Jurnal Pendidikan Matematika (Kudus)
P-ISSN 2615-3939 | E-ISSN 2723-1186
https://journal.iainkudus.ac.id/index.php/jmtk
DOI: http://dx.doi.org/10.21043/jpmk.v7i2.29232
Volume 7, Number 2, Desember 2024, pp. 227-248

Development of Teaching Materials Oriented to Numeracy Literacy and Socio-Cultural Literacy for Madrasah Ibtidaiyah

Abi Fadila[1*], Rahman Hakim[1], Rizki Wahyu Yunian Putra[1], Riyama Ambarwati[1]
[1]Mathematics Education, UIN Raden Intan Lampung, Bandar Lampung, Indonesia
**Correspondence: fadilaabi@radenintan.ac.id*

Abstract

In this modern era, although technology has brought significant changes to education, there remains a gap in the implementation of numeracy and socio-cultural literacy in Madrasahs in Indonesia, contributing to students' low numeracy literacy skills. The government has introduced the Indonesian Madrasah Competency Assessment Program (AKMI), but challenges in developing innovative and needs-based teaching materials persist. Therefore, new strategies are needed to enhance students' literacy in diverse contexts, such as numeracy literacy-oriented teaching materials. This study aims to develop teaching materials oriented towards numeracy and socio-cultural literacy for Madrasah Ibtidaiyah using the ADDIE model (Analysis, Design, Development, Implementation, Evaluation). The research instruments included expert validation sheets to evaluate the feasibility of the teaching materials and questionnaires to assess the product's attractiveness from students' perspectives. The feasibility of the teaching materials was evaluated by three groups of experts: material, media, and socio-cultural specialists. The validation results showed average scores of 3.59 for the material aspect, 3.46 for the media aspect, and 3.48 for the socio-cultural aspect on a 4-point scale, indicating that the teaching materials met the feasibility criteria. Meanwhile, the attractiveness of the teaching materials was assessed based on student responses through questionnaires involving two trial groups: a small group of 10 students with an average attractiveness score of 3.59 and a larger group of 20 students with an average attractiveness score of 3.62. The results of the study indicate that the developed teaching materials are feasible to use based on expert validation and are considered attractive by students. Thus, the development of these teaching materials is expected to contribute positively to the learning process in Madrasah Ibtidaiyah.

Keywords: Madrasah Ibtidaiyah; Numeracy Literacy; Socio-Cultural Literacy; Teaching Materials

Abstrak

Di era modern ini, meskipun teknologi telah membawa perubahan signifikan dalam pendidikan, masih terdapat kesenjangan dalam penerapan literasi numerasi dan sosial budaya di Madrasah di Indonesia, yang berdampak pada rendahnya kemampuan literasi numerasi siswa. Upaya pemerintah melalui Program Asesemen Kompetensi Madrasah Indonesia (AKMI) telah dilakukan, tetapi tantangan dalam mengembangkan bahan ajar yang inovatif dan sesuai kebutuhan tetap ada. Oleh karena itu, diperlukan strategi baru untuk meningkatkan literasi siswa dalam konteks yang beragam. Penelitian ini bertujuan untuk mengembangkan bahan ajar yang berorientasi pada literasi numerasi dan sosial budaya untuk Madrasah Ibtidaiyah dengan menggunakan model ADDIE (Analisis, Desain, Pengembangan, Implementasi, Evaluasi). Instrumen penelitian mencakup lembar validasi ahli untuk mengevaluasi kelayakan bahan ajar dan angket untuk menilai tingkat kemenarikan produk dari sudut pandang mahasiswa. Kelayakan bahan ajar dievaluasi oleh tiga kelompok ahli, yaitu ahli materi, media, dan sosial budaya. Hasil validasi menunjukkan rata-rata skor 3,59 untuk aspek materi, 3,46 untuk aspek media, dan 3,48 untuk aspek sosial budaya pada skala 4, yang menunjukkan bahwa bahan ajar memenuhi kriteria kelayakan (kategori"layak"). Sementara itu, kemenarikan bahan ajar dinilai berdasarkan respons mahasiswa melalui angket. Penilaian dilakukan oleh dua kelompok uji coba: kelompok kecil yang terdiri dari 10 mahasiswa dengan rata-rata penilaian kemenarikan 3,59 dan kelompok besar yang terdiri dari 20 mahasiswa dengan rata-rata penilaian kemenarikan 3,62. Hasil penelitian menunjukkan bahwa bahan ajar yang dikembangkan layak digunakan berdasarkan validasi para ahli dan dinilai menarik oleh mahasiswa. Dengan demikian, pengembangan bahan ajar ini diharapkan dapat memberikan kontribusi positif terhadap proses pembelajaran di Madrasah Ibtidaiyah.

Kata Kunci: Bahan ajar; Literasi Numerasi, Literasi Sosial Budaya; Madrasah Ibtidaiyah

Introduction

The rapid development of technology has influenced various aspects of society, including education (Silahuddin, 2015). The integration of technology into educational systems has been shown to enhance quality and standards (Putra et al., 2024). As a result, the education system has undergone changes driven by government policies that adapt to contemporary needs. One significant policy is the curriculum reform, which aims to bring about improvements in education (Hutchinson & Torres, 1994). In Indonesia, madrasah plays a vital role in educating the nation's youth (Indra, 2020). As an Islamic educational institution, madrasah develops students' potential and fosters their religious character to develop an informed and dignified generation. In addition to religious instruction, madrasah equips students with essential literacy skills, including numeracy and socio-cultural understanding. Numeracy literacy serves as a guide for teachers in evaluating student progress, designing activities, and selecting appropriate tools for the

learning process (Mahmud & Pratiwi, 2019). Individuals with strong numeracy skills can manage finances, measure medication doses, interpret graphs, and perform basic calculations confidently. Numeracy literacy extends beyond formal mathematics taught in schools; it also encompasses the practical application of mathematical concepts in daily life (Ika Puspitasari & Sri Watini, 2022). To address the issue of low numeracy literacy, educators must play a critical role in introducing numeracy-focused exercises to students. Regular exposure to numeracy literacy programs can enhance students' interest and motivation in mathematics. Furthermore, the inclusion of numeracy-based problems has been shown to significantly improve student learning outcomes, making its implementation essential (Perdana & Suswandari, 2021).

In addition to numeracy literacy, social and cultural literacy significantly contributes to education. Social and cultural literacy refers to a person's ability to understand, participate in, and interact within society by comprehending norms, values, and cultural contexts. This entails acknowledging cultural disparities and engaging proficiently with varied backgrounds, particularly in academic environments. Individuals with strong social and cultural literacy can communicate effectively, navigate social dynamics, and appreciate cultural diversity. This type of literacy involves understanding the history, beliefs, values, customs, and communication styles within a community and communication styles, such as traditional greetings or storytelling methods. In the educational context, social and cultural literacy is crucial as it helps students comprehend the world around them, interact with people from various backgrounds, and become responsible citizens. This literacy also includes the ability to adapt in multicultural and multi-ethnic environments. Beyond knowledge of cultural diversity, social and cultural literacy encompasses skills such as empathy, effective communication, and building positive relationships. With strong social and cultural literacy, individuals can become more informed citizens, actively engage in society, and contribute to developing inclusive communities.

Despite these competencies being essential, students' literacy skills in mathematics remain significantly lower than those in other countries (Purwasih, Sari, & Agustina, 2018). Research conducted by the Program for International Student Assessment (PISA) in 2018 highlighted this issue, ranking Indonesian students 73rd out of 79 participating countries, with a score of 379 compared to the international average of 489 (OECD, 2015). In 2015, the Trends in International Mathematics and Science Study (TIMSS) assessed students in Indonesia, ranking them 44th out of 49 countries, with an average score of 397, below the international average score of 500. Similarly, the Indonesian National Assessment Program

(INAP) revealed that students achieved a score of 77.13% in mathematics and 73.61% in science, categorized as moderately proficient; however, their literacy score was only 46.83%, which is classified as low (GLN, 2017).

The students' limited ability to solve numeracy literacy problems is linked to challenges in critical, reflective, and creative thinking, as well as difficulties in text comprehension, representation, and problem-solving strategies (Hasnawati, 2016). The significance of numeracy literacy within the madrasah curriculum relates directly to students' need to apply mathematical concepts in everyday life and comprehend religious teachings. To address this gap, the Indonesian government has introduced the Indonesian Madrasah Competency Assessment Program (AKMI). AKMI aims to measure and map the competency levels of students in various areas of literacy, including reading, numeracy, science, and socio-cultural literacy (Machmudah et al., 2022). As a diagnostic assessment, AKMI provides accurate information regarding students' literacies that serves as a foundation for enhancing the quality of learning. Consequently, the AKMI program seeks to improve both the teaching and learning processes and the educational outcomes of students in Madrasah (Madrasah & kementrian Agama RI, 2023). The amalgamation of numeracy literacy and socio-cultural literacy offers a distinctive and substantial opportunity. The combination of numeracy literacy and social-cultural literacy can help students understand norms, values, and cultural and social contexts in numeracy-based problems. Thus, with the integration of these literacies, students will be trained and accustomed to both mathematical and social-cultural communication. This integration can enhance students' numeracy and socio-cultural literacy skills. As it is important to note, there has not yet been a combination of these two literacies. Combining these literacies is critical for encouraging numeracy integration in socio-cultural contexts.

Enhancing students' literacy skills can be accomplished by utilizing teaching materials as the primary learning resource. These materials facilitate learning activities during lectures and offer additional information that may be challenging to obtain from other sources (Gasong, 2018). During the learning process, students need interesting teaching materials as a tool that is used as a source of learning information (Fadila et al., 2019). Teaching materials encompass both printed and electronic formats, which students use to achieve their learning objectives (Cahyadi, 2019). Teaching materials can be defined as any resources that assist teachers in delivering content during classroom activities (Nurdyansyah & Mutala'liah, 2015). Based on their nature, teaching materials can be categorized into four groups: print-based materials, electronic media, project-based resources, and distance learning materials (Wahyudi, 2022). The development of teaching materials aims to help

students grasp concepts, innovate in content delivery to maintain student engagement, and enhance the overall learning experience (Prastowo et al., 2015). Teaching materials have a significant impact on the success of the learning process (Wahyuni, Yati, & Fadila, 2020). Teaching resources are crucial for improving the quality of education in the instructional process (Handayani & Fadila, 2019). Thus, the development of learning media for students is essential to enhance their interest and understanding of the subject matter (Cahyaningsih et al., 2024).

Generally, learning materials consist of the knowledge, skills, and attitudes students must achieve according to established competency standards (Putra & Andriani, 2023). Specifically, these materials encompass knowledge, skills, values, and attitudes (Prastowo et al., 2015). Teaching materials come in various forms, including printed and non-printed resources. Common printed teaching materials include handouts, books, modules, brochures, and student worksheets (Khulsum, Hudiyono, & Sulistyowati, 2018). Six essential components should be included in teaching materials: learning instructions, competencies to be achieved, supporting information for the learning content, practice questions, student worksheets, and evaluations (Prastowo, 2012). Therefore, it is crucial to innovate in the creation of teaching materials that effectively assist students in the learning process, ensuring that learning objectives are optimally achieved (Putra & Pamungkas, 2019).

Method

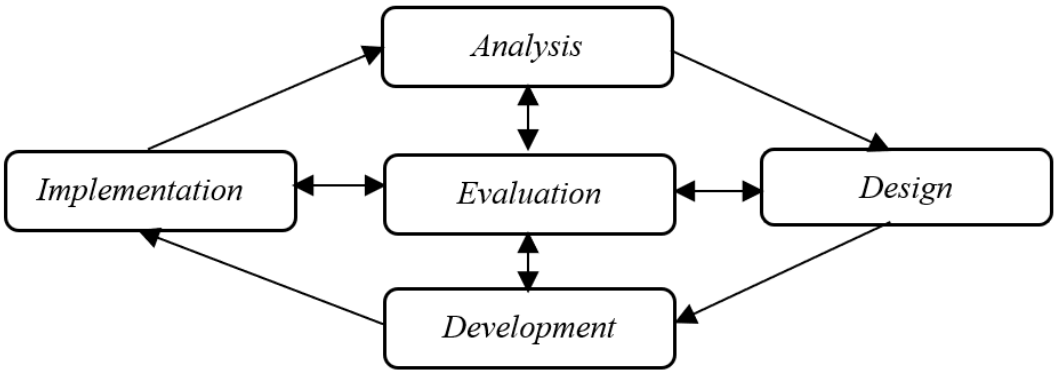


Figure 1. ADDIE Development Model

This research employed the Research and Development (R&D) method using the ADDIE development model (Analysis, Design, Development, Implementation, Evaluation) to design, develop, and evaluate teaching materials focused on numeracy and socio-cultural literacy for Madrasah Ibtidaiyah. The sample for this study consisted of students from the PGMI (Elementary School Teacher Education)

Study Program at UIN Raden Intan Lampung, selected using a purposive sampling technique. Participants were chosen based on their enrollment in the Madrasah Ibtidaiyah teacher education program. The sample comprised small group trials with 10 students and large group trials with 20 students. The research utilized two primary instruments: expert validation sheets and questionnaires. Expert validation sheets were used to assess the feasibility of the teaching materials. Experts in content, media, and socio-cultural fields evaluated the materials to ensure they meet the required standards for accuracy, media quality, and cultural relevance. The questionnaires were distributed to assess the attractiveness of the materials from the students' perspectives. Students provided feedback based on their experience with the materials during the trials.

The final evaluation was carried out to revise the teaching materials based on feedback from validators and students, ensuring that the final product can be used as a learning reference (Bundsgaard & Hansen, 2011). In terms of research implementation, the validation sheets were administered to three content experts, three media experts, and three socio-cultural experts. These experts reviewed the materials and provided feedback on their suitability, which was then used to revise and improve the teaching materials. The questionnaires were given to students after using the materials in both small and large group trials. The students' responses were collected and analyzed to evaluate the appeal and relevance of the materials. The data collected through these instruments were analyzed both quantitatively and qualitatively. Quantitative data focused on validity scores and attractiveness ratings, while qualitative data was derived from feedback provided by the experts and students. Statistical analysis was applied to the quantitative data, while thematic analysis was used to process the qualitative data, guiding the revisions and improvements of the developed teaching materials.

Expert Validation Data Analysis

The validation analysis used a Likert scale to measure the attitudes and perceptions of individuals or groups. Validators filled out a questionnaire with four rating scales according to the predetermined categories:

Table 1. Expert Validation Assessment Score

Category	Score
Very Good (VG)	4
Good (G)	3
Fair (F)	2
Poor (P)	1

The calculation of the validation results was computed using the following formula (Sriyanti, 2019):

$$\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n}$$

With

$$x_i = \frac{total\ score}{maximum\ score} \times 4$$

Description:

$\bar{x}$ = final average

x_i = the operational test score of the questionnaire for each respondent

n = the number of respondents who filled out the questionnaire

From the calculations above, the next step is to interpret the validation results based on the Likert scale to determine the interpretation criteria for the module's feasibility. The interpretation criteria for feasibility using the Likert scale are presented as follows (Wibowo & Pratiwi, 2018):

Table 2. Eligibility Interpretation Criteria

Score	Category	Description
$3{,}26 < \bar{x} \leq 4{,}00$	Very Feasible	No Revision
$2{,}51 < \bar{x} \leq 3{,}26$	Feasible	Partial Revision
$1{,}76 < \bar{x} \leq 2{,}51$	Less Feasible	Partial Revision & Re-evaluation of Material
$1{,}00 < \bar{x} \leq 1{,}76$	Very Infeasible	Total Revision

Analysis of Product Trial Results

Questionnaires were administered to students aimed to analyze data from the product trial. The response questionnaire consisted of four options tailored to the theme of the questions, each with a different score to reflect the level of suitability for using the developed teaching materials. A scoring table is used to assess the responses provided.

Table 3. Questionnaire Scoring

Category	Score
Strongly Agree (SA)	4
Agree (A)	3
Disagree (D)	2
Strongly Disagree (SD)	1

The formula to calculate the response results from the questionnaire is presented as follows (Sriyanti, 2019):

$$\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n}$$

With

$$x_i = \frac{total\ score}{maximum\ score} \times 4$$

Description:

$\bar{x}$ = final average

x_i = the operational test score of the questionnaire for each respondent

n = the number of respondents who filled out the questionnaire

The percentage of the results obtained will provide the criteria for interpreting the assessment based on the Likert scale, allowing for conclusions to be drawn according to the criteria listed below (Ariski, Putra, & Alhaq, 2023).

Table 4. Aspect of Appeal Interpretation

Score	Statement of the Quality of the Appeal Aspect
$3{,}26 < \bar{x} \leq 4{,}00$	Very Appealing
$2{,}51 < \bar{x} \leq 3{,}26$	Appealing
$1{,}76 < \bar{x} \leq 2{,}51$	Less Appealing
$1{,}00 < \bar{x} \leq 1{,}76$	No Appealing

Results

This research produced teaching materials focused on numeracy and socio-cultural literacy for Madrasah Ibtidaiyah within the KKNI curriculum. The materials were validated by content, media, and socio-cultural experts, confirming their validity and suitability for use. Additionally, the materials were tried-out by students in small groups (10 students) and large groups (20 students). Feedback from validators and students was used to revise and improve the materials, ensuring their alignment with learning objectives.

The final product consisted of teaching materials oriented towards enhancing numeracy and socio-cultural literacy, developed through the stages of analysis, design, development, implementation, and evaluation. The materials were deemed ready for use in the teaching and learning process since they met the required standards for content accuracy and presentation quality.

Analysis Stage

In this stage of product development, a detailed needs analysis was conducted to identify the fundamental requirements for developing teaching materials focused on numeracy literacy and socio-cultural literacy for Madrasah Ibtidaiyah. The needs analysis involved a comprehensive curriculum review to identify the most relevant content for the teaching materials, as well as an analysis of student characteristics, including their learning styles, prior knowledge, and specific educational challenges. The findings revealed that students lacked contextual understanding of numeracy in everyday life, and their engagement with socio-cultural topics was limited. The findings informed the development of instructional materials to include practical examples and contextually pertinent content, including real-world numeracy applications and relatable socio-cultural themes, assuring alignment with the students' educational aims and requirements.

Design Stage

The design stage involved the process of creating teaching materials focused on numeracy literacy and socio-cultural literacy for Madrasah Ibtidaiyah. At this stage, the structure of the teaching materials was carefully arranged based on the competencies and learning indicators that must be achieved, ensuring alignment with the curriculum and the specific needs of the students. The content was designed to be clear, engaging, and contextually relevant, and was organized into a modular format that allows for progressive learning.

Visual design was executed using tools such as Canva, while MS Word facilitated text composition, ensuring the resources were accessible and user-friendly. The modular format includes clear sections, such as an introduction, learning objectives, core content, examples, and exercises, followed by a summary or review section facilitating a structured and comprehensive learning experience.

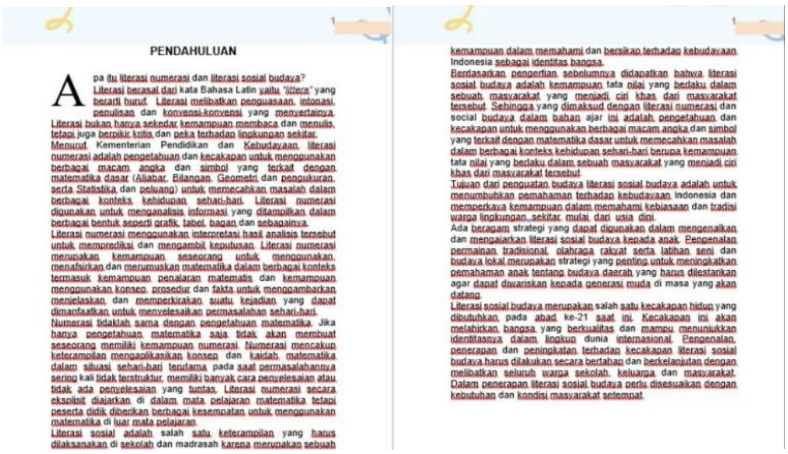
In addition, to assess the feasibility and appeal of the teaching materials, assessment instruments were developed, including expert validation sheets to evaluate the accuracy, media quality, and cultural relevance of the content. Questionnaires were also developed for students to gather feedback on the attractiveness of the materials in relation to their learning needs. These tools engaged students and made sure the instructional materials fulfilled academic standards while offering insightful feedback for improvement.

Development Stage

After the design stage, the next step in the development of the teaching materials was the development stage, which included activities such as creating the

teaching materials and validating the product. Below is an overview of the developed product:

Figure 2. Front Cover of Teaching Materials



PENDAHULUAN

Apa itu literasi numerasi dan literasi sosial budaya?
Literasi berasal dari kata Bahasa Latin yaitu "litera" yang berarti huruf. Literasi melibatkan penguasaan, intonasi, penulisan, dan konvensi-konvensi yang menyertainya. Literasi bukan hanya sekedar kemampuan membaca dan menulis, tetapi juga berpikir kritis dan peka terhadap lingkungan sekitar.
Menurut Kementerian Pendidikan dan Kebudayaan, literasi numerasi adalah pengetahuan dan kecakapan untuk menggunakan berbagai macam angka dan simbol yang terkait dengan matematika dasar (Aljabar, Bilangan, Geometri dan pengukuran, serta Statistika dan peluang) untuk memecahkan masalah dalam berbagai konteks kehidupan sehari-hari. Literasi numerasi digunakan untuk menganalisis informasi yang ditampilkan dalam berbagai bentuk seperti grafik, tabel, bagan dan sebagainya.
Literasi numerasi menggunakan interpretasi hasil analisis tersebut untuk memprediksi dan mengambil keputusan. Literasi numerasi merupakan kemampuan seseorang untuk menggunakan, menafsirkan dan merumuskan matematika dalam berbagai konteks termasuk kemampuan penalaran matematis dan kemampuan menggunakan konsep, prosedur dan fakta untuk menggambarkan menjelaskan, dan memperkirakan suatu kejadian yang dapat dimanfaatkan untuk menyelesaikan permasalahan sehari-hari.
Numerasi tidaklah sama dengan pengetahuan matematika. Jika hanya pengetahuan matematika saja tidak akan membuat seseorang memiliki kemampuan numerasi. Numerasi mencakup keterampilan menggunakan konsep dan kaidah matematika dalam situasi sehari-hari terutama pada saat permasalahannya sering kali tidak terstruktur, memiliki banyak cara penyelesaian atau tidak ada penyelesaian yang tuntas. Literasi numerasi secara eksplisit diajarkan di dalam mata pelajaran matematika tetapi peserta didik diberikan berbagai kesempatan untuk menggunakan matematika di luar mata pelajaran.
Literasi sosial adalah salah satu keterampilan yang harus dilaksanakan di sekolah dan madrasah karena merupakan sebuah kemampuan dalam memahami dan bersikap terhadap kebudayaan Indonesia sebagai identitas bangsa.
Berdasarkan pengertian sebelumnya didapatkan bahwa literasi sosial budaya adalah kemampuan tata nilai yang berlaku dalam sebuah masyarakat yang menjadi ciri khas dari masyarakat tersebut. Sehingga yang dimaksud dengan literasi numerasi dan social budaya dalam bahan ajar ini adalah pengetahuan dan kecakapan untuk menggunakan berbagai macam angka dan simbol yang terkait dengan matematika dasar untuk memecahkan masalah dalam berbagai konteks kehidupan sehari-hari berupa kemampuan tata nilai yang berlaku dalam sebuah masyarakat yang menjadi ciri khas dari masyarakat tersebut.
Tujuan dari penguatan budaya literasi sosial budaya adalah untuk menumbuhkan pemahaman terhadap kebudayaan Indonesia dan memperkaya kemampuan dalam memahami kebiasaan dan tradisi warga lingkungan sekitar mulai dari usia dini.
Ada beragam strategi yang dapat digunakan dalam mengenalkan dan mengajarkan literasi sosial budaya kepada anak. Pengenalan permainan tradisional, olahraga rakyat serta latihan seni dan budaya lokal merupakan strategi yang penting untuk meningkatkan pemahaman anak tentang budaya daerah yang harus dilestarikan agar dapat diwariskan kepada generasi muda di masa yang akan datang.
Literasi sosial budaya merupakan salah satu kecakapan hidup yang dibutuhkan pada abad ke-21 saat ini. Kecakapan ini akan melahirkan bangsa yang berkualitas dan mampu menunjukkan identitasnya dalam lingkup dunia internasional. Pengenalan, penerapan dan peningkatan terhadap kecakapan literasi sosial budaya harus dilakukan secara bertahap dan berkelanjutan dengan melibatkan seluruh warga sekolah, keluarga dan masyarakat. Dalam penerapan literasi sosial budaya perlu disesuaikan dengan kebutuhan dan kondisi masyarakat setempat.

Figure 3. Introduction in Teaching Materials

Figure 4. Number Material in Teaching Materials

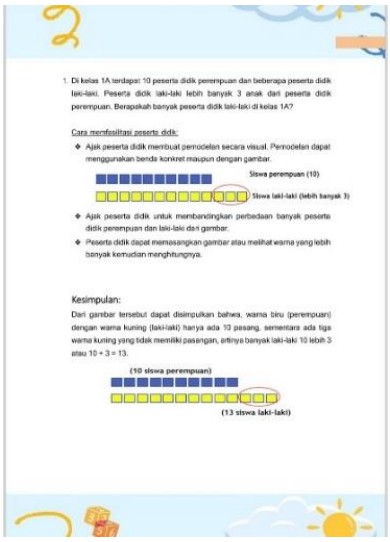


Figure 5. Example Problems in Teaching Materials

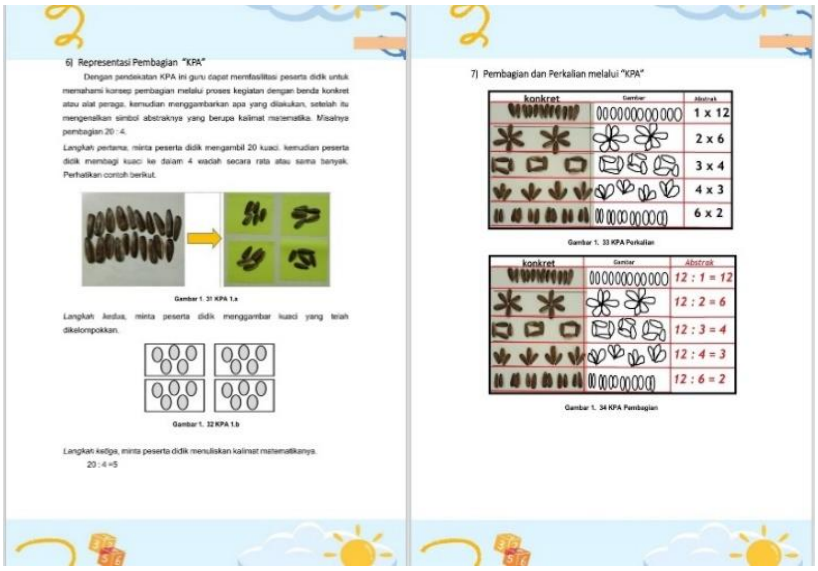
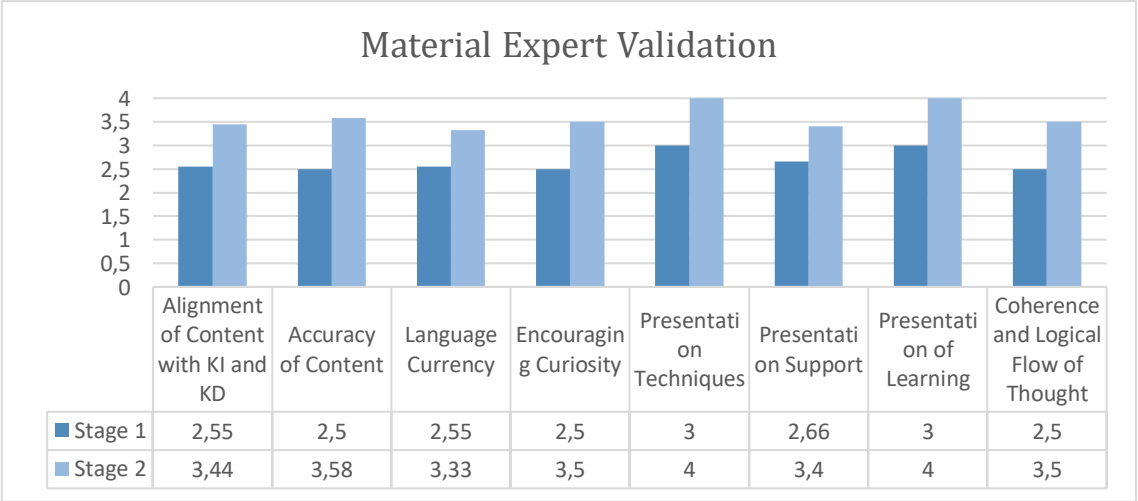


Figure 6. Integration of Material with Culture in Teaching Materials

The prepared teaching materials was evaluated by validators, consisting of media experts, content experts, and socio-cultural experts. The content validators were Mr. Rizki Wahyu Yunian Putra, M.Pd., Ms. Siska Andriani, S.Si., M.Pd., and Dr. Mujib, M.Pd. The media validators were Ms. Arini Alhaq, M.Pd., Ms. Riyama Ambarwati, M.Si., and Ms. Novian Riskiana Dewi, M.Si. The socio-cultural validators were Dr. Heru Juabdin Sada, M.Pd. I., Ms. Fraulein Intan Suri, M.Si., and Mr. Iip Sugiharta, M.Si. This evaluation provided comments, suggestions, and input used as a reference for revising the teaching materials to improve product quality (Selvaraj & Azman, 2020). Below are the detailed assessments from each expert based on product evaluation indicators from stages 1 and 2:



	Alignment of Content with KI and KD	Accuracy of Content	Language Currency	Encouraging Curiosity	Presentation Techniques	Presentation Support	Presentation of Learning	Coherence and Logical Flow of Thought
Stage 1	2,55	2,5	2,55	2,5	3	2,66	3	2,5
Stage 2	3,44	3,58	3,33	3,5	4	3,4	4	3,5

Figure 7. Comparison Chart of Material Expert Validation in Stages 1 & 2

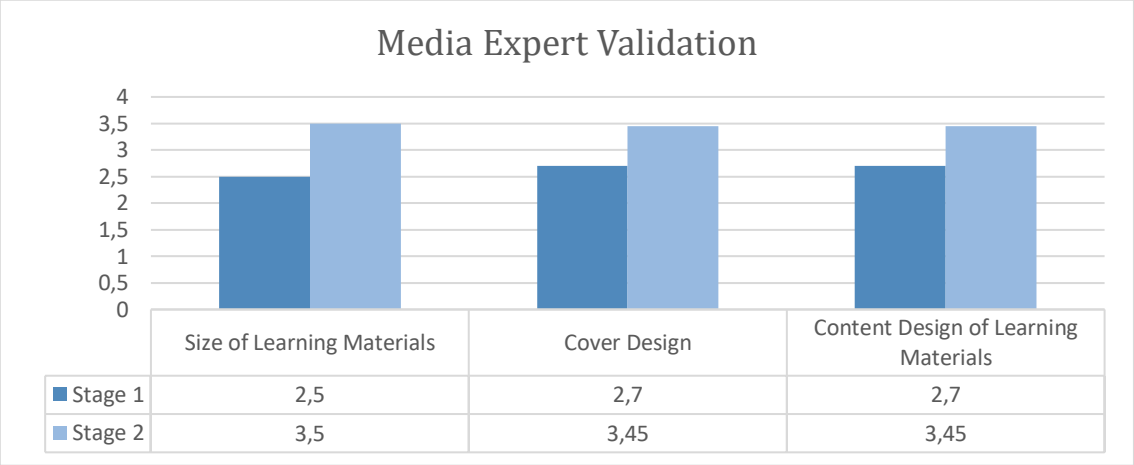


Figure 8. Comparison Chart of Media Expert Validation in Stages 1 & 2

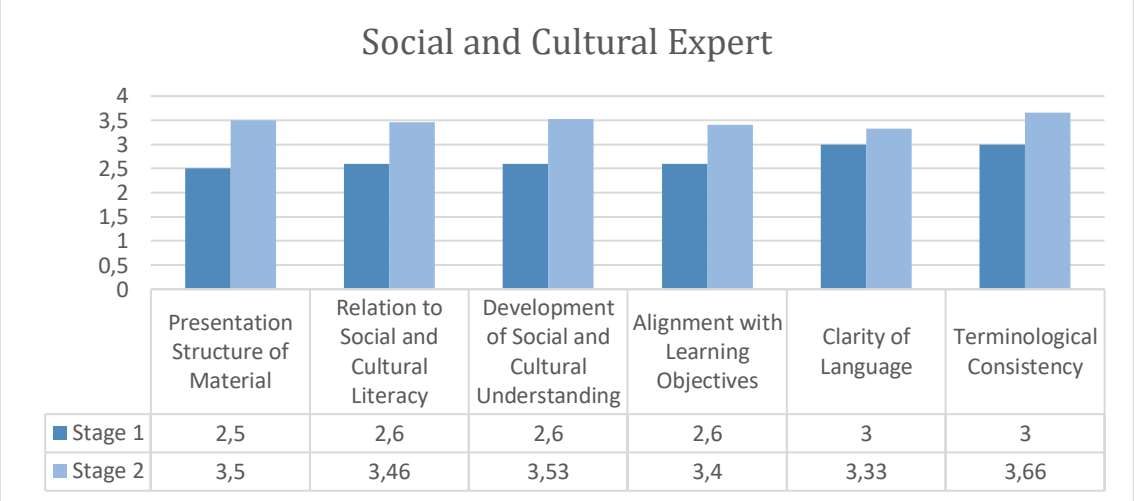


Figure 9. Comparison Chart of Social and Cultural Expert Validation in Stages 1 & 2

The purpose of this validation was to gather feedback, critiques, and suggestions to improve the quality of the developed teaching materials. Each input was applied to the revision of the teaching materials. The completion of the validation questionnaire was used to determine the feasibility of the teaching materials before being tested with students. Below are the evaluation results from the subject matter experts, media experts, and socio-cultural experts regarding the developed product:

Table 5. Product Validation Results

Expert	Validator			Average Score	Criteria
	I	II	III		
Material	3,64	3,57	3,57	3,59	Very Feasible
Media	3,52	3,41	3,47	3,46	Very Feasible
Socio-Cultural	3,48	3,31	3,65	3,48	Very Feasible

Implementation Stage

The developed teaching materials, after being validated and deemed suitable by expert validators, moved on to this stage. In this phase, the product was tested in learning activities at PGMI, and feedback questionnaires were distributed to students who used the materials. The purpose of this stage was to assess the attractiveness of the developed teaching materials through small-scale and large-scale trials. The small-scale trial involved 10 students, while the large-scale trial included 20 students. The assessment aspects of the questionnaire included evaluating the clarity, relevance, and engagement of the materials. According to Fisbie and Ebel's criteria for evaluating instructional materials, the data collected from the trials were analyzed quantitatively by calculating the average scores for each trial. The small-scale trial yielded an average score of 3.59, while the large-scale trial resulted in an average score of 3.62, both meeting the criterion of being "very appealing." These scores indicated that the teaching materials were appropriate for use. Based on the evaluation, it was concluded that additional printed copies of the materials are needed so that each student can use them individually during each session. A summary of the data and a graph illustrating the trial results are presented below.

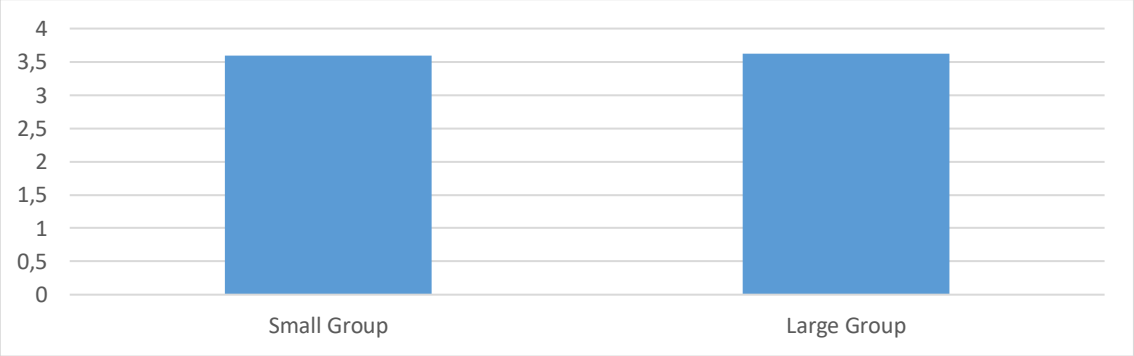


Figure 10. Graph of Comparison between Small Group and Large Group Trial Results

Evaluation Stage

The evaluation was conducted at each stage, from analysis to implementation. The purpose of this evaluation was to analyze the data obtained at each stage and make improvements to aspects deemed less appropriate. The final evaluation aimed to ensure that the teaching materials for the course on mathematics, Islam, and the environment fell into the categories of valid, suitable for use, and engaging for learning activities. Based on the validation results from content experts, media experts, and social cultural experts, it was found that several

improvements were still needed for the teaching materials to be used. Therefore, the researcher needed to revise according to the suggestions and critiques from each validator. One important aspect of the revision was to integrate social and cultural elements into the teaching materials, as well as to ensure correct writing procedures.

Discussion

The researcher conducted an analysis stage that included needs analysis, curriculum analysis, and student characteristic analysis. There was an urgent need to develop teaching materials that not only focus on cognitive aspects but also integrate local social and cultural contexts while linking mathematical concepts to students' everyday lives. The developed teaching materials should enhance student engagement in the learning process through the presentation of contextual, relevant, and interesting content. The students required teaching materials that aligned with the current curriculum. Therefore, to ensure that the learning process proceeds well and engaging, the development of teaching materials was essential.

This was supported by previous research conducted by Magdalena, Prabandanii, Rini, Fitriani, & Putri (2020). Their findings indicated that the development of teaching materials significantly helped and influenced many aspects, such as making learners more active in the learning process, facilitating understanding of the material, and encouraging educators to create a more dynamic learning atmosphere. This finding was consistent with the results from the validation and implementation stages of this study, where the teaching materials received high evaluations from expert validators and students. (Sandy, Cholily, & Ummah, 2022) found that the development of flipbook-based teaching materials was effective for use as learning media. The derived n-gain value, utilized to assess the efficacy of educational materials, was classified as moderate (Kharisma & Asman, 2018), indicated that the development of problem-based mathematics teaching materials for eighth-grade junior high school students were effective, of good quality, and oriented toward mathematical problem-solving skills and learning achievement. Therefore, one alternative that can be pursued is to develop a product as teaching materials.

In the design stage, after evaluating the analysis phase, the next step was to design the framework for the developed product. This design was based on the established basic competencies and indicators (Huda, 1999). Basically, a module is a body of knowledge derived from the existing basic competencies and the

applicable curriculum (Yuberti, 2018). The content and visuals in the teaching materials were conceptualized at this stage and then evaluated once more. In addition to designing the teaching materials, an instrument in the form of a questionnaire was also created to assess the results of the product validation and measure the level of interest in the product. A module is referred to as a medium for independent learning because it contains guidelines for self-directed study. Additionally, a module serves as a tool or means of learning that includes various materials, methods, limitations, and evaluation techniques, designed systematically and attractively to achieve the desired competencies according to their level of complexity (Shania & Arianto, 2022). The validation assessment questionnaire was provided to validators to evaluate the feasibility of the developed product, while the interest questionnaire was given to students to gauge how engaging the product was. Subsequently, the evaluation results were used to identify any shortcomings in terms of alignment with the competencies and indicators needed to be achieved.

The development stage is a continuation of the previously evaluated design stage, involving the creation of teaching materials and the validation process. At this stage, the framework of the teaching materials that have been conceptualized evolved into a complete product. The created product was then evaluated by educational practitioners who acted as expert validators. The purpose of this validation was to gather input, critiques, and suggestions to improve the quality of the developed teaching materials.

Suggestions from content experts for the materials included correcting undefined points and lines and undefined terms underlie the definitions of all geometric terms. They can be given meanings by way of descriptions. However, these descriptions should not be considered formal definitions (Rich & Thomas, 2018). The use of appropriate mathematical symbols should be neatly organized and the sources should be written un the bibliography. The bibliography can be made by utilizing reference management, like Mendeley or Zotero. Reference management is the process of managing and organizing reference sources or citations used in research or scientific writing (Warda & Habibah, 2024). Suggestions from media experts included aligning the cover with the book title and improving color combinations, adding designs to the theoretical review section to make it more appealing. Furthermore, the experts suggested that the footer should not be plain and it should reflect the MI students or child-friendly. The chosen color combination was green, as it was associated with Islamic education and Islamic educational institutions in Indonesia, such as *Pesantren* or other schools. Additionally, there were suggestions from social-cultural experts to more deeply connect the material with culture. For example, the division problems were treated

as repeated subtraction and could be replaced with the culture of charity by providing example problems focused on giving charity. The tradition of *sedekah bumi* contains values that are embedded in Pancasila, namely building togetherness among fellow people (Maulana, Polisya, Qoimah, & Irawan, 2022). Furthermore, environmental culture should be added to the example of multiplication representation with the number 1. It was based on the idea that local wisdom is always connected to the lives of people living in a natural and integrated environment. Each piece of input was applied in the revision of the teaching materials. The validation questionnaire was completed to assess the feasibility of the teaching materials before they were tested on students. The validation results from expert validators showed that the content experts gave an average score of 3.59, media experts gave an average score of 3.46, and social-cultural experts gave an average score of 3.48. All three results fell into the "Very Feasible" interpretation category.

In implementation stage, the validated teaching materials were tested on two groups: small-scale testing and large-scale testing. The aim was to measure the level of interest in the teaching materials. At this stage, student response questionnaires were distributed to evaluate the use of the teaching materials in the learning process. The small-scale test involved 10 students, while the large-scale test involved 20 students. The level of attractiveness of the teaching materials was determined based on student responses to the questionnaires. In the small-scale trial, the average result shows a score of 3.59, which falls into the very attractive category. Meanwhile, the large-scale trial yields an average score of 3.62, also with very attractive criteria. Based on these results, it can be concluded that the developed teaching materials meet the attractiveness aspect and are therefore suitable for implementation for PGMI students at UIN Raden Intan Lampung.

The evaluation stage was conducted at each step of the research. In the analysis stage, the evaluation was performed to assess the analysis results of the teaching materials used in the learning process and to identify student needs. This data was collected during the pre-research phase conducted at PGMI Study program of UIN Raden Intan Lampung. The evaluation in the design stage aimed to assess the design of the teaching materials to be developed before proceeding to the development stage. At this stage, the researchers received assistance from fellow lecturers. Subsequently, the evaluation in the development stage was carried out through a validation process by experts, involving content experts, media experts, and social-cultural experts. In the implementation stage, the evaluation was conducted by distributing questionnaires to ascertain the level of attractiveness of the developed teaching materials in the learning process.

After the teaching materials had passed through all stages and were deemed valid and suitable for use, the researcher proceeded with mass production of the teaching materials. In addition, the researcher introduced the teaching materials to the sixth semester students of the PGMI Study Program of UIN Raden Intan Lampung in the 2023/2024 academic year.

Conclusion

This research concludes that the teaching materials developed for numeracy and socio-cultural literacy in Madrasah Ibtidaiyah are found to be feasible and engaging. Validation from experts in content, media, and socio-cultural aspects shows that the materials meet the feasibility criteria. Feedback from students also confirms that the materials are attractive and relevant to their needs. It is recommended that these materials be implemented more widely in Madrasah Ibtidaiyah. Additionally, they should be continuously updated based on user feedback to maintain their quality and appeal.

References

Ariski, E. T., Putra, R. W. Y., & Alhaq, A. (2023). Pengembangan Modul Matematika Bernuansa Islam dan Lingkungan pada Materi Bilangan Bulat. *Journal on Education*, *06*(01), 5364–5376.

Bundsgaard, J., & Hansen, T. I. (2011). Evaluation of learning materials. *Journal of Learning Design*, *4*(4), 31–44.

Cahyadi, R. A. H. (2019). Pengembangan Bahan Ajar Berbasis Addie Model. *Halaqa: Islamic Education Journal*, *3*(1), 35–42. doi: 10.21070/halaqa.v3i1.2124.

Cahyaningsih, D., Khairunnisa, A., Safitri, A. I., Kholifah, N., Jumrotin, R., Rani, R. N., … Sukma, Y. (2024). Developing LEGAMAT on Geometric Distribution: A Teaching Tools for Understanding Mathematics Concept. *Jurnal Pendidikan Matematika (Kudus)*, *7*(1), 133. doi: 10.21043/jpmk.v7i1.26085.

Fadila, A., Dasari, R., Setiyaningsih, Septiana, R., Sari, R. M., & Rosyid, A. (2019). The Development of Electronic Flash Worksheet Based on Adobe Flash Cs6 on Fraction Numbers in the Seventh Grade of Junior High School. *Journal of Physics:*

Conference Series, *1155*, 012019. doi: 10.1088/1742-6596/1155/1/012019

Gasong. (2018). Belajar dan pembelajaran. *Deepublish*.

GLN, T. (2017). *Panduan Gerakan Literasi Nasional*. Jakarta: Kemendikbud.

Handayani, F., & Fadila, A. (2019). Pengembangan Lembar Kerja Siswa (LKS) Bernuansa Islami dalam Pembelajaran Matematika. *E-DuMath: Jurnal Pendidikan Matematika*, *5*(1), 20–30. doi: https://doi.org/10.52657/je.v5i1.932.

Hasnawati. (2016). Description of Mathematics Literacy Ability of Students First Secondary School State 15 Kendari Based on Content, Context, Materials, and Process. *International Journal of Education and Research*, *4*.

Huda, N. (1999). *Language Learning and Teaching*. Malang: IKIP Malang Publisher.

Hutchinson, T., & Torres, E. (1994). The Textbook as Agent of Change. *ELT Journal*, *48*(4), 315–328.

Ika Puspitasari, & Sri Watini. (2022). Penerapan Model ATIK Untuk Meningkatkan Literasi Numerasi Anak Usia Dini Melalui Media Menggambar di Pos PAUD Flamboyan I. *Edukasia: Jurnal Pendidikan Dan Pembelajaran*, *3*(3), 387–398. doi: 10.62775/edukasia.v3i3.126.

Indra, H. (2020). Pendidikan Madrasah dalam Membangun Akhlak Generasi Bangsa. *Al-Afkar: Journal for Islamic Studies*, *3*(89–102). doi: https://doi.org/10.31943/afkar_journal.v3i1,%20January.80.

Kharisma, J. Y., & Asman, A. (2018). *Berorientasi pada Kemampuan Pemecahan Masalah Matematis dan Prestasi Belajar Matematika The Development of Problem-Based Mathematics Instructional Materials Oriented to Students ' Mathematics Problem Solving Skill and Students '*.

Khulsum, U., Hudiyono, Y., & Sulistyowati, E. D. (2018). Pengembangan Bahan Ajar Menulis Cerpen Dengan Media Storyboard Pada Siswa Kelas X Sma. *DIGLOSIA : Jurnal Kajian Bahasa, Sastra, Dan Pengajarannya*, *1*(1), 1–12. doi: 10.30872/diglosia.v1i1.pp1-12.

Machmudah, M., Shari, D., Fitriyah, F. K., Saleh, N. R., Afandi, M. D., & Syaikhon, M. (2022). Pelatihan & Pendampingan Pengembangan Pembelajaran Literasi

Sosial Budaya Sebagai Implementasi Kurikulum Merdeka. *JPkMN: Jurnal Pengabdian Kepada Masyarakat Nusantara*, *3*(2), 520–526.

Madrasah, D. K., & kementrian Agama RI, D. P. I. (2023). *Modul Pembelajaran Literasi Numerasi*.

Magdalena, I., Prabandanii, R. O., Rini, E. S., Fitriani, M. A., & Putri, A. A. (2020). *Analisis pengembangan bahan ajar*. *2*, 170–187.

Mahmud, M. R., & Pratiwi, I. M. (2019). Literasi Numerasi Siswa Dalam Pemecahan Masalah Tidak Terstruktur. *Kalamatika*, *vol 4*(1), 69–88.

Maulana, M. R., Polisya, S. A., Qoimah, S. N., & Irawan, A. D. (2022). Kearifan Lokal Tradisi Sedekah Bumi Dalam Pembentukan Karakter Masyarakat Dibee Lamongan. *Jurnal Pendidikan Sosial Keberagaman*, *9*(2), 1–7. doi: 10.29303/juridiksiam.v9i2.375.

Nurdyansyah, & Mutala'liah, N. (2015). Pengembangan Bahan Ajar Modul Ilmu Pengetahuan Alambagi Siswa Kelas IV Sekolah Dasar. *Program Studi Pendidikan Guru Madrasa Ibtida'iyah Fakultas Agama Islam Universitas Muhammadiyah Sidoarjo*, *41*(20), 1–15.

OECD. (2015). *PISA Result From PISA 2015*.

Perdana, R., & Suswandari, M. (2021). Literasi Numerasi dalam Pembelajaran Tematik Siswa Kelas Atas Sekolah Dasar. *BSIS Mathematics Education Journal*, *3*.

Prastowo, A. (2012). *Panduan Kreatif Membuat Bahan Ajar yang Inovatif*. Yogyakarta: Diva Press.

Prastowo, I., Hidayat, C., & Hastuti, P. (2015). Production of Oleic Acid Ethyl Ester Catalyzed by Crude Rice Bran (Oryza sativa) Lipase in a Modified Fed-batch System: A Problem and its Solution. *Bulletin of Chemical Reaction Engineering & Catalysis*.

Purwasih, R., Sari, N. R., & Agustina, S. (2018). Analisis Kemampuan Literasi Matematik dan Mathematical Habits of Mind Siswa SMP pada Materi Bangun Ruang Sisi Datar. *Numeracy: Jurnal Ilmiah Pendidikan Matematika*, *5*(1), 67–76. doi: https://doi.org/10.46244/numeracy.v5i1.318.

Putra, R. W. Y., & Andriani, S. (2023). Bahan Ajar Bernuansa Islam pada Mata Kuliah Pembelajaran Matematika SMA/MA. *Jurnal E-DuMath*, *9*(1), 11–19. doi: 10.52657/je.v9i1.1936.

Putra, R. W. Y., Azmi, N. N. N. A., Ambarwati, R., Leni, N., Fadila, A., & Dewi, N. R. (2024). Pengembangan E-Modul Matematika Berbasis Nilai Keislaman dan Situation Based Learning. *Sigma*, *16*(1), 209–220. doi: https://doi.org/10.26618/sigma.v16i1.14977.

Putra, R. W. Y., & Pamungkas, A. S. (2019). Pengembangan Bahan Ajar Gamifikasi Matematika Siswa MTs. *Jurnal Penelitian Dan Pembelajaran Matematika*, *12*(1). doi: 10.30870/jppm.v12i1.4865.

Rich, B., & Thomas, C. (2018). *Geometry*. United States: McGraw-Hill Education.

Sandy, D. N., Cholily, Y. M., & Ummah, S. K. (2022). *Pengembangan Flipbook Bermuatan Literasi Numerasi untuk Meningkatkan Kemampuan Komunikasi Matematis*. *5*(November), 135–148.

Selvaraj, A. M., & Azman, H. (2020). Reframing the effectiveness of feedback in improving teaching and learning achievement. *International Journal of Evaluation and Research in Education*, *9*(4), 1055–1062. doi: 10.11591/ijere.v9i4.20654.

Shania, A. I., & Arianto, F. (2022). Pengembangan Modul Pembelajaran Hypercontent Materi Konsep Kelangkaan dan Kebutuhan Manusia Bagi Siswa Kelas VII SMP Nusantara Krian. *Jurnal Mahasiswa Teknologi Pendidikan*, *12*(6), 1–8.

Silahuddin, S. (2015). Penerapan E-Learning dalam Inovasi Pendidikan. *CIRCUIT: Jurnal Ilmiah Pendidikan Teknik Elektro*, *1*(1). doi: 10.22373/crc.v1i1.310.

Sriyanti, I. (2019). *Evaluasi Pembelajaran Matematika*. Jawa Timur: Uwais Inspirasi Indonesia.

Wahyudi, A. (2022). Pentingnya Pengembangan Bahan Ajar dalam Pembelajaran IPS Adip. *JESS : Jurnal Education Social Science*, *2*(46), 51–61.

Wahyuni, S., Yati, M., & Fadila, A. (2020). Pengembangan Modul Matematika Berbasis REACT terhadap Kemampuan Komunikasi Matematis Peserta Didik. *Jambura Journal of Mathematics Education*, *1*(1), 1–12. doi:

10.34312/jmathedu.v1i1.4542.

Warda, & Habibah, S. (2024). Studi dokumentasi penggunaan manajemen referensi mendeley pada skripsi mahasiswa administrasi pendidikan di unm. *Jurnal Ilmiah Penelitian Mahasiswa*, *2*(5), 45–55. doi: https://doi.org/10.61722/jipm.v2i5.472.

Wibowo, E., & Pratiwi, D. D. (2018). Pengembangan Bahan Ajar Menggunakan Aplikasi Kvisoft Flipbook Maker Materi Himpunan. *Desimal: Jurnal Matematika*, *1*(2), 147–156. doi: 10.24042/djm.v1i2.2279.

Yuberti. (2018). Teori Pembelajaran Dan Pengembangan Bahan Ajar Dalam Pendidikan. In *Psikologi Pendidikan* (Vol. 1).