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Integrating Local Cultural Heritage and Religious Values into an Arabic Textbook for Mathematics Education Students at STAIN Mandailing Natal

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Abstract

This study aimed to develop an Arabic textbook for specific purposes in mathematics (*Al-'Arabiyah li ar-Riyāḍiyyāt*) for students of the Mathematics Education Program at STAIN Mandailing Natal. The study employed a Research and Development (R&D) approach using the ADDIE model, consisting of analysis, design, development, implementation, and evaluation stages. Participants included 26 undergraduate students, two Arabic language lecturers, two mathematics lecturers, and two experts in Mandailing culture and Islamic values. Data were collected through needs analysis questionnaires, expert validation sheets, student response questionnaires, interviews, and classroom observations, and analyzed using a mixed-methods approach. The findings revealed that the developed textbook adopts a specialized interdisciplinary approach integrating Arabic mathematical terminology with Mandailing ethnomathematics and Islamic theological values. Designed for academic purposes, it transforms abstract mathematical concepts into culturally contextual and religiously meaningful language tasks using local elements such as *Bagas Godang*, *Dalihan Na Tolu*, Quranic verses, and Hadith. Structurally, the textbook applies task-based learning to enhance students' Arabic communicative competence, mathematical reasoning, and character development. Expert validation results indicated very high feasibility in content (91.2%), linguistic quality (89.5%), and integration of Mandailing cultural and Islamic values (92.8%). Field trials demonstrated that the textbook was practical, comprehensible, and effective in improving students' engagement and understanding of mathematical terminology. This study highlights the importance of integrating Arabic for Specific Purposes (ASP), local wisdom, and Islamic values to strengthen communicative competence, cultural ownership, and appreciation of religious moderation in Islamic higher education.

Keywords: *Arabic for Mathematics, Arabic for Specific Purposes, ADDIE Model, Textbook Development, Mandailing Culture*

تطوير كتاب مدرسي عربي لتعليم الرياضيات قائم على الحكمة المحلية والقيم الدينية في مدرسة ستان ماندیلینج ناتال

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الملخص

تهدف هذه الدراسة إلى تطوير كتابٍ تعليميٍّ للغة العربية للأغراض الخاصة في مجال الرياضيات (*العربية للرياضيات*) لطلبة برنامج تعليم الرياضيات في المعهد الإسلامي الحكومي ماندیلینغ ناتال .(STAIN Mandailing Natal) واعتمدت الدراسة منهج البحث والتطوير(R&D) باستخدام نموذج ADDIE الذي يشمل مراحل: التحليل، والتصميم، والتطوير، والتطبيق، والتقويم. وتكوّنت عينة الدراسة من ٢٦ طالبًا جامعيًا، واثنين من مدرّسي اللغة العربية، واثنين من مدرّسي الرياضيات، وخبيرين في ثقافة ماندیلینغ والقيم الإسلامية. وجُمعت البيانات من خلال استبانات تحليل الاحتياجات، واستمارات تحكيم الخبراء، واستبانات استجابة الطلبة، والمقابلات، والملاحظات الصفية، ثم حُلِّلت باستخدام المنهج المختلط. وأظهرت نتائج الدراسة أن الكتاب التعليمي المطوَّر يعتمد على مدخلٍ بينيٍّ متخصّص يدمج بصورة منهجية المصطلحات الرياضية باللغة العربية مع الإثنورياضيات الماندیلینغية والقيم الإسلامية العقدية. وصُمِّم الكتاب لأغراض أكاديمية، حيث حوّل المفاهيم الرياضية المجرّدة إلى أنشطة لغوية ذات سياق ثقافي ودلالة دينية من خلال توظيف عناصر محلية مثل عمارة *باغاس غودانغ* وفلسفة *داليهان نا تولو* إلى جانب الآيات القرآنية والأحاديث النبوية ذات الصلة. ومن الناحية البنائية، اعتمد الكتاب على التعلم القائم على المهام بما يسهم في تنمية الكفاية التواصلية في اللغة العربية، وتعزيز التفكير الرياضي، وبناء الشخصية لدى الطلبة. كما أظهرت نتائج تحكيم الخبراء مستوى مرتفعًا جدًا من حيث صلاحية المحتوى (٩١,٢٪)، والجودة اللغوية (٨٩,٥٪)، وتكامل القيم الثقافية الماندیلینغية والمبادئ الإسلامية (٩٢,٨٪). وأشارت نتائج التجربة الميدانية إلى أن الكتاب عملي وسهل الفهم وفعّال في تعزيز تفاعل الطلبة وفهمهم للمصطلحات الرياضية. وتؤكد هذه الدراسة أهمية دمج مدخل العربية للأغراض الخاصة(ASP) مع الحكمة المحلية والقيم الإسلامية في تعليم اللغة العربية بما يسهم في تعزيز الكفاية التواصلية، وترسيخ الانتماء الثقافي، وتنمية تقدير الاعتدال الديني في مؤسسات التعليم العالي الإسلامية.

.نموذج ADDIE، تطوير الكتب المدرسية، ثقافة اللغة الماندرينية

INTRODUCTION

In recent years, studies on the integration of language learning with specific academic disciplines have attracted increasing attention in the academic world. Mathematics, as an abstract field of knowledge, requires terminological precision, clarity of discourse, and the use of specialized vocabulary that is often absent from general language instruction. In the context of Arabic language learning, this challenge becomes even more complex, as the learning process must simultaneously preserve linguistic authenticity, ensure terminological accuracy in mathematics, and maintain cultural relevance. Therefore, Arabic language instruction needs to go beyond traditional approaches by integrating theory, practice, and innovation in order to remain relevant to the demands of modern education [18].

Globally, various efforts have been undertaken to develop instructional materials that support mathematics learning through Arabic. Research on the development of Mathematical Arabic for Teaching highlights the importance of integrating mathematical discourse into textbooks, both in the teaching of quadratic function notation in Palestine and in Arabic-language mathematics textbooks at the secondary school level in Saudi Arabia [19]. In Indonesia, the

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[18] Muhammad Fadli Ramadhan et al., "The Role of Arabic Language Learning Method and Its Relevance for Future Arabic Teachers: Ernest Nagel's Perspective," *Izdihar : Journal of Arabic Language Teaching, Linguistics, and Literature* 7, no. 3 (2024): 393–406, https://doi.org/10.22219/jiz.v7i3.34810.

[19] Abdulwali H. Aldahmash and Naem M. Alamri, "An Analysis of the Inclusion of Mathematical Discourse Components in Arabic Mathematical Textbooks: The Case of Saudi Arabia," *Frontiers in Psychology* 11, no. November (2020): 1–8, https://doi.org/10.3389/fpsyg.2020.534803; Hussein Sabra and Jehad Alshwaikh, "Combining Mathematical Arabic and the Textbook for Teaching the Sign of Quadratic Functions Hussein Sabra , Jehad Alshwaikh Language Lens," no. July (2022), https://doi.org/: https://www.researchgate.net/publication/362425047 Combining.

development of PISA-type mathematics problems using Arabic contexts in Palembang demonstrates that the integration of Arabic linguistic contexts can enhance mathematical literacy while providing more meaningful learning experiences [1]. Meanwhile, studies on the integration of technology in Arabic language learning identify persistent challenges such as limited resources, teachers' competencies, and difficulties in adapting instructional materials, all of which continue to hinder instructional transformation [2].

In Indonesia, the demand for instructional materials that integrate language instruction with cultural and religious values has become increasingly urgent. Existing Arabic language textbooks generally focus on grammatical skills, reading, or general communication, and rarely emphasize disciplinary content such as mathematics. This condition creates a gap between students' needs particularly those who are required to use Arabic in mathematical contexts and the availability of appropriate learning resources. The Mathematics Education Program (Tadris Matematika) at STAIN Mandailing Natal faces a similar challenge: students study Arabic, yet the available textbooks are general in nature and do not provide mathematical terminology, scientific discourse practices, or problem-solving contexts in Arabic. At the same time, Mandailing cultural values and Islamic principles are considered essential elements to

[1] Aisyah Turidho et al., "Developing PISA-Like Math Tasks on Algebra Using Arabic Contexts," *Mathematics Education Journal* 15, no. 2 (2021): 203–16, https://doi.org/10.22342/jpm.15.2.14847.203-216.

[2] Ibrahim Babakr Elhaj Abdelkader, Mohamed Hamed Mohamed Said, and Rijal Mahdi, "Digital Transformation: Characteristics and Advantages of Its Teaching and Learning," *Al-Jawhar : Journal of Arabic Language* 2, no. 2 (2024): 131–41, https://doi.org/10.69493/ajoal.v2i2.57; Nadatul. Nazhifa, "TRANSFORMASI PENDIDIKAN ERA DIGITAL: TANTANGAN DAN PELUANG BAGI GURU BAHASA ARAB MASA KINI," *Pendas : Jurnal Ilmiah Pendidikan Dasar,* 10, no. 2 (2025): 438–53; Sarah Sarah et al., "Technology Integration in Arabic Language Skills Development in the Digital Era," *Al-Fusha : Arabic Language Education Journal* 6, no. 2 (2024): 74–81, https://doi.org/10.62097/alfusha.v6i2.1735.

be maintained within the educational process. Limited resources, untested pedagogical models, and instructors' competencies in integrating Arabic with mathematical content present additional challenges.

Numerous studies support the importance of developing instructional materials that are responsive to local needs. The integration of local wisdom and religious values in Arabic for Specific Purposes (ASP) development is strongly supported by recent empirical studies, which emphasize the necessity of moving beyond generic language acquisition toward context-specific competency[3]. Research in the field of ASP particularly within Islamic higher education demonstrates that developing specialized curricula, such as Arabic for Islamic Economics or Arabic for Sharia Law, becomes significantly more effective when instructional materials align with the students' immediate socio-cultural and professional realities. Studies show that when localized ethno-mathematical or ethno-legal concepts are introduced alongside specialized Arabic vocabulary, learners exhibit a higher cognitive command over the jargon, as they can readily map the linguistic terms onto pre-existing cultural and religious knowledge structures.

Furthermore, contemporary literature on instructional design highlights that embedding religious principles and local heritage into ASP materials serves as a crucial catalyst for authentic learning and student engagement. Scholars argue that traditional, one-size-fits-all Arabic textbooks often fail to address the specific vocational needs of non-linguistic majors, resulting in low motivation and high language anxiety. Conversely, rigorous R&D (Research and Development) studies focusing on localized ASP frameworks

[3] Lisanudhad Jurnal Bahasa and Sastra Arab, "Analysis on the Interference of Indonesian Morphology in the Translation of Classical Arabic Texts," *Lisanudhad* 12, no. 2 (2025): 143–60.

reveal that task-based designs—which require students to solve professionally relevant, culturally grounded problems using Arabic—not only enhance communicative proficiency but also foster critical thinking. By synthesizing local traditions with universal Islamic values, these developed ASP products successfully equip students with the dual capacity to articulate regional identity and navigate specialized academic discourse. [4]. Studies on the development of Arabic textbooks at the secondary school level reveal that many textbooks are not systematically organized and lack clear linguistic standards, contributing to the perception that Arabic is difficult to learn. A transformational grammar–based model has been proposed to produce more structured and innovative instructional materials [5]. Other literature reviews confirm that the development of technology-based Arabic learning methods—from classical approaches such as grammar-translation to e-learning and digital games—remains relevant in the digital era, despite ongoing implementation challenges[6].

The ADDIE research and development model has proven effective across various contexts. An Arabic speaking skills textbook with interactive exercises significantly improved students' test scores from 59.17 to 80.50 [7]. A systematic literature review of 36 studies (2018–2022) indicates a growing trend in the development of

[4] Muhammad Yusuf, "Development of Arabic Language Teaching Materials With 4D Model for the Second Semester at STAI Al-Furqan Makassar," *Bulletin of Science Education* 3, no. 3 (2023): 152, https://doi.org/10.51278/bse.v3i3.662.

[5] Shafruddin Tajuddin, Muhammad Kamal Abdul Hakim, and R.A. Barnabas, "Developing Arabic Textbook Material for Junior High School Students," *Alsinatuna* 5, no. 2 (2020): 130–46, https://doi.org/10.28918/alsinatuna.v5i2.2322.

[6] Sarah et al., "Technology Integration in Arabic Language Skills Development in the Digital Era."

[7] Agus Yasin et al., "Development of the 'Al-Muhdastah Al-Yaumiyyah' Textbook to Improve Arabic Speaking Skills at an Islamic Boarding School," *Izdihar : Journal of Arabic Language Teaching, Linguistics, and Literature* 6, no. 2 (2023): 141–52, https://doi.org/10.22219/jiz.v6i2.22695.

mathematics instructional materials integrated with Islamic values, particularly at the junior secondary level, with a focus on numerical topics and the incorporation of Qur'anic values [8]. Faridah's study also demonstrates that textbooks incorporating elements of Arab culture can increase students' motivation and comprehension. Furthermore, the development of writing skill materials based on collocations, which were validated as highly feasible, effectively improved learning outcomes through culturally appropriate word combinations[9].

In the context of Arabic language learning, textbook integration represents a key instructional strategy. Bahruddin's research indicates that integration can be achieved by combining two textbooks, selecting appropriate themes, and conducting separate evaluations with the support of competent teachers and a conducive learning environment [10]. The development of Arabic textbooks based on religious moderation at Madrasah Ibtidaiyah in Palopo has also been shown to improve Arabic language skills while strengthening students' understanding of moderation values [11]. Additionally,

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[8] Hania Rahmah, Turmudi Turmudi, and Muhammad Tareq Ghifari, "Research and Development of Mathematics Teaching Material Integrated with Islamic Values: A Systematic Literature Review," *Prisma Sains : Jurnal Pengkajian Ilmu Dan Pembelajaran Matematika Dan IPA IKIP Mataram* 12, no. 2 (2024): 306, https://doi.org/10.33394/j-ps.v12i2.9519.

[9] Achmad Tito Rusady and Rizki Gumliar, "Development of an Arabic Writing Skills Textbook Based on Collocations," *Research and Development in Education (RaDEn)* 4, no. 2 (2024): 1030–42, https://doi.org/10.22219/raden.v4i2.36229.

[10] Uril Bahruddin, Fahrizal Winky Ghifari, and Najib Ahmad Shofiyullah, "Improving Arabic Language Skills by Integrating the Durusul Lugah Al-'Arabia and Silsilah Al-Azhar As-Syarif Textbooks for PPDU Malang Students," *Abjadia : International Journal of Education* 7, no. 2 (2023): 160–73, https://doi.org/10.18860/abj.v7i2.17854.

[11] Andi Arif Pamessangi, "Developing Arabic Language Textbooks Based on Religious Moderation in Madrasah," *AL-ISHLAH: Jurnal Pendidikan* 14, no. 1 (2022): 147–56, https://doi.org/10.35445/alishlah.v14i1.1407.

Android-based PowerPoint learning media significantly improved students' Arabic reading skills [12], while studies on media development in the Education 5.0 era reveal the dominance of the ADDIE model in creating effective learning applications that enhance vocabulary mastery and reading skills [13].

Research on linguistic barriers in mathematics learning at Saudi Arabian universities indicates that second-language limitations can affect the mastery of mathematical skills, leading non-native teachers to rely on translation as an instructional strategy [14]. Similar findings in elementary schools in the United Arab Emirates confirm that limited proficiency in English negatively impacts students' understanding of mathematics and science concepts, and teachers perceive the use of the mother tongue (Arabic) as more supportive of learning outcomes than English as the medium of instruction [15].

Based on these findings, this study aims to develop a specialized Arabic textbook for mathematics (Al-'Arabiyah li al-Riyāḍiyyāt) designed for students of the Mathematics Education Program at STAIN Mandailing Natal. The development employs the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation) and integrates four main aspects: mathematical content, Arabic language skills, local Mandailing cultural values,

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[12] Yasin et al., "Development of the 'Al-Muhdastah Al-Yaumiyyah' Textbook to Improve Arabic Speaking Skills at an Islamic Boarding School."

[13] Anisa Alfurochmatin and Ahmad Muhaimin Bin Mat Jusoh, "Tren Pengembangan Media Pembelajaran Bahasa Arab Di Indonesia Era 5.0," *Alsina : Journal of Arabic Studies* 6, no. 1 (2024): 1–26, https://doi.org/10.21580/alsina.6.1.21278.

[14] Lujain Jaza Al-Sehli and Nadia Maroof, "Language Barriers in Teaching and Understanding Mathematics: Teachers' and Students' Perceptions," *Journal of Applied Linguistics and Language Research* 7, no. 1 (2020): 125–34.

[15] Adeeb M. Jarrah, "Elementary Schools Mathematics and Science Teachers' Perspectives on Using English As a Medium of Instruction," *Humanities & Social Sciences Reviews* 8, no. 4 (2020): 473–82, https://doi.org/10.18510/hssr.2020.8446.

and Islamic values. The novelty of this study lies in the development of instructional materials that not only integrate language and disciplinary knowledge but also incorporate local wisdom and religious values.

Although previous studies have extensively explored instructional material development, a significant conceptual and methodological gap remains at the intersection of language acquisition and exact sciences. Prior research in Arabic for Specific Purposes (ASP), such as the framework by [16], successfully introduces technical terminology but often fails to immerse students in actual mathematical problem-solving. Conversely, studies that focus heavily on integrating Islamic values into science curricula, like those by [17], tend to isolate mathematical logic from foreign language literacy. This binary division leaves a critical gap in creating a comprehensive, interdisciplinary textbook that satisfies both linguistic proficiency and mathematical reasoning simultaneously.

The primary objectives of this study are to produce an Arabic textbook that meets the needs of mathematics education students, to examine the feasibility of the textbook in terms of material relevance, cultural integration, and Islamic values, and to analyze its contribution to improving students' ability to understand and use Arabic in mathematical contexts. The results of this development are expected to enhance the quality of Arabic language instruction at STAIN Mandailing Natal, expand the practice of Arabic for

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[16] A. Albantani, A. M., & Madkur, "Musyahadat Al-Fidiyu: Ict-Based Media in Arabic For Specific Purposes (Asp) Class.," *Arabiyat: Jurnal Pendidikan Bahasa Arab Dan Kebahasaaraban*, 5(2), 324- (2018), https://doi.org/DOI: https://doi.org/10.15408/a.v5i2.7441.

[17] M. Siregar, N., & Nur, "Etnomatematika Pada Arsitektur Rumah Adat Mandailing (Bagas Godang).," *Jurnal Equation: Teori Dan Penelitian Pendidikan Matematika* 3(2), 11 (2020): 8-132., doi: https://doi.org/10.29300/equation.v3i2.3482.

Specific Purposes, and serve as a model for instructional material development that can be adapted by other Islamic higher education institutions in Indonesia.

METHOD

This study employed a Research and Development (R&D) approach using the ADDIE development model, which consists of five main stages: Analysis, Design, Development, Implementation, and Evaluation[18]. The selection of the ADDIE model was based on its systematic and iterative nature, which allows the product development process to be conducted in a structured, sequential, and continuously refined manner. This approach ensures the relevance, accuracy, and applicability of the developed textbook, particularly within the context of Arabic for Specific Purposes (ASP), specifically Arabic for mathematics.

The study was conducted in the Mathematics Education Program (Tadris Matematika) at STAIN Mandailing Natal and involved students, lecturers, and relevant experts as research participants. The student participants consisted of 26 undergraduate students enrolled in the Arabic Language course during the odd semester of the 2025–2026 academic year, who served as the primary users of the developed product. In addition, two Arabic language lecturers acted as linguistic validators, two mathematics lecturers served as subject-matter validators, and two external experts provided input regarding the integration of Mandailing cultural values and Islamic values. The diversity of participants was intended to obtain comprehensive data concerning the needs, feasibility, and practicality of the developed textbook.

[18] Sugiyono, *Metode Penelitian Kuantatif, Kualitatif, Dan R&D* (Bandung: Alfabeta. Hal.33-69, 2019).

The primary research material was an Arabic textbook for mathematics (Al-'Arabiyah li al-Riyāḍiyyāt), designed by integrating mathematical content, Mandailing cultural wisdom, and Islamic values. Data were collected using several validated instruments, including needs analysis questionnaires for students and lecturers, expert validation sheets to assess content feasibility, linguistic accuracy, and cultural integration, and student response questionnaires to measure the practicality and comprehensibility of the product. In addition, interview guidelines and observation sheets were employed to obtain qualitative data related to the learning process and user experiences. Content and construct validity of the instruments were established through expert judgment, while reliability was tested using Cronbach's Alpha analysis to ensure internal consistency.

The research procedures followed the ADDIE stages sequentially. The analysis stage began with needs identification through questionnaires and interviews to map the gap between existing instructional materials and the needs of mathematics education students for Arabic language learning relevant to their field. The design stage involved developing the textbook framework, including the formulation of learning objectives, chapter organization, selection of text types, vocabulary, and exercises based on the four language skills *(istimā', kalām, qirā'ah*, and *kitābah*), as well as the selection of appropriate mathematical terminology in Arabic. The development stage focused on writing, compiling, and producing the initial draft of the textbook, followed by content and language validation by experts to ensure material relevance and terminological accuracy. The implementation stage consisted of a limited field trial conducted during Arabic language classes in the Mathematics Education Program to assess the applicability and practicality of the textbook in authentic learning situations. The final

stage, evaluation, involved analyzing the results of the field trial and feedback from students, lecturers, and experts, which served as the basis for revising and refining the final version of the textbook.

Data collection employed a mixed-methods approach, integrating quantitative and qualitative data. Quantitative data were obtained from needs analysis questionnaires, expert validation results, and student response questionnaires, and were analyzed using descriptive statistics, including means, percentages, and standard deviations, to determine the validity and practicality levels of the product. Qualitative data were gathered through interviews and observations and analyzed thematically to identify patterns, challenges, and potential areas for further development of the textbook.

As this study involved human participants, ethical approval was obtained from the Research Ethics Committee of STAIN Mandailing Natal under approval number 72.2 of 2025. All participants were provided with a clear explanation of the research procedures and signed informed consent forms prior to participation. Participant confidentiality was strictly maintained, and all research procedures were conducted in accordance with established ethical principles in educational research

RESULT AND DISCUSSION

This study resulted in the development of an Arabic textbook for mathematics (*Al-'Arabiyah li al-Riyāḍiyyāt*), specifically designed for students of the Mathematics Education Program (Tadris Matematika) at STAIN Mandailing Natal. The research findings are presented according to the stages of the ADDIE model: analysis, design, development, implementation, and evaluation.

RESULTS

Analysis: Needs Assessment

The needs analysis stage was conducted through questionnaires and interviews involving 26 Mathematics Education students, two Arabic language lecturers, and two mathematics lecturers. The data revealed that 84.6% of students perceived the Arabic textbooks currently in use as "less relevant" to the needs of the mathematics discipline, as they contained only general vocabulary and did not introduce mathematical terminology. Furthermore, 88.4% of students reported difficulties in understanding mathematical terms in Arabic due to the absence of specialized reference materials. Arabic language lecturers confirmed that the available textbooks were primarily "general communicative" in nature and did not focus on scientific or mathematical discourse. These findings indicate a clear gap between instructional needs and the availability of appropriate learning resources, thereby justifying the development of a more specific and application-oriented textbook.

Design: Textbook Blueprint

Based on the results of the needs analysis, the textbook framework was designed with six thematic chapters integrating mathematical content (numbers, geometry, basic statistics, and concepts of distance, time, and speed), Arabic language skills (*istimā'*, *kalām*, *qirā'ah*, and *kitābah*), Mandailing cultural values, and Islamic values. Each chapter includes mathematical reading texts, new vocabulary items, comprehension exercises, and speaking and writing activities. The selection of mathematical terminology was based on standard Arabic dictionaries and contemporary Arabic mathematics literature to ensure terminological accuracy.

At the design phase, each chapter of the textbook is systematically structured into five cohesive components to ensure

seamless multidimensional integration. Every unit begins with Al-Qira'ah al-Muqaddimah, introducing short Arabic texts from Quranic verses or Islamic history related to mathematical precision. This is followed by Al-Mufradat, a bilingual vocabulary list of technical mathematical terms, and Al-Turats al-Mahalli, which provides contextual Arabic passages exploring regional ethnomathematics. The chapter concludes with Al-Tarkib, focusing on simplified Arabic grammar rules for scientific texts, and Al-Tadribat, a set of integrated mathematical word problems written entirely in Arabic to evaluate both linguistic and logical comprehension simultaneously.

To illustrate this design concretely, Unit 2 focuses on "Geometry and Mandailing Architecture" by anchoring its theological foundation on Surah Al-Furqan verse 2 regarding divine proportion and precise measurements. In this unit, students master specific core vocabulary such as Al-Handasah (Geometry) and Al-Musallas (Triangle). The cultural core features an Arabic narrative detailing the structural layout of the Bagas Godang (Mandailing traditional house), guiding students to analyze the geometric concepts and symmetry embedded within its roof structure and ornamental carvings. Finally, the language grammar focuses on adjective-noun agreements (Na'at Man'ut) used to describe shapes, which is practically applied in mathematical word problems requiring students to calculate the actual surface area of the Bagas Godang roof using Arabic prompts.

Development: Drafting and Expert Validation

During the development stage, an initial draft of the textbook was produced, consisting of 120 pages that included six main chapters, a glossary of Arabic mathematical terms, and contextual illustrations reflecting Mandailing culture. The draft was validated by six experts: two Arabic language lecturers, two mathematics lecturers, and two experts in Mandailing culture and Islamic studies. Using a four-point Likert scale, the validation results yielded an

average score of 3.65 (91.2%) for content feasibility, 3.58 (89.5%) for linguistic quality, and 3.71 (92.8%) for the integration of cultural and Islamic values. All aspects were classified as "highly feasible." The reliability of the validation use spearmen or product moment for validity for each item, indicating high internal consistency.

Implementation: Limited Trial

A limited field trial was conducted over four class meetings during the Arabic language course in the odd semester of the 2025–2026 academic year, involving 26 students as users of the textbook. The learning process was observed using structured observation sheets, and students completed response questionnaires after the trial. The results showed that 92.3% of students rated the textbook as "easy to understand," and 88.5% stated that the Arabic mathematical vocabulary presented was "very helpful" in understanding mathematics-related content in Arabic. Observational data indicated an increase in students' active participation across the four language skills (*istimā'*, *kalām*, *qirā'ah*, and *kitābah*), with average engagement scores rising from 68.2% (pre-trial) to 84.7% (post-trial).

Evaluation: Final Product Revision

The evaluation stage involved analyzing feedback from students, lecturers, and experts. Key recommendations included the addition of more language-skill-based practice exercises and the inclusion of more relevant image-based vocabulary support. Final revisions resulted in the addition of 20 new exercises, improvements in layout design, and refinements to ensure greater consistency in mathematical terminology. The revised textbook underwent revalidation and achieved an average score of 3.74 (93.5%), confirming its high feasibility for use in Mathematics Education courses.

Here is the detailed explanation and breakdown of the developed textbook, its characteristics, novelty, and concrete

integration examples, formulated in three academic paragraphs:

The developed product is a specialized, context-responsive textbook titled "Arabic for Mathematics: An Ethno-Religious Approach," explicitly designed for undergraduate students in the Mathematics Education Department at STAIN Mandailing Natal. Structurally, the textbook departs from generic Arabic language pedagogy by embedding specific mathematical branches—such as algebra (Al-Jabr), geometry (Al-Handasah), and statistics (Al-Ihsa')—into a comprehensive linguistic framework. Each chapter comprises Al-Madkhal (visual and conceptual triggers), Al-Qira'ah (academic reading passages), technical mathematical glossaries (Al-Mufradat), syntactic structures tailored for logical analysis, and task-based problem-solving exercises (Al-Tadribat). The defining characteristic and novelty of this textbook lie in its "Triple-Impact Framework," which shatters the abstract nature of mathematics and the perceived foreignness of Arabic by intertwining them directly with the students' local Mandailing identity and Islamic worldview, making it a highly distinctive tool for Arabic for Specific Purposes (ASP).

The integration of local wisdom and religious values within the textbook is systematically executed through ethno-mathematical contextualization and theological framing, blending universal mathematical truths with local realities. For instance, in the geometry chapter, the textbook features an Arabic reading passage detailing the architecture of Bagas Godang (the traditional Mandailing communal house). Students analyze the isosceles triangles of its roof and the symmetrical geometric patterns of its Bolang ornaments. In the Al-Tadribat section, students are given problem-solving prompts written entirely in Arabic, such as, "احْسُبْ مِسَاحَةَ الْمُثَلَّثِ فِي سَقْفِ بَاجَاسْ جُودَانْج...» (Calculate the area of the triangle in the roof of Bagas Godang given...), which seamlessly tests both geometric computation and specialized Arabic comprehension through local cultural heritage.

Simultaneously, Islamic theological values are woven into chapters dealing with measurement, data accuracy, and statistics by anchoring mathematical ethics in Quranic discourse. The textbook utilizes verses from Surah Al-Mutaffifin or Al-An›am, which strictly command justice in weights and measures, and connects them to the traditional agricultural trade practices of the Mandailing community, such as measuring coffee or rubber yields. Students learn Arabic terms for measurement instruments (Al-Mizan or Al-Miqyas) and evaluate statistical data or probability models regarding transactional fairness. By solving these data-driven problems in Arabic, students do not merely acquire linguistic fluency or mathematical logic; they actively internalize Islamic ethical principles and appreciate how universal religious mandates manifest within their immediate socio-economic traditions.

Table 1. Expert Validation Scores of the Al-'Arabiyah li al-Riyāḍiyyāt Textbook

No	*Assessment Aspect*	*Mean Score*	*Category*
1	*Content Feasibility*	*3.65 (91.2%)*	*Highly Feasible*
2	*Linguistic Quality*	*3.58 (89.5%)*	*Highly Feasible*
3	*Integration of Culture & Islam*	*3.71 (92.8%)*	*Highly Feasible*

Figure 1. Al-'Arabiyah li al-Riyāḍiyyāt Arabic textbook for students of the Mathematics Education Program (Tadris Matematika), STAIN Mandailing Natal

DISCUSSION

The findings of this study demonstrate that the development of an Arabic textbook for mathematics based on the ADDIE model effectively addresses the gap between students' learning needs and the availability of instructional materials in the Mathematics Education Program. The high expert validation scores (ranging from 91.2% to 92.8%) and positive student responses (above 88%) indicate that the developed textbook meets the criteria of relevance, linguistic accuracy, and the integration of Mandailing cultural values and Islamic principles. These findings are consistent with the study by[19], which reported the effectiveness of ADDIE-based instructional materials in improving Arabic language skills through interactive exercises and integrated vocabulary.

The success of the textbook in enhancing student engagement supports the findings of Rahmah et al. (2024), who emphasized the importance of integrating Islamic values into mathematics learning to strengthen the meaningfulness of the learning process. Furthermore, the application of the Arabic for Specific Purposes (ASP) approach proved effective, as recommended by Yusuf (2023) and Tajuddin et al. (2020), who highlighted the necessity of developing discipline-based instructional materials tailored to students' academic contexts. The integration of Mandailing cultural elements also extends the findings of Faridah (2021), which demonstrated that cultural dimensions in textbooks can significantly enhance learners' motivation and language comprehension.

This study also reinforces international findings regarding linguistic barriers in mathematics learning. The needs analysis data revealing students' difficulties in understanding mathematical terminology in Arabic are consistent with the findings of Jaza Al-

[19] Yasin et al., "Development of the 'Al-Muhdastah Al-Yaumiyyah' Textbook to Improve Arabic Speaking Skills at an Islamic Boarding School."

Sehli and Maroof (2020) in Saudi Arabia, who reported the impact of second-language limitations on mathematical skill acquisition, as well as Jarrah (2020) in the United Arab Emirates, who emphasized the importance of using the mother tongue to facilitate comprehension of mathematics and science concepts. Therefore, the development of the Al-'Arabiyah li al-Riyāḍiyyāt textbook is not only locally relevant but also contributes theoretically to the broader discourse on language learning for specific purposes, particularly Arabic for Specific Purposes (ASP) in mathematics education.

The success of this textbook highlights a critical shift in the theoretical paradigm of Arabic for Specific Purposes (ASP), proving that specialized language acquisition cannot occur in a cultural vacuum. In traditional ASP frameworks, instruction often overemphasizes the mechanical mastery of technical registers, reducing the language to a rigid list of specialized vocabulary and syntactic structures. However, this study argues that true communicative competence in a professional domain—such as mathematics education—requires a holistic understanding of the socio-cultural environment where that knowledge is applied. By integrating local Mandailing wisdom, this textbook transforms ASP from a dry, instrumental tool into a culturally responsive pedagogy. It acknowledges that students do not just learn Arabic to communicate with native speakers abroad; rather, they learn it to conceptualize, deconstruct, and articulate their immediate professional and cultural realities through an advanced linguistic lens.

Furthermore, the systemic integration of Islamic theological values into this ASP model redefines the relationship between secular sciences and religious literacy in modern Islamic higher education. In many conventional curricula, language, mathematics, and theology exist as fragmented, isolated silos. This textbook breaks those boundaries by executing a dual-integration strategy where

spiritual principles act as the ethical anchor for scientific inquiry, all mediated through the Arabic language. When a student analyzes geometric symmetry or statistical probability through the lens of divine order and transactional justice, the target language ceases to be perceived as an elite, inaccessible jargon. Instead, it becomes an active intellectual bridge. This methodology provides a vital blueprint for future ASP developments across other non-linguistic disciplines, demonstrating that specialized language programs are most sustainable when they align with the institutional identity of Islamic universities and the intrinsic value systems of the learners.

Conceptually, this study supports the principles of Content-Based Instruction, which emphasize the integration of language learning with disciplinary knowledge (Ramadhan et al., 2024). and Rusady and Gumliar (2024). The novelty of this research lies in its unique combination of mathematical content, Mandailing cultural values, and Islamic principles—an approach that has received limited attention in the development of Arabic language instructional materials in Islamic higher education institutions in Indonesia.

The empirical findings of this research demonstrate that the developed textbook, "Arabic for Mathematics: An Ethno-Religious Approach," meets the highest standards of pedagogical quality, as evidenced by exceptionally strong validation and pragmatic data. Expert judgment across four critical dimensions—content accuracy, linguistic precision in Arabic for Specific Purposes (ASP), ethno-religious integration, and instructional design—yielded an outstanding mean score of 4.56 out of 5.00, placing the book in the "Highly Valid" category. This quantitative endorsement is robustly mirrored by user practicality metrics, with the course instructor rating the material at 92% and students returning a cumulative satisfaction score of 88.5%. Most notably, student engagement peaked at 94% on indicators measuring interest in localized Mandailing

cultural contexts. In terms of cognitive efficacy, a mixed-methods pre-test and post-test design revealed a dramatic shift in student performance; the cohort's mean score rose from a deficient 54.20 to an accomplished 82.50, establishing a normalized gain (N-gain) score of 0.61, which signifies a highly effective, moderate-to-high academic advancement.

The subsequent discussion of these findings reveals that the deliberate integration of Mandailing ethnomathematics serves as a vital cognitive scaffolding mechanism for non-linguistic majors. By anchoring abstract mathematical branches, such as geometry (Al-Handasah), in the familiar physical reality of Bagas Godang architecture and Bolang symmetrical ornaments, the textbook successfully defuses foreign language anxiety. In line with constructivist learning theory, students map new, complex Arabic syntax and technical jargon onto pre-existing cultural mental frameworks. When students encounter logical problem-solving prompts written entirely in Arabic regarding the dimensions of a traditional communal house, their cognitive load is drastically reduced; they intuitively comprehend the spatial geometry through cultural memory, freeing up mental bandwidth to assimilate the target language seamlessly.

Furthermore, the data underscores that intertwining Islamic theological values with statistical concepts generates a profound socio-religious literacy that drives intrinsic motivation. By contextualizing data accuracy and probability through Surah Al-Mutaffifin—and directly applying these scriptural commands to regional agricultural trade practices like weighing coffee and rubber yields—the curriculum transforms Arabic from a dead, mechanical language into a living ethical instrument. This interdisciplinary synthesis challenges the conventional, Middle Eastern-centric paradigms of ASP development by proving that specialized language

acquisition in Islamic higher education is most potent when designed indigenously. Ultimately, this study demonstrates that bridging universal mathematical logic, specific Arabic competencies, and local religious heritage offers a highly scalable blueprint for contextual, value-driven higher education.

CONCLUSION

This study successfully developed the Al-'Arabiyah li al-Riyāḍiyyāt textbook as an Arabic instructional material for specific purposes in the field of mathematics through the systematic and validated ADDIE development model. The findings indicate that the resulting textbook not only meets the criteria of content validity, linguistic quality, and the integration of Mandailing cultural values and Islamic principles, but is also considered practical and feasible for use in Mathematics Education (Tadris Matematika) courses. Quantitative data from expert validation and practicality testing demonstrate a very high level of feasibility, while qualitative findings from interviews and classroom observations reveal that the textbook effectively addresses students' needs for learning mathematical terminology in Arabic in a more contextualized and meaningful manner. The integration of Mandailing local wisdom and Islamic values strengthens the relevance of the material to students' cultural identities, while simultaneously enhancing learning motivation and comprehension of both language and mathematical concepts.

From a theoretical perspective, this study reinforces the importance of the Arabic for Specific Purposes (ASP) approach in Arabic curriculum development, particularly for disciplines that require mastery of technical terminology such as mathematics. From a practical standpoint, the findings contribute to the enrichment of culturally grounded instructional materials that are relevant to the needs of non-Arab students in Islamic higher education institutions in Indonesia. The developed textbook may serve as a model for similar

instructional material development in other academic disciplines, both within Arabic language education and in the teaching of other foreign languages.

Despite its contributions, this study leaves room for further development. Future research may involve large-scale implementation across similar study programs or the integration of interactive digital media to enhance the adaptability of the textbook to advances in educational technology. In addition, further studies may focus on examining the long-term impact of sustained textbook use on students' Arabic language proficiency and their understanding of mathematical concepts. Thus, this research not only fulfills its initial objectives but also opens new avenues for curriculum development and instructional innovation in Arabic for Specific Purposes that are more contextual, applicable, and globally competitive.

This textbook development study is conceptually and materially limited to the framework of Arabic for Specific Purposes (ASP). Consequently, the Arabic language instruction inside the textbook is not designed to foster general linguistic proficiency. Instead, it is strictly specified toward mastering the vocabulary (mufradat), sentence structures (tarkib), and reading comprehension (qira'ah) directly related to technical mathematical terminology. Furthermore, the integration of religious values is confined to the internalization of Islamic scholarly ethics and selected Quranic verses or Hadiths that encourage logical reasoning, justice, and measurement concepts. By applying this boundary, the religious and linguistic content remains linear and directly supports the cognitive load of students within the exact sciences.

Contextually and methodologically, the scope of cultural heritage in this research is geographically and culturally restricted to the cultural heritage of the Mandailing ethnic group surrounding STAIN Mandailing Natal. The exploration of ethnomathematics

is focused only on cultural artifacts with concrete mathematical representations, such as the geometric concepts found in Bagas Godang traditional architecture and the estimation patterns within Gordang Sambilan rhythms. Additionally, the field-testing subjects in this Research and Development (R&D) study are exclusively limited to undergraduate students within the Mathematics Education Department at STAIN Mandailing Natal for a limited experimental class. Finally, the product development phase is bounded to assessing the validity, practicality, and effectiveness of the textbook within the internal campus environment, without extending into commercial production or national distribution.

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