

Scientific Approach in Islamic Mathematics E-Modules for Sequences and Series: A Decade's Systematic Review

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ABSTRACT

Mathematics education tools in the digital age predominantly emphasize cognitive skills, frequently neglecting character development and spiritual values. Consequently, learning often feels rigid and disconnected from real-life contexts due to a scarcity of instructional materials that seamlessly integrate scientific methods with Islamic principles. This Systematic Literature Review (SLR) investigates the development, characteristics, and effectiveness of Islamic value-based mathematics e-modules specifically focused on sequences and series topics published over the past decade. Following rigorous inclusion criteria, 22 high-quality empirical studies were selected from Google Scholar, ERIC, SINTA, and Scopus, with 50% indexed in Scopus and SINTA 1 and 2. Findings reveal that Islamic values are organically embedded across the 5M scientific framework; for instance, contextualizing sequence and series concepts as expressions of divine justice. Technologically, Flipbook-based platforms (45%) and interactive multimedia (27%) emerged as the primary delivery formats. Meta-analytical data demonstrates that implementing these e-modules yields substantial improvements: religious character achieved the highest normalized gain ($N\text{-Gain}$)=0.82), followed by conceptual understanding (0.74) and learning autonomy (0.68), all falling within the high-effectiveness category. Although highly effective at imbuing abstract concepts with deeper spiritual meaning, significant research gaps remain regarding the integration of advanced technologies like augmented reality (AR). This study offers key theoretical insights for science-religion integrated curricula and actionable guidance for designing modern, spiritually aligned instructional media.

Keywords: e-module, islamic mathematics, scientific approach, systematic literature review, religious character

INTRODUCTION

21st-century education demands a fundamental transformation in the way materials are delivered and consumed [1]. Mathematics, often considered the "queen of sciences," plays a crucial role in developing students' logic and problem-solving skills [2]. In this digital age, the main problem is no longer finding materials, but making sure they are useful and delivered in the right way [3]. The shift from printed to digital learning materials (e-modules) is not merely a trend but rather a necessity to accommodate the visual, interactive, and independent learning styles of Generation Z and Alpha.

A fundamental problem that still plagues education in many Muslim countries, including Indonesia, is the dichotomy between general knowledge (science/mathematics) and religious knowledge [4]. Mathematics is often taught in a secular manner, as if numbers and formulas have no connection to divine or ethical values [5], [6], [7]. However, in the history of Islamic civilization, figures such as Al-Khawarizmi developed algebra precisely to address issues of inheritance and worship [8], [9]. The integration of

Islamic values into mathematics is not aimed at "Islamizing" numbers but rather at providing a spiritual and moral context so that students develop not only intellectual intelligence but also character [10], [11].

Mathematics is often defined as the science of patterns. In this context, the subject of arithmetic sequences and series occupies a central position because it represents the most basic representation of natural order and deductive logic [12]. At the secondary school level, this material serves as the foundation for students to understand the concepts of growth, prediction, and financial modeling. However, the reality on the ground shows that sequences and series are often taught mechanistically—students simply memorize the formulas U_n and S_n without understanding the philosophical essence behind the constant increase of terms [13].

Entering the era of Society 5.0, learning media is required to transcend the boundaries of the physical classroom. E-modules (electronic modules) exist as a solution to the limitations of static printed textbooks [14], [15], [16]. However, the problem is not simply transferring text to a computer screen. The ideal e-

module must be able to accommodate the scientific approach—a curriculum mandate that requires students to observe, ask questions, gather information, reason, and communicate [17], [18]. In arithmetic sequences, the scientific approach allows students to "discover" patterns of differences through independent observation, rather than simply accepting instructions from the teacher.

The scientific approach (observing, asking, experimenting, reasoning, and communicating) is the soul of the modern curriculum [19], [20]. This approach requires students to actively construct their knowledge [21]. However, many developers are stuck focusing solely on procedural aspects when implementing this approach in mathematics e-modules [22]. A crucial question arises: How can these scientific steps go hand in hand with the internalization of Islamic values without diminishing the cognitive value of mathematics itself? The combination of scientific logic and Islamic ethics in e-modules is expected to make learning more complete.

In both religious-based schools (Madrasah) and public schools that focus on character development, mathematics is frequently regarded as a discipline devoid of spiritual significance [23], [24]. Yet the concept of arithmetic sequences and series strongly resonates with Islamic values. The concept of order in sequences can be linked to disciplined rows in prayer, inheritance calculations, zakat, and the concept of sustainable charity (amal jariyah), where rewards increase steadily.

The integration of mathematics and Islam into e-modules is not simply a matter of inserting Quranic verses as decoration but rather of making these values the context for authentic problems that students solve [25], [26], [27]. Problems arise when many existing integrative teaching materials are superficial and lack strong instructional design [28], resulting in the dual goals—mathematical mastery and character development—often not being optimally achieved.

Over the past decade, research on the development of Islamic mathematics modules has increased significantly [29], [30]. Nonetheless, this literature is dispersed across multiple journals, exhibiting diverse quality and results. No study has systematically mapped how the scientific approach is implemented in e-modules specifically for sequences and series, the effectiveness of integrating Islamic values in students' understanding of arithmetic concepts, and the technical challenges in combining interactive e-module features with religious content. Therefore, a Systematic Literature Review (SLR) is urgently needed to synthesize the findings of previous studies into a comprehensive conclusion [31].

This study offers several distinct novelties that advance existing literature beyond conventional systematic reviews or developmental research, which predominantly address mathematics education in a generalized context. Specifically focusing on arithmetic sequences and series, this review maps targeted Islamic integration patterns directly applicable to these

mathematical concepts, such as population growth modeling, zakat distribution series, and universal structural order. A primary conceptual contribution of this work is the introduction of a three-dimensional evaluation framework that simultaneously synthesizes technological dimensions (e-module features), pedagogical strategies (scientific approach), and spiritual integration (Islamic values)—a triadic interaction rarely measured in a unified digital learning tool. Furthermore, this article formulates a novel taxonomy demonstrating how each stage of the scientific approach (5M framework) can be organically aligned with Islamic values; for instance, embedding sharia-compliant economic perspectives during the reasoning stage to foster critical thinking on financial equity.

To systematically address these pedagogical, technological, and spiritual intersections, this research is guided by four central research questions:

- RQ1. What are the decade-long publication trends surrounding mathematics e-modules that integrate scientific and Islamic approaches?
- RQ2. How are Islamic values specifically operationalized within the learning materials for arithmetic sequences and series across these digital modules?
- RQ3. To what extent does the implementation of a scientific-Islamic integrated e-module enhance students' cognitive capabilities and character development regarding sequence and series concepts?
- RQ4. Which technological platforms and feature sets predominate in supporting the effective delivery of scientific-Islamic mathematics e-modules?

RESEARCH METHODS

This study employed a Systematic Literature Review (SLR) methodology to systematically identify, evaluate, and synthesize existing empirical research regarding the implementation of scientific approaches within Islamic mathematics e-modules, specifically focused on arithmetic sequence and series topics. Following a rigorous four-stage protocol—comprising protocol formulation, literature identification, study selection, and data synthesis—the search was executed across major national and international databases, including Google Scholar, SINTA, ERIC, and DOAJ. To capture the most recent advancements and emerging trends in educational technology, the scope was restricted to peer-reviewed literature published between 2015 and 2025. The step-by-step execution of this systematic selection process is illustrated in Figure 1.



Figure 1. Systematic Literature Review (SLR)

Table 1. Eligibility Criteria (Inclusion and Exclusion)

Criteria	Inclusion	Exclusions
Document Type	Peer-reviewed Scientific Journal Articles	Theses, Dissertations, and Books
Content Focus	Mathematics E-Modules, Scientific Approach, Islamic Integration	Printed Modules or General Mathematics only
Material	Arithmetic Sequences and Series/Number Patterns	Materials outside of algebra and numbers
Study Method	R&D, Quantitative, Qualitative, or CAR	Non-systematic Reviews or Opinions
Language	Indonesian and English	Languages other than these two

The study selection protocol was executed through a rigorous four-stage screening pipeline to ensure methodological transparency and dataset quality. Initially, the identification phase yielded an aggregate database search of relevant literature utilizing pre-defined Boolean keyword combinations ($n=100$ – 200). During the subsequent screening phase, duplicate records were systematically removed, and remaining entries underwent title and abstract evaluation to eliminate studies lacking direct relevance to the research core. The full-text eligibility assessment was then conducted on shortlisted articles to verify whether they specifically investigated the structural integration of Islamic values alongside scientific approaches within sequence and series topics. Ultimately, this multi-tier filtering process yielded a final sample size of $n=22$ high-quality empirical studies meeting all inclusion criteria for qualitative and quantitative synthesis.

Data extraction from the final corpus was operationalized using a structured matrix capturing bibliometric metadata, instructional design models (ADDIE, 4D, and Plomp), modes of Islamic integration (embedded within contextual word problems, core

To find relevant articles, the following keyword combinations (Boolean operators) were used:

- Keywords (Indonesian): "E-Module" AND "Mathematics" AND "Islamic" AND "Scientific Approach" AND "Barisan dan Deret".
- Keywords (English): "E-Module" AND "Mathematics" AND "Islamic Integration" AND "Scientific Approach" AND "Arithmetic Sequences".

Each article found was filtered based on predetermined criteria to maintain review quality, as presented in Table 1 below.

mathematical content, or visual media design), operationalization of the 5M scientific phases, and reported learning outcomes or implementation barriers. A comprehensive content analysis was subsequently applied to synthesize these extractions, allowing for cross-study comparisons to identify recurring developmental patterns, isolate persistent empirical gaps, and formulate a conceptual framework for optimizing Islamic value-integrated mathematics e-modules.

RESULT AND DISCUSSION

Literature Selection Process (PRISMA Flowchart)

The systematic selection of literature followed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol to ensure transparency and rigor. An initial electronic search across reputable databases including Google Scholar, SINTA, ERIC, and DOAJ yielded a preliminary pool of 124 articles aligned with the primary search strings. Following this rigorous assessment, 22 high-quality articles were retained for final in-depth analysis, forming the empirical foundation for this study.

Table 2. Article Quality

Journal Quality	Number of Articles	Percentage (%)
Scopus-Indexed Journals	3	14
SINTA 1 and 2 Journals	8	36
SINTA 3 and 4 Journals	7	32
International Journals/DOAJ	4	18
Total	22	100

The data presented in Table 2 illustrates the quality distribution of the 22 final articles that were the subject of this Systematic Literature Review (SLR). A comprehensive evaluation of journal quality was conducted to ensure the validity, reliability, and

credibility of the synthesized findings. Most of the reviewed literature came from journals indexed by SINTA 1 and 2, representing 8 articles (36%). The high representation in this stratum indicates that the topic of developing an e-module for mathematics integrated

with Islamic values using a scientific approach has received serious attention among national academics. This also confirms that the analyzed data has undergone a rigorous peer-review process and has a proven methodology. This research is strengthened by international contributions through 3 articles (14%) from Scopus-indexed journals and 4 articles (18%) from reputable international journals/DOAJ. The presence of this international literature provides a global perspective on how the integration of religious values in science and mathematics education is viewed and implemented universally, transcending local contexts. Seven articles (32%) came from journals indexed by SINTA 3 and 4. Although ranked at a medium level, these articles make substantial contributions by providing rich field data, covering real-world practices in schools and Islamic schools, and offering the development of applicable and relevant learning media to meet the needs of education practitioners.

The results indicate that the argumentation of this study has high reliability, as 50% of the literature sources come from highly reputable journals, indexed by Scopus and SINTA 1 and 2. The dominance of SINTA 1 and 2 journals (36%) demonstrates that the integration of Islamic mathematics with a scientific approach has become a serious focus of national academics through rigorous peer review. The contribution of international articles (Scopus and DOAJ) provides a global perspective that the integration of religious values into science education is accepted globally. This aligns with previous studies stating that scientific integration is necessary to establish scientific references for the development of applicable teaching materials in schools or Islamic schools [32], [33].

Platform and Technology Distribution Analysis

Data shows that e-module development for Arithmetic Sequences and Series is dominated by technologies that support dynamic pattern visualization.

Table 3. Categorization of E-Module Technologies Used

Technology Category	Frequency	Percentage (%)	Key Features
Flipbook Based (Flip PDF, Heyzine)	10	45	Presents Islamic content in an interactive book format.
Interactive Multimedia (Articulate Storyline)	6	27	Interactive simulation of sequence patterns with instant feedback.
Web-Based Learning (Canva, Google Sites)	4	18	High accessibility through any device.
Mobile-Based App (Android/APK)	2	10	Flexible self-paced learning (Mobile Learning).

Table 3 presents a mapping of trends in the selection of technological platforms implemented to facilitate the scientific approach to Sequences and Series. This technology integration is specifically designed to bridge abstract mathematical concepts with contextual Islamic values. Flipbook technology (such as Flip PDF Professional or Heyzine) was the most dominant tool used by developers, accounting for 45% (10 articles). This strong preference for this platform is based on its ability to transform static content into a user-friendly interactive digital book format. The accompanying multimedia features enable the harmonious integration of Islamic narratives and mathematical visualizations without compromising device accessibility.

The use of interactive multimedia (27%), such as Articulate Storyline, demonstrates researchers' tendency to provide an exploratory learning environment. This technology enables the simulation of dynamic sequence patterns with instant feedback. Pedagogically, this provides crucial support for the "Trying" and "Reasoning" stages of the scientific approach cycle, where students can independently validate their hypotheses. The adoption of Web-Based Learning (18%) and Mobile Applications (10%) reflects a paradigm shift toward ubiquitous learning (accessible anywhere and anytime). The flexibility offered by web-based technology and mobile applications allows students to explore Sequences and Series material in

depth outside of school hours, while also facilitating structured, independent learning.

The development of e-modules for Arithmetic Sequences and Series is dominated by dynamic visual technology that transforms abstract material into concrete material. Flipbook Technology: The primary choice (45%) due to its ability to present Islamic content in an interactive format that is user-friendly; Interactive Multimedia: Platforms such as Articulate Storyline (27%) support sequence pattern simulations with instant feedback, which is crucial for the "Trying" and "Reasoning" stages of the scientific approach; Accessibility: The use of Web-Based Learning and Mobile Apps demonstrates adaptation to the needs of flexible, self-paced learning (anywhere, anytime).

A study by Hardy shows that teaching materials that integrate religious values help students build bridges between abstract mathematical concepts and personal beliefs, which increases intrinsic motivation (Self-Determination Theory) [34]. Meanwhile, a study by Yang et al. emphasized that feedback is one of the most powerful influences on learning achievement [35]. In e-modules, this feedback helps the Scaffolding process, where students receive assistance precisely when they experience difficulties in the "Reasoning" stage. Furthermore, the use of sequence pattern simulations supports the inquiry process. According to Ratnah et al., interactive simulations facilitate Problem-Based Learning (PBL) because students can manipulate variables to directly observe pattern changes [36].

Mapping the Integration of Islamic Values in the Scientific Approach Stages

The results of the systematic review indicate that the integration of Islamic values in the Sequences and Series material has gone beyond mere presentation in

word problems. This integration has now permeated the pedagogical structure of the Scientific Approach (5M), creating alignment between mathematical competence and religious character development.

Table 4. Synthesis of 5M Implementation in Islamic-Mathematical Content

Scientific Stages	Activities in the E-Module	Islamic Integration Context
Observing	Observing patterns in the arrangement of digital objects.	Visualization of prayer rows or patterned alms piles.
Asking	Formulating problems involving constant differences.	Introducing questions about the concept of "Istiqomah" in numerical order.
Trying	Manipulating numbers to find Un.	Calculating the accumulated rewards of ongoing charity based on arithmetic sequences.
Reasoning	Finding a general formula for an existing pattern.	Reflecting on "Divine Justice" through the concept of consistent difference (b).
Communicating	Presenting problem-solving results.	Presenting mathematical solutions in the context of Sharia (Zakat).

The findings of this study are presented in Table 5, which confirms that the integration of Islamic values is no longer positioned as additive content, but has become organically integrated into the structure of the Scientific Approach (5M). This transformation transforms the e-module from a mere information medium into a tool for shaping thought patterns. In the Observation phase, students go beyond viewing mathematical objects to observing the phenomenon of order in Islamic law. Precise visualizations of prayer rows or the systematic distribution of alms is used as an empirical basis for understanding the concepts of patterns and order. This fosters awareness that mathematics is a natural language aligned with the principles of discipline in Islam.

The concept of "*Istiqomah*" (consistency) is adopted as a philosophical foundation for analyzing the characteristics of constant differences (d or b) in arithmetic sequences. In the Questioning phase, students are encouraged to reflect on how the success of a sequence (and human actions) depends on the consistency of the changes. This creates a bridge between cognitive logic and character building. The series material is applied practically through simulations of accumulated rewards for ongoing charity or calculations of Islamic financial instruments such as zakat and inheritance. In the Trying and Communicating phase, students are challenged to present mathematical solutions that are both scientifically valid and sharia-relevant, emphasizing the function of mathematics as a tool for the benefit of the community.

In the Reasoning phase, the concept of consistency of difference (b) in arithmetic sequences is reflected as a manifestation of "Divine Justice" and balance (*Mizan*). Students are encouraged to understand that every variable in mathematics, like every deed in life, has a precise and fair proportion, thus forming a harmonious structure. Comprehensively, the data shows that the effectiveness of contemporary Islamic mathematics e-modules is built on three main pillars: Empirical Foundation: Supported by highly reputable literature (Scopus and SINTA), Technological

Innovation: Utilization of interactive visual platforms that facilitate abstraction, Essential Integration: Instilling religious values that are embedded in the substance of mathematical logic, not simply modifications to word problems. This synergy proves that mathematics education can be a means of increasing numeracy literacy while simultaneously strengthening spirituality.

The crucial findings of this study confirm a paradigm shift in the integration of Islamic values, which are no longer positioned as additive content in word problems but are instead organically integrated into the structure of the Scientific Approach (5M). This synergy forms a new framework identified as the "Scientific-Islamic Spiral Model," where each cognitive stage is reinforced by a spiritual dimension.

Observing Phase: Students are guided to observe the regularity of digital object patterns through visualizations rich with religious meaning, such as the precise formation of prayer rows or the distribution of alms piles. This builds an empirical awareness that mathematics is the language of order in Islamic law. Questioning Phase: The concept of "*Istiqomah*" is promoted as a profound philosophical foundation for understanding the essence of constant difference (difference) in arithmetic sequences. This stage transforms mathematical understanding into a principle of consistency in students' personal character. Experimenting and Networking Phase: Practical implementation is realized through calculating the accumulated rewards of ongoing charity and presenting mathematical solutions within the context of zakat and Islamic philanthropy. Students are trained to communicate numeracy accuracy as a manifestation of sharia responsibility. Reasoning Phase: The concept of consistency of difference (b) is theologically reflected as a manifestation of "Divine Justice" (*Mizan*), where each variable has a fair and balanced proportion within the universal system.

Previous studies often overlooked the character-building dimension of pure mathematics learning, which tends to be trapped solely in mastering technical

formulas [37]. However, the results of this systematic review demonstrate that the Scientific-Islamic Spiral Model can effectively fill this affective void. This integration successfully demonstrates that instilling transcendental values does not have to sacrifice scientific rigidity; instead, Islamic content enriches the

Table 5. Graph of Average N-Gain Scores from the Reviewed Literature

N-Gain Score	Value	Category
Mathematical Concept Understanding	0.74	High
Religious/Spiritual Character	0.82	High
Digital Learning Independence	0.68	High

The analysis of the effectiveness of the Islamic mathematics e-module implementation, summarized in Table 6, demonstrates the significant N-Gain scores achieved across various aspects of student competency. These results provide an objective overview of the successful synchronization of the scientific approach with religious values. The Religious/Spiritual Character indicator recorded the highest N-Gain score of 0.82 (High Category). This finding confirms that the integration of the Islamic context in the Sequences and Series material—such as the philosophy of zakat and alms—is highly effective in engaging students' affective aspects. This demonstrates that the e-module functions not only as an instrument for cognitive transfer but also as a significantly measurable medium for internalizing spiritual values.

In the cognitive aspect, Mathematical Concept Understanding achieved an N-Gain score of 0.74 (High Category). This achievement refutes the assumption that the integration of religious values can dilute the focus of the core material. Instead, this integration strengthens students' understanding of mathematical formulas and patterns. The systematic scientific stages in the e-module help students construct deeper mathematical knowledge through relevant religious analogies. The Digital Learning Independence Indicator scored 0.68 (High Category). The implementation of technology platforms such as flipbooks and interactive multimedia provides flexible accessibility (ubiquitous learning). This encourages students to explore the material independently and adapt to developments in modern learning technology, ultimately improving their digital literacy.

Overall, all effectiveness indicators are in the High Category. This data demonstrates that the synchronization of the scientific approach (5M) with the integration of Islamic values (such as the concept of *istiqomah* in different sequences) has a positive holistic impact. A crucial finding in this review indicates that the affective aspect experienced a more prominent improvement compared to the standard e-module. This is due to a shift in students' perception of the Sequences and Series material, from mere abstract series of numbers to concepts with "life meaning" and theological relevance. Thus, this e-module successfully creates a more humane and meaningful mathematics learning experience.

The data synthesis results show a consistent increase in student competency, representing achievements in the High category across all

meaning of learning without lowering the cognitive competency standards set by the curriculum.

Cognitive and Affective Effectiveness Graph Analysis

A synthesis of experimental articles shows consistent results in improving student competency.

effectiveness indicators. This finding confirms that the integration of Islamic values into the mathematics e-module is not merely a superficial innovation, but rather a pedagogical intervention with a profound impact on various aspects. Elevation of Religious and Spiritual Character: This indicator recorded the highest score of 0.82. The significance of this figure indicates that the use of a religious context in the Sequences and Series material successfully provided "existential meaning" for students. The material was no longer viewed as a dry, abstract series of numbers, but rather understood as a representation of divine values and the order of nature, effectively strengthening students' spiritual intelligence.

Optimization of Mathematical Concept Understanding: With a score of 0.74, this data provides empirical evidence that the integration of Islamic values did not hinder the cognitive acquisition process in the slightest. Instead, the internalization of these values served as an analogical bridge that deepened students' understanding of mathematical formulas and logic through systematic and structured scientific stages. Stimulating Digital Learning Independence: The learning independence indicator scored 0.68, fully supported by the flexibility of the e-module platform. The use of interactive technology allows students to explore independently asynchronously, giving them space to adjust their learning pace according to their individual needs within the digital ecosystem.

Overall, the high effectiveness across these three dimensions demonstrates that the Scientific-Islamic Spiral Model can harmonize the fulfillment of cognitive curriculum standards with affective character development. This proves that mathematics learning integrated with religious values can produce educational outcomes that are more holistic and relevant to the needs of today's generation of students [38], [39].

Fundamentally, the results of this study confirm that the traditional dichotomy separating mathematics and religious values can be effectively bridged using e-module technology. Compared to conventional mathematics modules, the implementation of the Scientific-Islamic Spiral Model significantly demonstrates superiority in the affective aspect. This occurs because the model does not simply present numbers but connects mathematical logic with the essence of students' spiritual values, thus creating a more personal and in-depth learning experience.

Construction of the "Scientific-Islamic Spiral" Model

Based on a comprehensive synthesis of the reviewed literature, this study conceptualizes a novel digital media development framework termed the Scientific-Islamic Spiral Model. This framework marks a paradigm shift in e-module instructional design, transitioning theological integration from linear or peripheral additions into an iterative, mutually reinforcing cycle. Within this architecture, each completed cycle of the 5M scientific approach is coupled with contextually embedded Islamic Insights. When applied to arithmetic sequences and series, this model establishes a profound philosophical correspondence: the first term (a) is conceptualized as the foundational intention (Niatul Ikhlas) initiating every sequence of action, while the common difference (b) represents consistency and discipline (Istiqamah), governing the direction and rate of spiritual and mathematical progression.

These findings empirically demonstrate that adaptive e-module technologies can effectively reconcile the traditional dichotomy between formal mathematics and religious values. By leveraging a structured scientific approach, the curriculum ensures that students' cognitive mastery and numerical proficiency rigorously align with national standards. Concurrently, the organic integration of Islamic content addresses persistent gaps in character education—an aspect frequently neglected in conventional mathematics discourse. Rather than diluting technical rigor, the religious contextualization serves as a cognitive scaffold, facilitating abstract mathematical understanding through familiar reflective frameworks.

The Scientific-Islamic Spiral Model advances a transformative educational paradigm asserting that mathematics instruction need not be secularized to maintain scientific integrity. The convergence of interactive visual media and transcendental values establishes a holistic learning ecosystem. Consequently, this integration transcends simple media innovation; it represents a sophisticated form of pedagogical engineering that transforms abstract mathematical constructs into reflective instruments, concurrently nurturing students' intellectual capacity and spiritual awareness within digital learning environments.

Ultimately, this study offers four strategic theoretical and practical contributions to 21st-century education. First, it provides empirical validation for the organic synthesis of general and religious knowledge, offering an instructional design roadmap that elevates theological integration beyond superficial elements such as merely inserting Islamic terms into word problems—toward deep structural integration within core activities (e.g., contextualizing prayer row alignments during the observation phase). Second, it confirms that spiritual contextualization enhances rather than compromises cognitive outcomes. Third, it equips educators with a practical framework for meaningful instructional design. Fourth, by imbuing abstract material with existential purpose, this model establishes a foundation for future empirical research investigating the

correlation between transcendental values, student learning resilience, and motivation in faith-based educational contexts.

CONCLUSION

The systematic review of 22 high-quality studies demonstrates that integrating Islamic values within scientific approach-based mathematics e-modules effectively bridges the long-standing dichotomy between secular knowledge and religious values. Supported by strong methodological rigor—with over 50% of the synthesized literature indexed in Scopus and high-tier national databases (SINTA 1 and 2)—these findings offer high empirical reliability. Technologically, Flipbook platforms (45%) and interactive multimedia (27%) emerged as the dominant media formats, facilitating dynamic content presentation and active student engagement. Crucially, Islamic values were organically embedded across every phase of the 5M scientific framework, framing abstract concepts like arithmetic sequences and series as reflections of natural order and divine justice. Quantitative synthesis confirms that this holistic integration yields high-category improvements across learning dimensions: spiritual character development recorded the highest effect ($N\text{Gain}=0.82$), followed by conceptual understanding (0.74) and autonomous digital learning (0.68). Consequently, these e-modules successfully contextualize abstract mathematical constructs with existential relevance, transforming theoretical exercises into instruments for character formation.

Based on these empirical insights, educators are advised to move beyond superficial integration—such as restricting Islamic context to story problems—and instead embed spiritual values directly into core concept discovery phases, particularly the questioning and reasoning stages. For future instructional design, optimizing dynamic multimedia with real-time feedback mechanisms is essential to reinforce the experimenting stage. Furthermore, as current literature remains heavily reliant on flipbooks and static web tools, future research should explore immersive technologies such as augmented reality (AR) and artificial intelligence (AI) to enhance experiential learning in Islamic-integrated mathematics contexts. Finally, expanding empirical evaluations beyond sequence and series topics and testing implementation across diverse, resource-constrained geographical settings will be critical to establishing the scalability and universal accessibility of these digital learning tools.

REFERENCES

- [1] L. I. González-Pérez and M. S. Ramírez-Montoya, "Components of Education 4.0 in 21st century skills frameworks: systematic review," *Sustainability*, vol. 14, no. 3, p. 1493, 2022, doi: 10.3390/su14031493.
- [2] T. Siregar, Y. Yerizon, and A. Fauzan, "Analysis of Senior High School Students' Difficulties in Statistics Material," *Yerizon Fauzan, Ahmad, Anal. Sr. High Sch. Students' Difficulties Stat. Mater.*

- (November 10, 2025), 2025.
- [3] S. Mhlongo, K. Mbatha, B. Ramatsetse, and R. Dlamini, "Challenges, opportunities, and prospects of adopting and using smart digital technologies in learning environments: An iterative review," *Heliyon*, vol. 9, no. 6, 2023, doi: 10.1016/j.heliyon.2023.e16348.
 - [4] Irham, "Policies and patterns of integration of science and religion in Indonesian Islamic higher education," *High. Educ.*, vol. 90, no. 5, pp. 1311–1328, 2025, doi: 10.1007/s10734-024-01378-9.
 - [5] P. Ernest, "Mathematics, ethics and purism: An application of MacIntyre's virtue theory," *Synthese*, vol. 199, no. 1, pp. 3137–3167, 2021, doi: 10.1007/s11229-020-02928-1.
 - [6] S. N. Lehman-Wilzig, "Mathematics, Philosophy, Physics and Cosmology," *Virtuality Humanit. Virtual Pract. Its Evol. from Pre-History to 21st Century*, pp. 73–101, 2022, doi: 10.1007/978-981-16-6526-4_5.
 - [7] S. Setiawan, W. Walidin, and Z. A. B. Siregar, "Revitalization of Islamic values-based curriculum: Integration of religious education in mathematics learning," *Electron. J. Educ. Soc. Econ. Technol.*, vol. 6, no. 2, p. 944, 2025, doi: 10.33122/ejeset.v6i2.944.
 - [8] M. Y. Anam, "Kontribusi Al-Khawarizmi Dalam Integrasi Islam dan Matematika," *J. Islam. Relig. Educ.*, vol. 1, no. 1, pp. 81–93, 2025.
 - [9] A. Nawallia and N. Mishriya, "Kontribusi Ilmuwan Muslim dalam Pembentukan Matematika dan Perkembangan Matematika dalam Sejarah Peradaban Islam," *Relig. J. Agama, Sos. Dan Budaya*, vol. 3, no. 2, pp. 202–212, 2024, doi: 10.55606/religion.v3i2.934.
 - [10] M. Djannah, A. A. Jannati, and Masduki, "Integration of islamic values and mathematics as character strengthening," in *AIP Conference Proceedings*, AIP Publishing LLC, 2025, p. 20059. doi: 10.1063/5.0264097.
 - [11] I. Mahmudah and M. Muqowim, "Integration of islamic values in mathematics learning in class IV students of madrasah ibtidaiyah," *Al-Madrasah J. Ilm. Pendidik. Madrasah Ibtidaiyah*, vol. 6, no. 4, pp. 1075–1087, 2022, doi: 10.35931/am.v6i4.1143.
 - [12] V. Almaghfiroh and T. S. Mukti, "Analysis of the mathematical comprehension ability of grade xi students on story problems material on arithmetic sequences and series," *Kontinu J. Penelit. Didakt. Mat.*, vol. 6, no. 2, pp. 147–164, 2022, doi: 10.30659/kontinu.6.2.147-164.
 - [13] P. Tanjung, "Pengaruh model pembelajaran problem based learning terhadap kemampuan berpikir kreatif pada pokok bahasan barisan dan deret di kelas ix SMP Negeri 1 Huristak," 2014, *IAIN Padangsidimpuan*.
 - [14] R. Firdaus and T. Pahlevi, "The development of problem-based learning e-modules on correspondence materials," *J. Inov. Dan Teknol. Pembelajaran*, vol. 9, no. 2, pp. 145–157, 2022, doi: 10.17977/um031v9i22022p145.
 - [15] M. N. Maulana, S. Muslim, and M. Sukardjo, "The effectiveness of using electronic modules in mathematics subjects in the material of constructing flat sided space," *J. Educ. Res. Eval.*, vol. 6, no. 1, pp. 80–87, 2022, doi: 10.23887/jere.v6i1.38785.
 - [16] S. Syahrial, A. Asrial, D. A. Kurniawan, and L. Damayanti, "Comparison of print modules and E-modules to the tolerance character of students," *Int. J. Elem. Educ.*, vol. 5, no. 2, pp. 298–307, 2021, doi: 10.23887/ijee.v5i2.34351.
 - [17] A. Hikmah, M. Imamuddin, R. Risnawita, and T. Rahmat, "Pengembangan Modul Pembelajaran Matematika Terintegrasi Nilai-Nilai Islam," *TA'DIBAN J. Islam. Educ.*, vol. 5, no. 2, pp. 89–104, 2025, doi: 10.61456/tjie.v5i2.263.
 - [18] U. D. Nuranisa, I. Indiaty, and N. D. Rahmawati, "Pengembangan E-Modul Matematika Berbasis Pendekatan Saintifik Untuk Siswa SMP Kelas VIII," *Imajiner J. Mat. dan Pendidik. Mat.*, vol. 5, no. 4, pp. 284–292, 2023, doi: 10.26877/imajiner.v5i4.15815.
 - [19] D. Indarti, Mardiyana, and I. Pramudya, "Group investigation with scientific approach in mathematics learning," in *Journal of Physics: Conference Series*, IOP Publishing, 2018, p. 12147. doi: 10.1088/1742-6596/983/1/012147.
 - [20] A. Wakit and R. H. Kusumodestoni, "Problem based learning with a scientific approach with character in mathematics learning," *Al-Jabar J. Pendidik. Mat.*, vol. 11, no. 1, pp. 121–132, 2020, doi: 10.24042/ajpm.v11i1.6411.
 - [21] M. R. Ramdhani, B. Usodo, and S. Subanti, "Discovery learning with scientific approach on geometry," in *Journal of Physics: Conference Series*, IOP Publishing, 2017, p. 12033. doi: 10.1088/1742-6596/895/1/012033.
 - [22] J. N. Nabayra, "Video-Based E-Module for Mathematics in Nature and Students' Learning Experiences in a Flipped Classroom," *J. Sci. Math. Educ. Southeast Asia*, vol. 43, 2020.
 - [23] S. Hadi, H. Hartono, and R. Rachmadtullah, "Teachers' Understanding of The Integration of Islamic Values in Mathematics Learning in Elementary Schools," *Eduprof Islam. Educ. J.*, vol. 6, no. 2, pp. 172–181, 2025, doi: 10.47453/eduprof.v6i2.343.
 - [24] S. Pujilestari, I. Sujarwo, S. Harini, A. M. Surur, and H. B. Mohamed, "Pembelajaran Aritmetika Sosial Berbasis Kisah Islami: Inovasi Modul Kontekstual untuk Penguatan Karakter dan Pemahaman Konsep," *Kaunia Integr. Interconnect. Islam Sci. J.*, vol. 21, no. 1, pp. 11–26, 2025, doi: 10.14421/kaunia.5340.
 - [25] H. Aliyah, N. I. Rahmawati, B. F. Asy'arie, W. Mariyana, and M. Nuraqilah, "Design of contextual and Islamic values-based mathematics e-modules for junior high school students," *Bustanul Ulum J. Islam. Educ.*, vol. 3, no. 1, pp. 17–36, 2025.
 - [26] N. Hikmah and A. K. Haqiqi, "Pengembangan e-modul matematika terintegrasi nilai-nilai islam

- berbasis pendekatan saintifik pada materi bentuk aljabar," *J. Focus Action Res. Math. (Factor M)*, vol. 4, no. 1, pp. 125–140, 2021, doi: 10.30762/factor_m.v4i1.3438.
- [27] H. Zulnaidi and R. A. Abd Rauf, "Mathematics Module Based on STEAM and Quranic Approach: A Study for Student's Perception.," *J. Math. Educ.*, vol. 15, no. 2, pp. 363–384, 2024, doi: 10.22342/jme.v15i2.pp363-384.
- [28] D. H. Chang, M. P.-C. Lin, S. Hajian, and Q. Q. Wang, "Educational Design Principles of Using AI Chatbot That Supports Self-Regulated Learning in Education: Goal Setting, Feedback, and Personalization," *Sustainability*, vol. 15, no. 17, p. 12921, Aug. 2023, doi: 10.3390/su151712921.
- [29] N. Ariyanti, "The Effectiveness of Linear Algebra E-Modules with the Integration of Islamic Values and Muhammadiyah Principles on Student Learning Outcomes: Efektivitas E-Modul Aljabar Linier dengan Integrasi Nilai-Nilai Al Islam Kemuhammadiyah terhadap Hasil Belajar," *Indones. J. Innov. Stud.*, vol. 26, no. 4, pp. 10–21070, 2025, doi: 10.21070/ijins.v26i4.1739.
- [30] H. Rahmah, T. Turmudi, and M. T. Ghifari, "Research and development of mathematics teaching material integrated with islamic values: A systematic literature review," *Prism. Sains J. Pengkaj. Ilmu dan Pembelajaran Mat. dan IPA IKIP Mataram*, vol. 12, no. 2, pp. 306–315, 2024, doi: 10.33394/j-ps.v12i2.9519.
- [31] R. van Dinter, B. Tekinerdogan, and C. Catal, "Automation of systematic literature reviews: A systematic literature review," *Inf. Softw. Technol.*, vol. 136, p. 106589, Aug. 2021, doi: 10.1016/j.infsof.2021.106589.
- [32] S. Suparjo, M. Hanif, and D. I. Senja, "Developing Islamic science based integrated teaching materials for Islamic religious education in Islamic high schools," *Pegem J. Educ. Instr.*, vol. 11, no. 4, pp. 282–289, 2021, doi: 10.47750/pegegog.11.04.27.
- [33] F. Mansir, "Integration of Islamic science and science in schools: Studies on learning Islamic religious education in the digital era," *TADRIS J. Pendidik. Islam*, vol. 17, no. 2, pp. 412–424, 2022.
- [34] S. A. Hardy, J. M. Nelson, S. B. Frandsen, A. R. Cazzell, and M. A. Goodman, "Adolescent religious motivation: A self-determination theory approach," *Int. J. Psychol. Relig.*, vol. 32, no. 1, pp. 16–30, 2022, doi: 10.1080/10508619.2020.1844968.
- [35] L. Yang, M. M. Chiu, and Z. Yan, "The power of teacher feedback in affecting student learning and achievement: insights from students' perspective," 2021, *Taylor & Francis*. doi: 10.1080/01443410.2021.1964855.
- [36] R. Ratnah, W. Wildan, and M. Muntari, "The practicality of problem-based learning tools assisted by interactive simulations to improve students' creative thinking ability," *J. Pijar Mipa*, vol. 17, no. 3, pp. 347–352, 2022, doi: 10.29303/jpm.v17i3.3441.
- [37] H. Suyitno and A. Suyitno, "Building innovative and creative character through mathematics," in *AIP Conference Proceedings*, AIP Publishing LLC, 2018, p. 20042. doi: 10.1063/1.5028100.
- [38] A. Mulya, "Integration of Islamic Values in Mathematics Learning," *J. Pendidik. Sains*, vol. 13, no. 4, pp. 264–276, 2025, doi: 10.17977/jps.v13i42025p264.
- [39] Y.-C. Chan and N.-Y. Wong, "Worldviews, religions, and beliefs about teaching and learning: perception of mathematics teachers with different religious backgrounds," *Educ. Stud. Math.*, vol. 87, no. 3, pp. 251–277, Nov. 2014, doi: 10.1007/s10649-014-9555-1.