improvements and to explore how these e-modules can be further refined to achieve more optimal results. This data can also be the basis for further development in educational technology and the application of differentiation-based learning in a broader educational context.

IV. Discussion

This study topic aims to thoroughly analyse the effects of creating and testing interactive e-modules that use differentiated learning techniques. The goal is to determine how these e-modules might enhance student learning outcomes in the Islamic History of Indonesia course. The study's findings demonstrate the efficacy of this e-module in improving student comprehension, as evidenced by a rise in the mean score from 62.33 on the first assessment to 79 on the final assessment. The T-test findings indicate a significant disparity between the students' pre-test and post-test scores after using this electronic module. The t value is -27.55, with 29 degrees of freedom (df) and a two-way significance value (Sig. 2-tailed) 0.000. The p-value, significantly below 0.05, indicates a statistically significant difference between the pre-test and post-test. This suggests that the module effectively enhances student learning results. Material specialists and media experts have validated this e-module, indicating its commendable quality in terms of content relevance, presentation, and language. However, some aspects need improvement, such as the selection of colours and the promotion of information exploration. The student feedback indicates a high acceptance of this e-module, as shown by an average score of 4.02, which falls within the "good" category.

The objective of creating interactive e-modules focused on differentiated learning in Indonesian history during the Islamic period is to cater to students' learning requirements based on their unique learning preferences. Interactive e-module learning solutions that use differentiation learning strategies attempt to support students in their learning process by acknowledging and addressing their differences in terms of preparedness, interests, and preferences (Serevina et al., 2018; Widiana et al., 2021). This module enables students to acquire

course content according to their abilities. The development of the interactive e-module component, which is based on differentiated learning, took into account the module content relevant to the topic being studied by students (Munthe et al., 2019; Soraya et al., 2023). In the module content section, the material is developed based on the curriculum and learning outcomes that students must achieve, which are adapted to the student's learning styles and initial ability conditions. In the learning process section, modules are developed by paying attention to how students process ideas and information and how they learn independently using the modules developed to determine their learning choices. In this section, the learning module contains learning videos, pictures, and exercises to strengthen students' understanding when studying Islamic history in Indonesia through the use of interactive e-modules that have been developed (Aufa et al., 2021; Nurhikmah et al., 2021; Simaremare & Thesalonika, 2022). The next component is to include an evaluation at the end of the module. This is intended so students can determine and show their final understanding after studying the lecture material using the modules developed.

This study makes a substantial addition to the existing body of knowledge on the use of technology in education, particularly in history teaching. Prior studies conducted by Soraya et al. (2023) and Yaniawati, (2021) have shown the advantages of using electronic modules to enhance learning efficacy. Nevertheless, this study delves deeper into the use of differentiated learning-based electronic modules in acquiring knowledge about Indonesia's history during the Islamic era. This topic has received little attention in prior research. Integrating educational technology with a student-centred learning strategy sets this study apart.

An important benefit of this study is the creation of e-modules that provide knowledge engagingly and dynamically and cater to different student learning preferences. The students' positive reaction to the material's clarity and visual design of the module is evident (Kustyarini et al., 2020; Sahronih et al., 2020). Furthermore, this study employs a thorough validation methodology that incorporates the input of subject matter experts and media specialists, ensuring that modules of superior quality are produced. The use of diverse multimedia components in the module is an additional benefit that enhances student involvement and comprehension of the content (Komalasari, 2019; Nuraripin & Jaja, 2021; Sung et al., 2022).

Nevertheless, it is important to acknowledge the many constraints of this research. One limitation is the small sample size, which may impact the capacity to apply the findings to a larger population. Furthermore, data-gathering techniques that depend on questionnaires and assessments may not accurately capture students' comprehensive comprehension of the subject matter. The

technical features of the e-module, such as the precision of colour selection and the quality of interactive design, also require improvement.

These results have practical implications, as many courses and educational institutions can use interactive e-modules designed on differentiated learning principles to enhance learning efficacy. For example, one could create analogous electronic modules for different disciplines by considering students' needs and learning preferences. These results also provide a solid foundation for advancing educational technology and implementing differentiation-based learning in a broader educational setting. To enhance the generalizability of the findings, it is advisable to carry out experiments with larger and more varied populations for future studies. Furthermore, it is possible to conduct more comprehensive statistical analysis, such as significance tests or correlations between variables, to provide additional evidence for the results. We must investigate further to explore potential enhancements for this electronic module, which could lead to more desirable outcomes. Future studies might prioritise certain areas, such as enhancing interactive elements and incorporating new technology into e-modules.

Our study demonstrates that interactive e-modules, which use differentiated learning techniques, effectively enhance student learning outcomes in Indonesian Islamic history courses. The validation conducted by material and media specialists, together with the favourable feedback from students, provides solid evidence of this module's high quality and efficacy. While some areas need improvement, such as the choice of colours and promotion of further investigation into the content, this module effectively fulfils the intended learning outcomes. This study contributes substantial value to the existing educational literature by introducing a novel method for using educational technology to facilitate tailored and adaptable learning. These results provide a solid foundation for the further development and adoption of comparable e-modules in diverse educational settings, highlighting the significance of technology and customisation in contemporary education

V. Conclusion

The conclusion of this study demonstrates that the development of interactive e-modules based on differentiated learning effectively enhances the quality of learning Indonesian history during the Islamic period. This is evidenced by a significant increase in students' understanding and engagement, reflected in the average learning outcome scores rising from 62.33 to 79 after using the e-modules. Validation by content and media experts also indicated that the e-modules are of good quality, although some aspects need improvement. The study's limitations include limited sample size, which may affect the generalizability of the results, and reliance on questionnaires and essay tests for data collection, which

may not fully capture students' deep understanding of the material. Recommendations for future research include expanding the sample size and using more varied data collection methods to obtain a more comprehensive understanding. Furthermore, the continued development of e-modules should focus on enhancing interactive features and incorporating new technologies to support diverse student learning styles better.

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