Arabiyatuna
Jurnal Bahasa Arab

Vol. 9. No. 1, 2025,
P-ISSN: **2580-5045, E-ISSN: 2580-5053**
DOI: 10.29240/jba.v9i1.12260

The Development of a Digital Module on the Concept and Application of the Kurikulum Merdeka in Madrasas Based on Problem-Based Learning

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Cite this article:
Naifah., Zuhrudin, Ahmad., Alfurochmatin, Anisa., Lathifah, Winda Nur., & Mudrofin. The Development of a Digital Module on the Concept and Application of the Kurikulum Merdeka in Madrasas Based on Problem-Based Learning. Arabiyatuna: Jurnal Bahasa Arab, 9(1), 393-412. doi: 10.29240/jba.v9i1.12260

Received: 13-01-2024	Revised: 18-02-2025	Accepted: 31-05-2025

Abstract

This study aimed to develop and evaluate a digital module entitled Concept and Application of the Kurikulum Merdeka in Madrasas to address the lack of accessible references and limited research on relevant teaching materials. These gaps have contributed to students' perceptions of the Manāhij Ta'līm al-Lughah al-'Arabiyah fi al-Madāris course as outdated and impractical. Grounded in the Problem-Based Learning (PBL) approach, the study employed the ADDIE model—Analyze, Design, Develop, Implement, and Evaluate—as its development framework. A total of 110 respondents participated in the needs analysis, 27 in the implementation phase, and 64 in the practicality testing. Data were collected through questionnaires, interviews, observations, documentation, and tests. Expert validation indicated high feasibility, with scores of 96% from subject-matter experts and 90% from media design experts. Student responses also reflected strong acceptance, with a practicality rating of 93.7%, indicating high user satisfaction and ease of use. The module significantly enhanced learning outcomes, as demonstrated by an increase in average scores from 56.89 (pretest) to 87.41 (posttest), with a paired-sample t-test confirming statistical significance, $t(26) = -169.56$, $p < .001$. These results suggest that the digital module is both pedagogically robust and practically effective

in supporting Arabic language instruction in madrasas within the Kurikulum Merdeka framework.

Keywords: Arabic language learning; curriculum; digital module development.

Introduction

Kurikulum Merdeka (an independent curriculum emphasizing flexibility and student-centered learning in Indonesia) is an educational policy aimed at improving the quality of learning in Indonesia.[1] However, its implementation still faces various challenges for teachers and prospective teachers. Data from Central Java indicates that only 20% of teachers feel prepared to implement the *Kurikulum Merdeka*.[2] These challenges are also experienced by university students, as prospective teachers, who struggle to understand the application of the *Kurikulum Merdeka* due to limited field experience and a lack of comprehensive references. These challenges hinder their capacity to develop lesson plans that are aligned with learning outcomes (CP), learning objectives (TP), and learning trajectory charts (ATP).

Another challenge arises from the characteristics of Generation Z students, who are accustomed to digital technology but encounter obstacles in utilizing it for academic purposes. These challenges are not limited to in-service teachers but also affect prospective teachers in higher education. As future educators, they must understand the *Kurikulum Merdeka* and develop relevant teaching materials, materials that are very important in the *Kurikulum Merdeka*,[3] including writing scientific articles based on studies or practical field experiences. A preliminary survey indicates that students frequently struggle to comprehend the core elements of the Kurikulum Merdeka, structure scientific articles systematically, and leverage technology effectively for academic tasks

Digital modules emerge as a potential solution to these challenges. Previous studies have shown that digital modules can enhance the quality of learning productively and responsibly.[4] Digital modules offer advantages over printed

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[1] Fateh Al Muhibbin et al., "Educators' and Learners' Responses to Optimising the Development of Arabic Teaching Module Based on the Merdeka Curriculum," *Arabiyatuna: Jurnal Bahasa Arab* 8, no. 1 (2024): 209–34, https://doi.org/10.29240/jba.v8i1.9878.

[2] Arti Prihatini and Sugiarti, "Citra Kurikulum Baru: Kesiapan Guru dalam Menerapkan *Kurikulum Merdeka*," *GHANCARAN: Jurnal Pendidikan Bahasa dan Sastra Indonesia*, 2022, 58–70, https://doi.org/10.19105/ghancaran.vi.7447.

[3] Aflisia, N., Rizka, S., & Rahman, A. B. A. (2024). Review of Arabic Language Books Independent Curriculum in Madrasah Ibtidaiyah: Materials, Methods, Advantages, and Disadvantages. *Al-Muktamar As-Sanawi li Al-Lughah Al-'Arabiyyah (MUSLA)*, *2*(1), 85-100.

[4] Paulina Christine and Indra Dewi Ienneke, "Enhancing The Post-Millennial Students Using Information Communication and Technology in Learning English," *Journal of Physics: Conference Series* 1477, no. 4 (2020): 42029, https://doi.org/10.1088/1742-6596/1477/4/042029;

ones, such as portability, visual appeal, and durability.[5] Additional research has also shown that digital modules can foster an interactive learning environment, thereby improving students' comprehension, motivation, and critical thinking abilities.[6] However, unlike previous studies that focused primarily on general content delivery and technical advantages, this study integrates the *Kurikulum Merdeka* framework and applies a Problem-Based Learning (PBL) approach, offering a novel intersection between national curriculum reform and interactive learning design. This integration is particularly relevant for preparing prospective teachers to understand and implement curriculum innovations while enhancing their academic writing and problem-solving skills through digital technology.

While many benefits have been reported, it is also important to acknowledge the limitations of digital modules. The use of digital modules is not without challenges. Some studies highlight concerns about their impact on health, such as eye strain[7] and technical limitations like device storage capacity and power requirements.[8] Factors such as layout design, level of interactivity, and students' perceptions significantly influence the effectiveness of digital modules.[9] In

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Katherine Muenks et al., "Elaborative Learning Practices Are Associated with Perceived Faculty Growth Mindset in Undergraduate Science Classrooms," *Learning and Individual Differences* 92 (December 2021): 102088, https://doi.org/10.1016/j.lindif.2021.102088.

[5] Abdurrahman Ghaleb Almekhlafi, "The Effect of E-Books on Preservice Student Teachers' Achievement and Perceptions in the United Arab Emirates," *Education and Information Technologies* 26, no. 1 (2021): 1001–21, https://doi.org/10.1007/s10639-020-10298-x; Sri Wahyuni et al., "Edmodo-Based Interactive Teaching Materials as an Alternative Media for Science Learning to Improve Critical Thinking Skills of Junior High School Students," *International Journal of Interactive Mobile Technologies* 14, no. 9 (2020): 166–81, https://doi.org/10.3991/ijim.v14i09.13041; Tao Wu and Maiga Chang, "The Cloud-Based Textbook: From Choice to Advantage," in *2021 IEEE International Conference on Engineering, Technology & Education (TALE)* (IEEE, 2021), 01–08, https://doi.org/10.1109/TALE52509.2021.9678553.

[6] Maria Drolia et al., "An Overview of Mobile Learning for Refugee Students: Juxtaposing Refugee Needs with Mobile Applications' Characteristics," *Challenges* 11, no. 2 (2020): 31, https://doi.org/10.3390/challe11020031; Alena Zakharova and Aleksandr Podvesovskii, "Application of Visual-Cognitive Approach to Decision Support for Concept Development in Systems Engineering," *IFAC-PapersOnLine* 54, no. 13 (2021): 482–87, https://doi.org/10.1016/j.ifacol.2021.10.495; Yuhan Wang, "Research on the Implications of Constructivism to Education," *Proceedings of the 2022 8th International Conference on Humanities and Social Science Research (ICHSSR 2022)* 664, no. Ichssr (2022): 2793–97, https://doi.org/10.2991/assehr.k.220504.507; Fabian Gunnars, "A Large-Scale Systematic Review Relating Behaviorism to Research of Digital Technology in Primary Education," *Computers and Education Open* 2 (2021): 100058, https://doi.org/10.1016/j.caeo.2021.100058.

[7] Yen-Yu Kang, Mao-Jiun J. Wang, and Rungtai Lin, "Usability Evaluation of E-Books," *Displays* 30, no. 2 (April 2009): 49–52, https://doi.org/10.1016/j.displa.2008.12.002.

[8] Abd Mutalib Embong et al., "E-Books as Textbooks in the Classroom," *Procedia - Social and Behavioral Sciences* 47 (2012): 1802–9, https://doi.org/10.1016/j.sbspro.2012.06.903.

[9] Shiao-Feng Su, "Exploring Students' Attitudes toward University E-Textbooks: Experiences, Expectations, and Preferences," *Journal of Librarianship and Information Science* 54, no. 3 (September 2022): 331–49, https://doi.org/10.1177/09610006211020096; Almekhlafi, "The

surveys, some respondents even objected to using digital modules due to costs, comfort, and flexibility.[10]

Despite these limitations, digital technology, particularly mobile devices, offers flexible access to digital modules anytime and anywhere.[11] Interactive digital content on these devices has been effective in enhancing comprehension, learning motivation, and fostering social interaction.[12] Digital modules also align with behaviorist, cognitivist, and constructivist learning approaches, making them highly suitable for Arabic language learning and the development of students' academic writing.

Many pre-service teachers still face difficulties in understanding and applying the *Kurikulum Merdeka* due to limited access to practical and contextual learning resources. Conventional materials often fail to provide clear examples, updated content, or interactive features that support deep engagement with curriculum concepts. As a result, students struggle not only with conceptual comprehension but also with academic writing skills needed to express their understanding systematically.

At the same time, digital modules offer a promising alternative to address these limitations. When integrated with a problem-based learning (PBL) approach, digital modules can enhance students' motivation, problem-solving skills, collaboration, time management, and decision-making.[13] Moreover, research shows that combining PBL with peer-review methods enhances

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Effect of E-Books on Preservice Student Teachers' Achievement and Perceptions in the United Arab Emirates."

[10] Kavita Chavali and Raghava R. Gundala, "The Textbook Dilemma: Digital or Print? Evidence from a Selected US University," *TEM Journal* 11, no. 1 (2022): 242–48, https://doi.org/10.18421/TEM111-30.

[11] Barbara C. Glackin, Roy W. Rodenhiser, and Brooke Herzog, "A Library and the Disciplines: A Collaborative Project Assessing the Impact of eBooks and Mobile Devices on Student Learning," *The Journal of Academic Librarianship* 40, no. 3–4 (May 2014): 299–306, https://doi.org/10.1016/j.acalib.2014.04.007.

[12] Stamatios Papadakis et al., "Evaluating the Learning Process: The 'thimeledu' Educational Game Case Study," *CSEDU 2020 - Proceedings of the 12th International Conference on Computer Supported Education* 2 (2020): 290–98, https://doi.org/10.5220/0009379902900298; Linda Harasim, "Learning Theories: The Role of Epistemology, Science, and Technology," in *Learning, Design, and Technology* (Cham: Springer International Publishing, 2017), 1–39, https://doi.org/10.1007/978-3-319-17727-4_48-1; Zakharova and Podvesovskii, "Application of Visual-Cognitive Approach to Decision Support for Concept Development in Systems Engineering."

[13] Pengyue Guo et al., "A Review of Project-Based Learning in Higher Education: Student Outcomes and Measures," *International Journal of Educational Research* 102, no. May (2020): 101586, https://doi.org/10.1016/j.ijer.2020.101586; D. Beneroso and J. Robinson, "Online Project-Based Learning in Engineering Design: Supporting the Acquisition of Design Skills," *Education for Chemical Engineers* 38 (2022): 38–47, https://doi.org/10.1016/j.ece.2021.09.002.

students' ability to structure scientific articles, write systematically, and revise their work based on feedback.[14]

However, existing studies have largely examined digital modules and PBL separately or focused only on general content delivery. Few have investigated how a digital module can be intentionally designed to integrate the Kurikulum Merdeka framework with PBL principles in pre-service teacher education. This study addresses that gap by developing a digital module titled *The Concept and Application of the Kurikulum Merdeka in Madrasas*, aiming to assess its feasibility, measure its practicality in enhancing students' understanding, and enrich the body of knowledge on PBL-based digital learning tools for curriculum implementation.

To achieve these objectives, this study employs a Research and Development (R&D) methodology using the ADDIE model, which consists of five stages: Analyze, Design, Development, Implementation, and Evaluation. In the Analyze stage, learning needs were identified through syllabus analysis, reviews of learning resources, and interviews with students. In the Design stage, a storyboard and validation instruments for teaching materials were developed. The module validation questionnaire was adapted from relevant literature and reviewed by experts to ensure content validity. Instrument reliability was assessed using Cronbach's alpha, yielding a coefficient of 0.87, which indicates good internal consistency.

During the Development stage, teaching materials were created using 3D Pageflip, validated by subject matter and media experts, and revised based on expert feedback. The Implementation stage included a limited trial involving 27 students to evaluate the effectiveness and practicality of the developed teaching materials. . Finally, the Evaluation stage involved collecting practicality data and making final revisions to ensure the materials met practical standards and aligned with the learning objectives of the *Kurikulum Merdeka*.

The research participants consisted of expert validators and students from the Arabic Language Education Study Program, Faculty of Tarbiyah and Teacher Training, Walisongo State Islamic University Semarang, selected through purposive sampling. Participants were selected based on active enrollment in the *Manahij Ta'lim* course and prior exposure to *Kurikulum Merdeka* discussions. Data were collected through online surveys (Google Forms) and interviews. Research instruments included (1) a needs analysis questionnaire, (2) a module validation questionnaire, (3) a module practicality questionnaire, and (4) an interview guide on the benefits and challenges of using digital modules for the *Kurikulum Merdeka* in madrasas. Demographic data such as gender, education level, and participants' experience were also gathered.

[14] Jessica A. Crowe, Tony Silva, and Ryan Ceresola, "The Effect of Peer Review on Student Learning Outcomes in a Research Methods Course," *Teaching Sociology* 43, no. 3 (2015): 201–13, https://doi.org/10.1177/0092055X15578033; Matthew M. Yalch, Erika M. Vitale, and J. Kevin Ford, "Benefits of Peer Review on Students' Writing," *Psychology Learning & Teaching* 18, no. 3 (November 2019): 317–25, https://doi.org/10.1177/1475725719835070.

Findings and Discussion

The development of the Digital Module in this study was carried out through the five stages of R&D using the ADDIE model: Analyze, Design, Development, Implementation, and Evaluation. These five stages were completed as follows:

Analyze Stage (Needs Analysis)

A needs analysis was conducted to determine learning requirements and identify issues. At this stage, problems were identified and selected for further study, and solutions were proposed, resulting in identifying learning needs aligned with the objectives. This analysis provided the basis for the subsequent design phase. The needs analysis encompassed three key components: syllabus analysis, learning resource evaluation, and an assessment of student needs.

Syllabus Analysis

The syllabus analysis covered the course description, graduate learning outcomes (CPL), and course learning outcomes (CPMK). The course *Manāhij Ta'lim al-Lughah al-'Arabiyyah fi al-Madāris* was identified as providing knowledge and skills to understand and implement the *Kurikulum Merdeka*, including the analysis of Arabic textbooks in madrasas. The review encompassed the curriculum's organizational structure, objectives, scope, and implementation challenges. Based on the syllabus analysis, the relevant CPLs for the program include digital literacy competencies for designing, evaluating, and implementing curricula and instructional materials grounded in linguistic and educational theories. The course's CPMK focuses on students' ability to comprehend the *Kurikulum Merdeka*, develop teaching modules, evaluate curricula, and analyze textbooks.

Learning Resource Analysis

The analysis of learning resources highlighted the need to ensure the availability, relevance, and accessibility of teaching materials. This aspect is critical to supporting the learning process and the implementation of the *Kurikulum Merdeka* in madrasas.

Student Needs Analysis

A survey was conducted with 110 students to explore their needs and challenges in the learning process. The results revealed that the majority of students (60%) found it challenging to understand the *Kurikulum Merdeka* in the context of Arabic language teaching and its implementation in madrasas. Additionally, 42.7% of students indicated challenges in finding sufficient references on the topic, while 44.5% felt moderately supported by the available resources. Despite these limitations, students expressed strong optimism about

developing a digital teaching module grounded in Problem-Based Learning (PBL). 98.2% of students believed such a module could facilitate their understanding and implementation of the *Kurikulum Merdeka*. Furthermore, 95% of students agreed that the PBL approach could help them identify and produce teaching tools aligned with the learning needs of the *Kurikulum Merdeka*.

Design

The next stage involved the planning of teaching materials. At this stage, an initial draft was produced, including a framework for the teaching materials and a flowchart to facilitate the development process. The planning was carried out manually.

The framework of the teaching materials to be developed consisted of 11 chapters, each comprising 4 to 5 subchapters. The framework for the digital module titled *Concept and Application of the Kurikulum Merdeka in Madrasas* includes the following topics: Chapter 1: The Essence of the Curriculum, Chapter 2: Curriculum Development, Chapter 3: Curriculum Design, Chapter 4: The Concept of the *Kurikulum Merdeka*, Chapter 5: Arabic Teaching Modules, Chapter 6: Concept and Application of P5PPRA (Profile of Pancasila Students Strengthening through Arabic Learning), Chapter 7: Implementation of the *Kurikulum Merdeka* for Arabic Language Subjects in MI, MTs, and MA, Chapter 8: Textbook Analysis, Chapter 9: Preparing KKTP (Competency Achievement Criteria) and Learning Outcome Reports, Chapter 10: Curriculum Evaluation, Chapter 11: Curriculum Evaluation Using the CIPP Model.

To ensure coherent structure and integration across chapters, the development of the digital module adhered to a systematic instructional design process. The overall flow of the module design is illustrated in Figure 1, which presents the key stages involved in planning, content development, integration of PBL (Problem-Based Learning), and digital formatting. This flowchart serves as the foundational blueprint for organizing the module's content, visual elements, and pedagogical strategies.

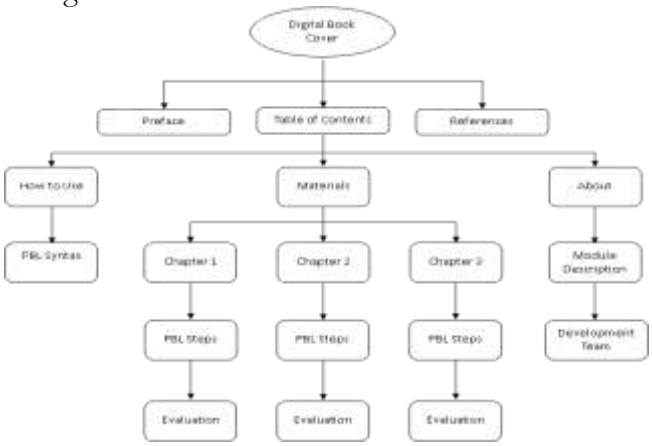

Figure 1. Flowchart of the Digital Module Design Development

At this stage, the digital teaching materials were developed based on the results of the analysis and design phases, utilizing 3D Pageflip Professional software. The development process involved the following steps: (1) Creating teaching materials using Microsoft Word to facilitate text and image editing, (2) Editing visuals using software such as Canva and Lucidchart to create diagrams and flowcharts, (3) Converting the document to PDF format and importing the file into 3D Pageflip for further processing, (4) Adding interactive elements such as digital modules, audio, links, and flash as needed, (5) Saving the results in project format and publishing them in .exe format.

This process results in an interactive digital module designed to support the implementation of the *Kurikulum Merdeka* in madrasas. To illustrate the features and interface of the developed module, several examples are provided below. As shown in Figure 2, the module cover prominently displays the central theme, "Concept and Application of the *Kurikulum Merdeka* in Madrasas," which reflects the overall focus and objective of the module.

Figure 2. The digital module cover showing the central theme, "Concept and Application of the *Kurikulum Merdeka* in Madrasas."

Figure 3 presents a screenshot of the module content display, featuring the Problem-Based Learning (PBL) syntax. This syntax is applied as a structured sequence for students' learning activities, aligning the module with constructivist learning principles.

Figure 3. Module content display featuring PBL syntax as the steps for learning activities

The core learning materials are depicted in Figure 4, which shows how the content is presented in a clear, structured, and accessible format to support students' comprehension.

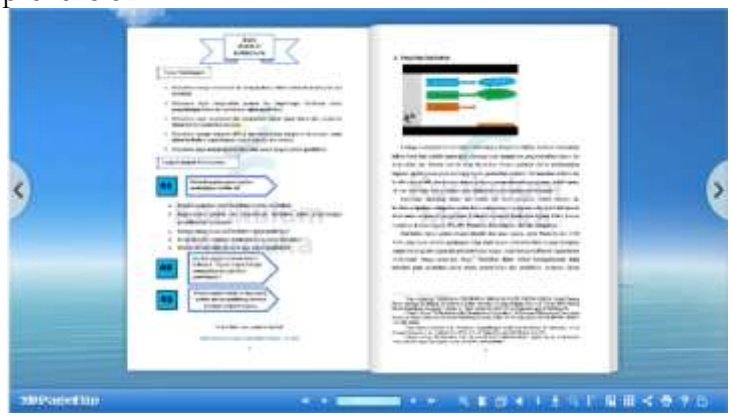

Figure 4. Module content display showing the learning materials.

To enrich the learning experience, Figure 5 displays the integration of video components. These videos serve as complementary and reinforcing elements that enhance students' understanding and engagement with the material.

Figure 5: Module content display incorporating videos as complementary and reinforcing elements for the digital module material presentation.

Finally, Figure 6 illustrates the use of 3D images within the module content. These visual enhancements are designed to increase user engagement, attract students' attention, and support deeper cognitive processing of the learning material.

Figure 6: Module content display featuring 3D images to enhance user engagement and attract attention.

The digital module also includes usage instructions with the following sequence: opening the 3D PageFlip Professional application, opening the digital module, navigating through the module pages, using the search feature, activating the 3D mode and page flipping, adjusting the page display, and saving and closing the project.

This digital module was developed by applying the steps of Problem-Based Learning (PBL) during lectures, which consist of the following five activities: (1) Orienting students to the problem, (2) Organizing students for learning, (3) Guiding individual and group investigations, (4) Developing and presenting solutions or project results, (5) Analyzing and evaluating the problem-solving process.

In the first step, the learning problem is introduced as a representation of the learning objectives. In the second step, the instructor organizes students into groups corresponding to the number of learning problems. In the third step, which focuses on guiding investigations, the instructor presents instructional videos followed by in-depth material exploration. In the fourth step, students present their group's solutions to the learning problems. Finally, in the fifth step, the instructor and students reflect on and evaluate the problem-solving process.

The final development step involved uploading the completed *Concept and Application of the Kurikulum Merdeka* digital module based on PBL to Google Drive to make it easily accessible to students and other stakeholders. The development stage is complete, and the research proceeds to product validation.

Product Testing of Learning Media

The validation by subject-matter experts aimed to identify potential errors or deficiencies in the presented material or teaching media. If any content was inaccurate or irrelevant, immediate revisions were made before implementing the product in the classroom.

Results of Validation by Subject-Matter Experts

The validation process was conducted on November 5, 2024, involving Dr. H. Agus Sutiyono, M.Ag., M.Pd., the Head of the Master's Program in Islamic Education (PAI) at the Faculty of Tarbiyah and Teacher Training (FITK), UIN Walisongo Semarang. He validated the developed digital module, particularly from the curriculum aspect. The validation utilized a questionnaire instrument that assessed the alignment of learning objectives, the information's accuracy, and the material's relevance to the student's competency levels.

The assessment results, summarized in Table 1, indicate that all evaluated aspects, namely content feasibility, relevance and continuity, language use, and material presentation, were rated in the "Very Good" category. The language aspect received the highest score at 100%, followed by material presentation at 95%, content feasibility at 90%, and relevance and continuity at 88%.

Table 1. Assessment Results by Subject-Matter Experts

Assessment Aspect	Validation Score	Category
Content Feasibility	90%	Very Good
Relevance and Continuity	88%	Very Good
Language	100%	Very Good
Material Presentation	95%	Very Good

Based on these validation results, the subject-matter expert also provided several suggestions for improvement. These suggestions, along with the corresponding follow-up actions, are detailed in Table 2. The feedback mainly addressed the need to accommodate diverse student characteristics, reinforce character education, and enhance the conceptual depth and continuity of the material.

Table 2. Follow-Up Action

No	Type of Issue	Follow-Up Action
1	Differences in student characteristics are not accommodated	Adding media variations such as tables, graphs, images, audio, and videos.
2	Material does not fully support positive character	Ensuring systematic material presentation in alignment with the PBL method.
3	Depth and continuity of concepts are not optimal	Enhancing material progression from conceptual to metacognitive levels.

The validation results indicate that this digital module achieved a validity level of 96%, categorized as "Very Good."

Results of Validation by Media Design Experts

The media design validation was conducted on November 5, 2024, by Prof. Dr. Mahfud Junaedi, M.Ag., Vice Dean for Academic and Institutional Affairs, Faculty of Tarbiyah and Teacher Training, UIN Walisongo Semarang. The validation focused on aspects of visual design, ease of use, and the media's appeal to students.

The detailed results of this assessment are presented in Table 3, which shows that all evaluated aspects—language, presentation, visual design, and usefulness—were rated in the "Very Good" category. Both the language and presentation components received perfect scores (100%), while visual design and usefulness scored 95% and 90%, respectively.

Table 3. Assessment Results by Media Design Experts

Assessment Aspect	Validation Score	Category
Language	100%	Very Good
Presentation	100%	Very Good
Visual Design	95%	Very Good
Usefulness	90%	Very Good

Notes from the media design expert include: (1) The use of language aligns with students' socio-emotional levels, (2) Illustrations and color choices effectively attract students' attention, (3) The module's navigation is user-friendly.

The conclusion from expert validations indicates that the digital module, "Concept and Application of the Kurikulum Merdeka Based on PBL," is highly feasible for implementation in the learning process, with a validity level of 90%.

Implementation

At this stage, the developed digital module was implemented in the classroom. The implementation process took place on October 23, 2024, involving 27 students from class PBA 3A who participated in learning activities for the *Manāhij Ta'līm al-Lughah al-'Arabiyah fi al-Madāris* course using the module. The teaching steps were applied as outlined in the digital module.

Evaluation

The evaluation stage aimed to assess the effectiveness and practicality of the digital module *"Concept and Application of the Kurikulum Merdeka Based on Problem-Based Learning (PBL)"* developed for PBA class students. The evaluation included measuring improvements in understanding and applying the *Kurikulum Merdeka* concepts and assessing the module's practicality.

During the field trials, a pretest and post-test were conducted on 27 students from class PBA 5D to evaluate the module's effectiveness. The results indicated a substantial improvement in performance, with the average score rising from a pretest mean of 56.89 to a post-test mean of 87.41—an increase of 30.52 points. The total score also reflected this gain, increasing from 1,536 in the pretest

to 2,360 in the post-test, representing a total difference of 824 points. A paired-sample *t*-test indicated a statistically significant improvement in students' scores after using the module, $t(26) = -169.56$, $p < .001$. These findings confirm the effectiveness of the digital module in supporting students' mastery of the material.

A practicality survey was also distributed to 88 students participating in the *Manāhij Ta'lim al-Lughah al-'Arabiyah fi al-Madāris* course. The data analysis showed that the module's usability aspect received an average score of 95.44%, ease of use scored 92.96%, and satisfaction scored 93.86%, resulting in an overall average of 94.08%. Based on these results, the digital module was categorized as "very practical" and is deemed suitable as teaching material for the *Kurikulum Merdeka* learning process.

In developing digital modules for the *Kurikulum Merdeka* in madrasas, this study employs the ADDIE model (Analysis, Design, Development, Implementation, Evaluation), a systematic framework proven effective in various educational contexts. The ADDIE model provides a systematic framework for the design and evaluation of instructional materials, ensuring that the developed modules are both practical and applicable in classroom settings. Waritsman's study highlights the effectiveness of the ADDIE model in improving the quality of digital learning resources, especially within teacher training programs, by promoting structured development and continuous refinement.[15] These findings resonate with this study, where the developed digital module achieved high feasibility and practicality, as evidenced by validation scores averaging above 90% from media and subject matter experts. Furthermore, research on interactive e-book-based materials supports the effectiveness of this approach, demonstrating high validity and enabling students to engage in independent learning more effectively.[16] This alignment suggests that the ADDIE model is particularly suited for creating adaptable and student-centered digital resources in the context of the *Kurikulum Merdeka*.

Given its relatively recent implementation, a significant challenge in this development process is the limited availability of references tailored to the *Kurikulum Merdeka*. Furaidah et al. emphasize the need for contextual and relevant teaching materials to enhance student understanding, particularly in novel curricula.[17] To address this need, the digital module incorporates the Problem-

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[15] Arsyil Waritsman, R A Mustika Hariyanti, and Japar Japar, "Manajemen Pelatihan: Pengembangan Bahan Ajar Digital Menggunakan Google Sites dan Youtube pada Materi Pembuatan Kuis Interaktif untuk Pembelajaran," *Inovasi-Jurnal Diklat Keagamaan* 18, no. 1 (2024): 1–12, https://doi.org/10.52048/inovasi.v18i1.482.

[16] Haniah Haniah, Mahira Mahira, and Muh. Napis Djuaeni, "The Development of Interactive E-Book-Based Teaching Materials for Senior High School Students," *Arabiyatuna: Jurnal Bahasa Arab* 7, no. 1 (2023): 55–787, https://doi.org/10.29240/jba.v7i1.6690.

[17] Aniq Jihan Furaidah, Abdul Rozak, and Sobihah Rasyad, "Bahan Ajar Digital Teks Novel Berorientasi Karakter Jujur," *Deiksis: Jurnal Pendidikan Bahasa dan Sastra Indonesia* 9, no. 1 (2022): 21–30, https://doi.org/10.33603/deiksis.v9i1.6837.

Based Learning (PBL) approach, which functions both as a learning resource and a means to cultivate critical thinking and problem-solving skills. PBL is grounded in Vygotsky's social constructivist theory, which emphasizes that learning is most effective through social interaction and collaborative engagement. This approach enables students to actively construct knowledge within their Zone of Proximal Development (ZPD).[18] By engaging students in real-world problem scenarios, the module encourages peer interaction, which, according to Vygotsky, fosters deeper cognitive development and understanding. Research by Putra et al. further supports this, demonstrating that STEM-based teaching materials enhance conceptual understanding through active engagement.[19] Thus, the PBL approach in this module not only addresses academic content but also cultivates higher-order thinking skills (HOTS), aligning with *Kurikulum Merdeka*'s emphasis on student-centered learning.

The module's effectiveness is evidenced by a significant improvement in student learning outcomes, with pre-test scores averaging 56.89 and post-test scores reaching 87.41. A paired-sample t-test further confirmed this improvement, indicating a statistically significant difference in students' scores after using the module, $t(26) = -169.56$, $p < .001$. These findings affirm the module's effectiveness in supporting students' mastery of the material, reflecting the strength of PBL in scaffolding cognitive development. According to Hmelo-Silver, PBL enhances cognitive development by encouraging students to actively construct knowledge through inquiry and reflection,[20] aligning with this study's observed outcomes. Additionally, Saputri and Hadi highlight the importance of incorporating HOTS in teaching materials to elevate learning quality.[21] The incorporation of PBL into the module supports this process by engaging students with complex, real-world problems that demand analysis, synthesis, and evaluation. This approach promotes deeper cognitive engagement and enhances the development of critical thinking skills.

Student feedback further validates the module's practicality, with an average 93.7% score indicating high usability and engagement. This finding aligns with Sulastri's findings that ADDIE-developed materials are well-received by students

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[18] Lev Semyonovich Vygotsky, *Mind in Society: Development of Higher Psychological Processes*, ed. Michael Cole et al. (Cambridge: Harvard University Press, 1980), https://doi.org/10.2307/j.ctvjf9vz4.

[19] Alfyananda Kurnia Putra, Muhammad Naufal Islam, and Edwin Budi Prasetyo, "Pengembangan Bahan Ajar Digital Mobilitas Penduduk dan Ketenagakerjaan Berbasis STEM," *ASANKA: Journal of Social Science And Education* 2, no. 2 (2021): 149–59, https://doi.org/10.21154/asanka.v2i2.3178.

[20] Cindy E. Hmelo-Silver, "Problem-Based Learning: What and How Do Students Learn?," *Educational Psychology Review* 16, no. 3 (2004): 235–66, https://doi.org/10.1023/B:EDPR.0000034022.16470.f3.

[21] Anindita Ekaning Saputri and Windia Hadi, "Pengembangan E-Book Bermuatan High Order Thinking Skill (HOTS)," *AKSIOMA: Jurnal Program Studi Pendidikan Matematika* 10, no. 2 (2021): 1008–21, https://doi.org/10.24127/ajpm.v10i2.3578.

and teachers due to their structured yet flexible design.[22] The module's alignment with the *Kurikulum Merdeka*'s emphasis on differentiated learning ensures that it caters to diverse student needs, interests, and abilities, as highlighted by Rahmawati et al.[23] By incorporating PBL, the module not only supports academic achievement but also promotes collaborative learning environments, where peer interactions, as Vygotsky suggests, enhance understanding through shared knowledge construction.

Reflecting on the broader implications, the development of this digital module demonstrates significant potential for advancing educational quality in madrasas under the *Kurikulum Merdeka*. The module meets both academic and cognitive developmental needs by merging the structured design of the ADDIE model with the active, student-centered principles of Problem-Based Learning (PBL). The integration of Vygotsky's social constructivist perspective further enhances this approach, as peer collaboration and context-driven problem-solving foster meaningful and impactful learning experiences. The statistically significant improvement in student outcomes, as confirmed by the t-test, underscores the module's efficacy. This research contributes to the growing body of literature on digital module development. It serves as a reference for future efforts to create innovative, contextually relevant teaching materials in the evolving landscape of the *Kurikulum Merdeka*.

Conclusion

This research successfully developed a digital module based on Problem-Based Learning (PBL) using the ADDIE model, which consists of five stages. The Analyze stage (Needs Analysis) produced data on development needs from students' perspectives and curriculum requirements. The Design stage resulted in an initial teaching material framework and a flowchart to facilitate the module development process, which was manually designed. The Development stage produced definitive narrative steps, a storyboard, and product validation by experts. The Implementation stage generated data on product application involving 27 students, supported by survey and observation results. The Evaluation stage provided data indicating a significant improvement in student learning outcomes, with the pre-test mean score increasing from 56.89 to a post-test mean of 87.41. A paired-sample t-test confirmed the statistical significance of this improvement, $t(26) = -169.56$, $p < .001$, affirming the module's effectiveness in enhancing students' mastery of the material. The validation of this digital module demonstrated excellent results, achieving a score of 99% from media

[22] Dede Sulastri, "Pengembangan Bahan Ajar Buku Saku Digital Model ADDIE Materi Peristiwa Kebangsaan Masa Penjajahan Indonesia," *Jurnal Holistika* 7, no. 2 (2024): 178–85, https://doi.org/10.24853/holistika.7.2.178-185.

[23] Nailur Rahmawati et al., "Differentiated Instruction as a Form of Merdeka Belajar in Arabic Language Learning," *Arabiyatuna: Jurnal Bahasa Arab* 8, no. 2 (2024): 873–96, https://doi.org/10.29240/jba.v8i2.11022.

validators and 96% from content validators, which falls into the "highly feasible" category. The module's practicality level was also very high, with an overall average percentage of 94.08%, encompassing usability, ease of use, and satisfaction.

Based on these findings, the digital module "Concept and Application of the *Kurikulum Merdeka* in Madrasahs" is feasible and practical for use in teaching and learning processes and holds significant potential for broader educational impact. For educators, this module provides a structured yet flexible tool to foster critical thinking and student-centered learning, aligning with *Kurikulum Merdeka*'s emphasis on differentiated instruction. For policymakers, this module offers potential for integration into national madrasa curriculum development initiatives and can serve as a prototype for similar innovations across various disciplines. Its design promotes the adoption of technology-enhanced, innovative teaching materials in diverse educational settings. These implications underscore the module's contribution to advancing pedagogical practices and supporting broader systemic educational reform.

Based on the findings of this study, several suggestions for further development can be provided. First, future researchers are encouraged to expand the scope of testing this digital teaching module in the same course across various classes to measure its broader effectiveness. Second, in subsequent module development, more varied practice exercises can be added to enable students to use the module independently and optimize its learning support. Additionally, the significant improvement in student outcomes, as evidenced by the statistical analysis, suggests that future iterations could further explore integrating advanced analytical tools to monitor long-term impacts on student performance.

References

Aflisia, N., Rizka, S., & Rahman, A. B. A. (2024). Review of Arabic Language Books Independent Curriculum in Madrasah Ibtidaiyah: Materials, Methods, Advantages, and Disadvantages. *Al-Muktamar As-Sanawi li Al-Lughah Al-'Arabiyyah (MUSLA),* 2(1), 85-100.

Almekhlafi, Abdurrahman Ghaleb. "The Effect of E-Books on Preservice Student Teachers' Achievement and Perceptions in the United Arab Emirates." *Education and Information Technologies* 26, no. 1 (2021): 1001–21. https://doi.org/10.1007/s10639-020-10298-x.

Beneroso, D., and J. Robinson. "Online Project-Based Learning in Engineering Design: Supporting the Acquisition of Design Skills." *Education for Chemical Engineers* 38 (2022): 38–47. https://doi.org/10.1016/j.ece.2021.09.002.

Chavali, Kavita, and Raghava R. Gundala. "The Textbook Dilemma: Digital or Print? Evidence from a Selected US University." *TEM Journal* 11, no. 1 (2022): 242–48. https://doi.org/10.18421/TEM111-30.

Christine, Paulina, and Indra Dewi Ienneke. "Enhancing The Post-Millennial

Students Using Information Communication and Technology in Learning English." *Journal of Physics: Conference Series* 1477, no. 4 (2020): 42029. https://doi.org/10.1088/1742-6596/1477/4/042029.

Crowe, Jessica A. et al. "The Effect of Peer Review on Student Learning Outcomes in a Research Methods Course." *Teaching Sociology* 43, no. 3 (2015): 201–13. https://doi.org/10.1177/0092055X15578033.

Drolia, Maria et al. "An Overview of Mobile Learning for Refugee Students: Juxtaposing Refugee Needs with Mobile Applications' Characteristics." *Challenges* 11, no. 2 (2020): 31. https://doi.org/10.3390/challe11020031.

Embong, Abd Mutalib et al. "E-Books as Textbooks in the Classroom." *Procedia - Social and Behavioral Sciences* 47 (2012): 1802–9. https://doi.org/10.1016/j.sbspro.2012.06.903.

Furaidah, Aniq Jihan et al. "Bahan Ajar Digital Teks Novel Berorientasi Karakter Jujur." *Deiksis: Jurnal Pendidikan Bahasa dan Sastra Indonesia* 9, no. 1 (2022): 21–30. https://doi.org/10.33603/deiksis.v9i1.6837.

Glackin, Barbara C. et al. "A Library and the Disciplines: A Collaborative Project Assessing the Impact of eBooks and Mobile Devices on Student Learning." *The Journal of Academic Librarianship* 40, no. 3–4 (May 2014): 299–306. https://doi.org/10.1016/j.acalib.2014.04.007.

Gunnars, Fabian. "A Large-Scale Systematic Review Relating Behaviorism to Research of Digital Technology in Primary Education." *Computers and Education Open* 2 (2021): 100058. https://doi.org/10.1016/j.caeo.2021.100058.

Guo, Pengyue et al. "A Review of Project-Based Learning in Higher Education: Student Outcomes and Measures." *International Journal of Educational Research* 102, no. May (2020): 101586. https://doi.org/10.1016/j.ijer.2020.101586.

Haniah, Haniah et al. "The Development of Interactive E-Book-Based Teaching Materials for Senior High School Students." *Arabiyatuna: Jurnal Bahasa Arab* 7, no. 1 (2023): 55–787. https://doi.org/10.29240/jba.v7i1.6690.

Harasim, Linda. "Learning Theories: The Role of Epistemology, Science, and Technology." In *Learning, Design, and Technology*, 1–39. Cham: Springer International Publishing, 2017. https://doi.org/10.1007/978-3-319-17727-4_48-1.

Hmelo-Silver, Cindy E. "Problem-Based Learning: What and How Do Students Learn?" *Educational Psychology Review* 16, no. 3 (2004): 235–66. https://doi.org/10.1023/B:EDPR.0000034022.16470.f3.

Kang, Yen-Yu et al. "Usability Evaluation of E-Books." *Displays* 30, no. 2 (April 2009): 49–52. https://doi.org/10.1016/j.displa.2008.12.002.

Muenks, Katherine et al. "Elaborative Learning Practices Are Associated with Perceived Faculty Growth Mindset in Undergraduate Science Classrooms." *Learning and Individual Differences* 92 (December 2021): 102088. https://doi.org/10.1016/j.lindif.2021.102088.

Muhibbin, Fateh Al et al. "Educators' and Learners' Responses to Optimising

the Development of Arabic Teaching Module Based on the Merdeka Curriculum." *Arabiyatuna: Jurnal Bahasa Arab* 8, no. 1 (2024): 209–34. https://doi.org/10.29240/jba.v8i1.9878.

Papadakis, Stamatios et al. "Evaluating the Learning Process: The 'thimeledu' Educational Game Case Study." *CSEDU 2020 - Proceedings of the 12th International Conference on Computer Supported Education* 2 (2020): 290–98. https://doi.org/10.5220/0009379902900298.

Prihatini, Arti, and Sugiarti. "Citra Kurikulum Baru: Kesiapan Guru dalam Menerapkan *Kurikulum Merdeka*." *GHANCARAN: Jurnal Pendidikan Bahasa dan Sastra Indonesia*, 2022, 58–70. https://doi.org/10.19105/ghancaran.vi.7447.

Putra, Alfyananda Kurnia et al. "Pengembangan Bahan Ajar Digital Mobilitas Penduduk dan Ketenagakerjaan Berbasis STEM." *ASANKA: Journal of Social Science And Education* 2, no. 2 (2021): 149–59. https://doi.org/10.21154/asanka.v2i2.3178.

Rahmawati, Nailur et al. "Differentiated Instruction as a Form of Merdeka Belajar in Arabic Language Learning." *Arabiyatuna: Jurnal Bahasa Arab* 8, no. 2 (2024): 873–96. https://doi.org/10.29240/jba.v8i2.11022.

Saputri, Anindita Ekaning, and Windia Hadi. "Pengembangan E-Book Bermuatan High Order Thinking Skill (HOTS)." *AKSIOMA: Jurnal Program Studi Pendidikan Matematika* 10, no. 2 (2021): 1008–21. https://doi.org/10.24127/ajpm.v10i2.3578.

Su, Shiao-Feng. "Exploring Students' Attitudes toward University E-Textbooks: Experiences, Expectations, and Preferences." *Journal of Librarianship and Information Science* 54, no. 3 (September 2022): 331–49. https://doi.org/10.1177/09610006211020096.

Sulastri, Dede. "Pengembangan Bahan Ajar Buku Saku Digital Model ADDIE Materi Peristiwa Kebangsaan Masa Penjajahan Indonesia." *Jurnal Holistika* 7, no. 2 (2024): 178–85. https://doi.org/10.24853/holistika.7.2.178-185.

Vygotsky, Lev Semyonovich. *Mind in Society: Development of Higher Psychological Processes*. Edited by Michael Cole, Vera Jolm-Steiner, Sylvia Scribner, and Ellen Souberman. Cambridge: Harvard University Press, 1980. https://doi.org/10.2307/j.ctvjf9vz4.

Wahyuni, Sri et al. "Edmodo-Based Interactive Teaching Materials as an Alternative Media for Science Learning to Improve Critical Thinking Skills of Junior High School Students." *International Journal of Interactive Mobile Technologies* 14, no. 9 (2020): 166–81. https://doi.org/10.3991/ijim.v14i09.13041.

Wang, Yuhan. "Research on the Implications of Constructivism to Education." *Proceedings of the 2022 8th International Conference on Humanities and Social Science Research (ICHSSR 2022)* 664, no. Ichssr (2022): 2793–97. https://doi.org/10.2991/assehr.k.220504.507.

Waritsman, Arsyil et al. "Manajemen Pelatihan: Pengembangan Bahan Ajar

Digital Menggunakan Google Sites dan Youtube pada Materi Pembuatan Kuis Interaktif untuk Pembelajaran." *Inovasi-Jurnal Diklat Keagamaan* 18, no. 1 (2024): 1–12. https://doi.org/10.52048/inovasi.v18i1.482.

Wu, Tao, and Maiga Chang. "The Cloud-Based Textbook: From Choice to Advantage." In *2021 IEEE International Conference on Engineering, Technology & Education (TALE)*, 01–08. IEEE, 2021. https://doi.org/10.1109/TALE52509.2021.9678553.

Yalch, Matthew M. et al. "Benefits of Peer Review on Students' Writing." *Psychology Learning & Teaching* 18, no. 3 (November 2019): 317–25. https://doi.org/10.1177/1475725719835070.

Zakharova, Alena, and Aleksandr Podvesovskii. "Application of Visual-Cognitive Approach to Decision Support for Concept Development in Systems Engineering." *IFAC-PapersOnLine* 54, no. 13 (2021): 482–87. https://doi.org/10.1016/j.ifacol.2021.10.495.

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