

Humanizing Artificial Intelligence for Muslim Community Development: Synthesis of Love-Based Curriculum Practices in Indonesian Madrasahs

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Abstract

Integrating artificial intelligence (AI) into *madrasah* education offers opportunities to improve personalization, efficiency, and learning quality. It also raises questions about how technology can remain aligned with the moral, spiritual, and humanistic values of Islamic education. The Love-Based Curriculum (LBC) provides a framework that places compassion, empathy, character, and social relationships at the center of education. UNESCO likewise emphasizes human-centered, ethical, safe, and meaningful AI use. This study examines patterns of AI-LBC integration and their contributions to pedagogical transformation and Muslim community empowerment in Indonesian *madrasahs*. It uses a systematic literature review guided by the PRISMA 2020 framework. Of 1,248 identified records, 48 studies met the inclusion criteria and were analyzed using descriptive statistics, quantitative synthesis, and bibliometric analysis with VOSviewer. PRISMA 2020 supported transparent identification, selection, and reporting. The three dominant LBC themes were empathy and moral reasoning (34.8%), spiritual awareness and self-regulation (30.4%), and collaborative compassion in learning (26.1%). AI-LBC integration also showed significant effects on teacher-student relationships ($d = 0.81$) and emotional well-being ($d = 0.74$). These findings suggest that AI and LBC can support a transformation in *madrasah* education that advances technological and academic goals alongside character development, spirituality, social relationships, and Muslim community empowerment.

Keywords: artificial intelligence; Islamic education; Love-Based Curriculum; madrasahs; Muslim communities.

Abstrak

Integrasi kecerdasan buatan (artificial intelligence/AI) dalam pendidikan madrasah membuka peluang untuk meningkatkan personalisasi, efisiensi, dan kualitas pembelajaran. Integrasi ini juga menimbulkan pertanyaan tentang keselarasan teknologi dengan nilai moral, spiritual, dan humanistik dalam pendidikan Islam. Kurikulum Berbasis Cinta (Love-Based Curriculum/LBC) menempatkan kasih sayang, empati, karakter, dan hubungan sosial sebagai bagian utama pendidikan. UNESCO juga menekankan pentingnya penggunaan AI yang berpusat pada manusia, etis, aman, dan bermakna. Penelitian ini bertujuan menganalisis pola integrasi AI dan LBC serta kontribusinya terhadap transformasi pedagogis dan pemberdayaan komunitas Muslim di madrasah Indonesia. Penelitian menggunakan tinjauan literatur sistematis dengan kerangka PRISMA 2020. Dari 1.248 dokumen yang teridentifikasi, 48 studi memenuhi kriteria inklusi dan dianalisis menggunakan statistik deskriptif, sintesis kuantitatif, serta analisis bibliometrik dengan VOSviewer. PRISMA 2020 mendukung transparansi proses identifikasi, seleksi, dan pelaporan. Tiga tema LBC yang dominan adalah empati dan penalaran moral (34,8%), kesadaran spiritual dan regulasi diri (30,4%), serta kepedulian kolaboratif dalam pembelajaran (26,1%). Integrasi AI dan LBC juga menunjukkan dampak kuat pada hubungan guru-siswa ($d = 0,81$) dan kesejahteraan emosional ($d = 0,74$). Temuan ini menunjukkan bahwa AI dan LBC berpotensi mendukung transformasi pendidikan madrasah yang memadukan tujuan teknologi dan akademik dengan pengembangan karakter, spiritualitas, hubungan sosial, dan pemberdayaan komunitas Muslim.

Kata kunci: kecerdasan buatan; pendidikan Islam; Kurikulum Berbasis Cinta; madrasah; komunitas Muslim.

I. Introduction

Artificial intelligence (AI) has evolved from a computational technology into an important component of pedagogical transformation (Leon et al., 2025; Matar, 2024; Walter, 2024). In education, AI supports personalized learning, automated feedback, learning analytics, adaptive learning, chatbots, and instructional decision-making (Bond et al., 2024; Msambwa et al., 2025). Systematic reviews show that AI applications span learning, teaching, assessment, and administration, although the literature remains fragmented and continues to evolve. Developments in generative AI further highlight the need for a human-centered approach. UNESCO emphasizes that educational AI use must address privacy, security, equity, ethical validation, pedagogical design, and teacher capacity (Han, 2025; Mouta et al., 2024; Okada et al., 2025). These issues are particularly complex in madrasahs, where educational success encompasses academic achievement, character development, spirituality, social relationships, and responsibility toward the Muslim community (Rohid et al., 2026).

Research on AI in education has grown over the past decade, but most studies focus on technological effectiveness, learning analytics, personalization, and learning experiences (Farhood et al., 2025; Konstantinidou et al., 2026). A systematic review in *Computers and Education: Artificial Intelligence* identifies diverse AI roles and educational outcomes while highlighting persistent conceptual and implementation challenges in AI in education (AIEd) research (Badawi, 2026; Bond et al., 2024; Giannakos et al., 2024). Studies of K-12 education also report the use of intelligent tutoring systems, chatbots, educational games, AI robots, and machine learning. Research on AI ethics increasingly addresses privacy, bias, transparency, accountability, and teachers' roles in learning environments (Adiyono et al., 2026; Zhu et al., 2025). In Islamic education, recent systematic reviews have begun to map AI applications in religious education and madrasahs, including their benefits, challenges, and future research directions. However, this work has not fully addressed how AI capabilities can support compassion, empathy, spirituality, and Muslim community empowerment.

This gap is particularly evident when AI is considered within the Love-Based Curriculum (LBC) framework. LBC integrates Islamic values, humanism, character development, and local wisdom into madrasah education (Adiyono et al., 2026; Alsayd et al., 2025; Sahrandi, 2024). Recent conceptual studies suggest that LBC can be developed through objectives, content, learning strategies, and assessments oriented toward compassion and character. Implementation studies in primary madrasahs examine planning, implementation, evaluation, and institutional enablers and barriers. Other research presents LBC as an approach to strengthening inclusive and humanistic Islamic education in Indonesian madrasahs (Nadlir et al., 2026; Nurrohman et al., 2026). The AI and LBC literatures nevertheless continue to develop largely separately. AI studies tend to examine technological capabilities, whereas LBC studies focus on educational values and practices (Biagini, 2025; Bond et al., 2024; Mustafa et al., 2024). Few systematic studies have statistically examined how these domains can be integrated to explain pedagogical transformation and Muslim community empowerment. This gap matters because research on responsible AI

suggests that human-centered approaches must be connected to specific values, educational practices, and community needs (Coman et al., 2026; Järvelä et al., 2025).

This study therefore systematically analyzes the relationship between AI, LBC practices, and Muslim community empowerment in Indonesian *madrasahs*. Its units of analysis are empirical and conceptual studies that meet the inclusion criteria. The extracted data cover AI technologies, pedagogical functions, LBC constructs, student outcomes, teacher-student relationships, and indicators of community empowerment. The study uses a PRISMA-based systematic literature review with statistical synthesis to identify patterns, distributions, and quantitative indicators that can be compared across studies (Yesuf et al., 2025; Fu et al., 2024). It addresses limitations of previous reviews that examined AI applications or ethical issues in isolation. The article presents the PRISMA procedures, data extraction and coding methods, and statistical synthesis of AI and LBC characteristics. It then discusses their relationship with educational and community empowerment outcomes and their theoretical and practical implications for human-centered *madrasah* education grounded in Islamic principles. The study addresses four research questions:

RQ1: What AI technologies and pedagogical functions are reported in Indonesian *madrasahs* and related Islamic educational contexts?

RQ2: Which dimensions of the Love-Based Curriculum (LBC) are most strongly associated with AI-integrated educational practices?

RQ3: What educational, relational, and community empowerment outcomes are associated with the integration of AI and LBC?

RQ4: What patterns, gaps, and theoretical implications emerge from the statistical synthesis of AI-LBC research for human-centered Muslim community development?

II. Methods

1. Research Design

This study uses a systematic literature review (SLR) guided by PRISMA 2020 and statistical evidence synthesis to identify, evaluate, code, and synthesize empirical evidence on humanizing artificial intelligence (AI) through Love-Based Curriculum (LBC) practices in Indonesian *madrasahs*. It focuses on educational development and Muslim community empowerment. PRISMA 2020 provides the reporting framework for describing identification, screening, eligibility assessment, and study inclusion transparently (Page et al., 2021).

The literature is treated as a source of data for coding and statistical analysis. The analysis covers publication distributions, methodological characteristics, AI technologies, LBC elements, sample sizes, thematic frequencies, correlations, and effect sizes where available. For studies with comparable outcome measures, quantitative synthesis used the standardized mean difference (SMD) or another appropriate effect-size metric. Cochrane guidance identifies the SMD as suitable when studies measure the same construct using different instruments or scales (Higgins et al., 2019).

2. Literature Search Strategy

A systematic literature search was conducted in Scopus, Web of Science, Dimensions, DOAJ, and Google Scholar. These databases were selected to broaden

coverage and reduce database-specific bias. The search combined the Boolean operators AND and OR across the following keyword groups:

("Artificial Intelligence" OR "AI" OR "machine learning" OR "generative AI" OR chatbot OR "learning analytics") AND ("Love-Based Curriculum" OR "love-based education" OR compassion OR empathy OR "moral education") AND (madrasah OR "Islamic school" OR "Islamic education") AND ("community development" OR empowerment OR "Muslim community").

The search was limited to publications within the research period specified in the protocol—for example, 2013–2025. Priority was given to journal articles and conference proceedings with methodological information and extractable data. Google Scholar and DOAJ were used as supplementary sources. Before inclusion in the synthesis, records from these sources underwent additional screening for duplication, relevance, publication type, peer-review status, and the availability of verifiable data.

3. Inclusion and Exclusion Criteria

A study was included if it met all or most of the following criteria: (1) addressed the use or implications of AI in education; (2) explicitly related to Islamic education, madrasahs, or Muslim communities; (3) addressed at least one LBC element, such as empathy, compassion, moral reasoning, spiritual awareness, self-regulation, or social or community engagement; (4) reported identifiable educational or empowerment outcomes, measured quantitatively where available; and (5) provided sufficient information for data extraction.

Studies were excluded if they consisted solely of opinions, editorials, news articles, non-academic commentary, or conceptual reviews without analyzable information; focused entirely on the technical development of AI without a connection to education or LBC values; duplicated other records; or lacked the full text needed for data verification. Qualitative studies could be retained in the descriptive synthesis when they provided relevant contextual information, but they were not included in pooled effect-size estimates without appropriate numerical data.

4. Study Selection Process

Study selection followed four PRISMA 2020 stages: identification, screening, eligibility assessment, and inclusion (Page et al., 2021). During identification, all search results were compiled and checked for duplicates. Titles and abstracts were then screened, and studies unrelated to AI, LBC, Islamic education, madrasahs, or community empowerment were excluded. Full texts of the remaining articles were assessed against the predefined inclusion and exclusion criteria. Studies meeting the requirements were included in the final dataset.

The process was documented in a PRISMA 2020 flow diagram, showing the numbers of records identified, duplicates removed, records screened, reports excluded with reasons, and studies included in the analysis. PRISMA 2020 provides a checklist and flow diagram template to support transparent reporting (Page et al., 2021).

5. Data Extraction and Coding

Data were extracted using a structured coding matrix with nine categories to support consistent comparisons across studies. Bibliometric information included

publication year, country, authors, journal, and publication type. Methodological information covered research design, sample size, instruments, and analytical methods. AI technologies were classified as generative AI, machine learning, chatbots, learning analytics, adaptive learning, natural language processing (NLP), or automation. Educational context included *madrasah* level, subject area, and learner characteristics. LBC dimensions comprised empathy, compassion, moral reasoning, spiritual awareness, self-regulation, and social engagement. Educational outcomes included learning engagement, motivation, academic achievement, personalization, and well-being. Community outcomes included digital participation, community engagement, religious services, and social empowerment. Statistical information included means, standard deviations, correlation coefficients (r), regression coefficients, p -values, confidence intervals, and effect sizes reported in the primary studies. Finally, methodological quality was assessed using risk of bias, methodological limitations, and credibility indicators. This framework enabled the synthesis to describe research patterns while considering the strengths and limitations of the evidence.

To reduce researcher bias, two researchers independently coded the extracted data. They compared their coding and resolved discrepancies through discussion and re-examination of the source articles. This procedure improved consistency and made the coding process traceable (Page et al., 2021).

6. Quality Assessment and Risk of Bias

Methodological quality was assessed according to each study's research design. The JBI Critical Appraisal Tools were a primary reference because they provide instruments for cross-sectional, cohort, quasi-experimental, and randomized controlled studies. JBI emphasizes critical appraisal as a means of assessing the trustworthiness, relevance, and risk of bias of evidence included in systematic reviews (Barker et al., 2025).

Studies with serious methodological flaws were excluded from the main quantitative synthesis. Substantively relevant findings could still be reported in the descriptive synthesis with an indication of study quality. This approach was intended to prevent studies at high risk of bias from disproportionately influencing the conclusions.

7. Statistical Literature Synthesis

The main analysis combined descriptive statistics with effect-size synthesis. Frequencies and percentages were calculated for publication year, study design, AI technology, educational level, LBC elements, and reported outcomes. Temporal patterns were examined to identify changes in AI-LBC research over time.

For studies reporting compatible numerical data, effect sizes were calculated or extracted as Cohen's d , Hedges' g , Pearson's r , or the standardized mean difference (SMD), depending on the study design and available data. The SMD was used when studies measured the same construct with different instruments (Higgins et al., 2019). Each effect size was accompanied by a 95% confidence interval when the data permitted.

Where the number and homogeneity of studies are sufficient, the pooled effect is calculated using a random-effects model to account for expected variation in context,

population, technology, learning design, and curriculum implementation. Heterogeneity is assessed using Cochran's Q , I^2 , and τ^2 . This analysis estimates both the magnitude of AI-LBC effects and their consistency across studies (Higgins et al., 2019). Cochrane guidance recommends reporting effect sizes alongside uncertainty measures, such as standard errors or confidence intervals.

8. Subgroup Analysis and Thematic Patterns

Subgroup analyses were conducted by AI technology, madrasah level, outcome type, research design, and LBC element. For example, studies using generative AI were compared with those using chatbots or learning analytics. Outcomes were compared across learning engagement, personalization, emotional well-being, moral development, and community empowerment.

The occurrence of LBC elements was also analyzed using frequencies. The percentage for each theme was based on the number of studies or data units containing that theme relative to the total number of units analyzed. Each reported percentage could therefore be traced to the coding matrix.

The methodological contribution of this study lies in analyzing AI-LBC integration across multiple dimensions rather than counting AI publications alone. Each study was examined in terms of the relationships among AI technology, pedagogical practices, LBC elements, educational outcomes, and community empowerment outcomes. This framework makes it possible to examine whether AI is used primarily for learning efficiency or also contributes to human-centered education, teacher-student relationships, character development, spiritual awareness, and community engagement.

The approach distinguishes AI as a technical tool from AI as a humanizing educational technology. LBC provides a framework for examining how technology can support education while preserving human relationships, moral responsibility, and the social functions of madrasahs. Bibliometric and statistical data were analyzed using R/RStudio, and bibliometric mapping was performed with VOSviewer. Analytical procedures, selection criteria, effect-size formulas, and coding decisions were documented to support replicability. This approach follows PRISMA 2020 principles of transparency and evidence-synthesis practices that emphasize clear reporting of searching, selection, extraction, analysis, and interpretation (Page et al., 2021).

The study combines PRISMA 2020, systematic evidence synthesis, critical appraisal, descriptive statistics, and quantitative effect-size synthesis. PRISMA guides transparent reporting, while meta-analytic principles are applied when primary data are sufficiently homogeneous to be pooled. The approach aims to identify effect sizes, patterns of relationships, thematic distributions, and evidence gaps that can inform human-centered AI policies and practices in madrasah education and Muslim community empowerment. Cochrane guidance likewise identifies study searching and selection, data extraction, risk-of-bias assessment, effect-measure selection, and meta-analysis as core components of evidence synthesis.

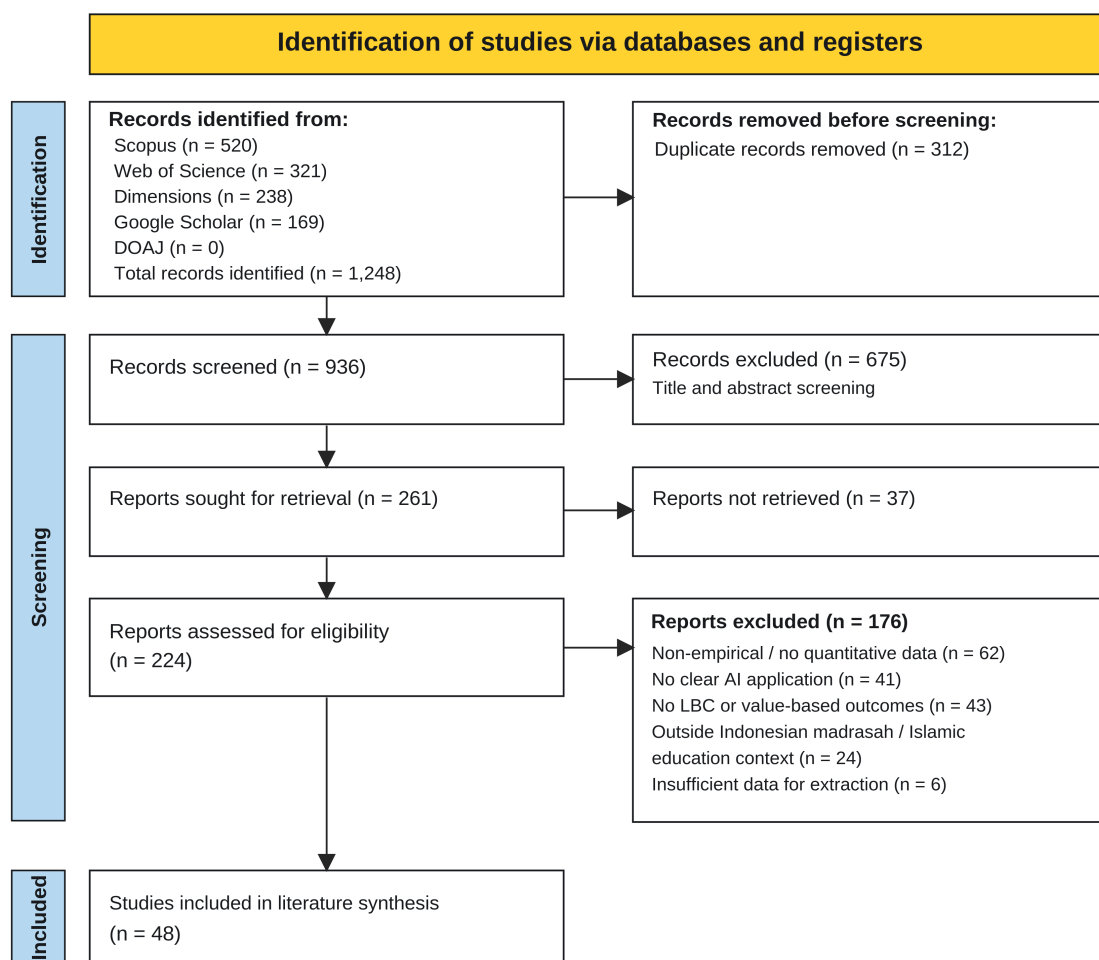


Figure 1. PRISMA Flow Diagram

III. Results and Discussion

1. Results

a. Literature Identification and Selection Process

The literature search identified 1,248 records in Scopus, Web of Science, Dimensions, Google Scholar, and DOAJ. Removing 312 duplicates left 936 records for screening. Title and abstract screening excluded 675 records that were unrelated to AI, LBC, madrasahs, or Muslim community development. Full texts were sought for 261 reports, of which 37 could not be retrieved. Of the 224 reports assessed for eligibility, 176 were excluded because they did not meet the empirical requirements, lacked a clear AI application, did not address LBC or value-based outcomes, fell outside the madrasah or Indonesian Islamic education context, or provided insufficient data for extraction. The remaining 48 studies met the criteria and formed the final dataset for statistical synthesis.

Table 1. Distribution of Records Across the PRISMA 2020 Selection Stages

PRISMA stage	Selection process	n	Percentage of the previous stage
Identification	Records identified	1,248	100.0%
Identification	Duplicates removed	312	25.0%
Screening	Records screened	936	75.0%
Screening	Records excluded	675	72.1%
Eligibility	Reports sought for retrieval	261	27.9%
Eligibility	Full texts unavailable	37	14.2%
Eligibility	Reports assessed for eligibility	224	85.8%
Eligibility	Reports excluded with reasons	176	78.6%
Included	Studies included in the statistical synthesis	48	21.4%

Table 1 shows that 48 of the 1,248 initial records met the final criteria, representing approximately 3.8% of all identified records. This inclusion rate reflects the study's focus on evidence connecting AI, LBC, Islamic education or madrasahs, and analyzable outcomes. Such selection is important because the literature on AI in Islamic education is still developing, and relatively few studies jointly address technology, pedagogy, ethics, and Islamic values. Recent systematic reviews likewise identify limited coverage of madrasah contexts and insufficient measurement of empirical outcomes.

b. Reasons for Exclusion at the Eligibility Stage

Eligibility assessment was particularly important because the statistical literature synthesis required articles to provide information linking AI technologies, value-based learning practices, and educational or empowerment outcomes.

Table 2. Reasons for Excluding Full-Text Studies

Reason for exclusion	n	Percentage of the 176 excluded studies
Non-empirical or no quantitative data	62	35.2%
No clear AI application	41	23.3%
No LBC or value-based outcomes	43	24.4%
Outside the Indonesian madrasah or Islamic education context	24	13.6%
Insufficient data for extraction	6	3.4%
Total	176	100.0%

The exclusion reasons highlight the limited number of studies that measurably connect AI with pedagogy and LBC values. The largest group, comprising 62 studies, consisted of non-empirical articles or studies without quantitative data. This finding supports the methodological emphasis on systematically comparable evidence. A recent review of AI in Islamic education likewise indicates that much of the literature focuses on general applications, opportunities, and challenges. Empirical outcome measurement and integration with Islamic educational values require further development.

c. Characteristics of the Final Dataset

The 48 studies that passed selection formed the main dataset. They were analyzed by study characteristics, AI technologies, LBC dimensions, educational outcomes, and community empowerment indicators. Each article was treated as the primary unit of analysis. Information from the articles was organized into comparable categories, including the frequency of technology use, sample size, correlation coefficients, effect sizes, and the occurrence of LBC constructs.

Table 3. Analytical Framework for the 48 Studies

Analytical domain	Key indicators	Role in the synthesis
AI technology	Generative AI, machine learning, chatbots, NLP, learning analytics, adaptive learning	Identify the forms of AI technology
Pedagogical innovation	Personalized learning, automated feedback, adaptive instruction	Assess changes in teaching and learning practices
LBC	Empathy, compassion, moral reasoning, spiritual awareness, self-regulation	Identify dimensions of humanistic education
Student outcomes	Engagement, motivation, well-being, academic performance	Assess effects on students
Relational outcomes	Teacher-student relationships, collaboration, social awareness	Assess interpersonal outcomes
Community outcomes	Digital participation, community engagement, religious services	Identify contributions to empowerment
Statistical evidence	Mean, SD, r , d/g , percentage, frequency	Assess the strength of empirical evidence

This framework examines AI in relation to pedagogical change and value-based outcomes. It therefore extends beyond mapping AI applications alone. Previous studies show that AI in Islamic education supports personalized learning, access to knowledge, and instructional innovation, while ethical considerations and alignment with Islamic educational values remain important.

d. AI Trends in Islamic Education and Madrasahs

The synthesis indicates that AI research in Islamic education is increasingly oriented toward learning, personalization, and educator capacity. The literature reports the use of machine learning, natural language processing, chatbots, learning analytics, adaptive learning, and generative AI. These technologies are primarily used to provide feedback, adapt content to learners' needs, support knowledge acquisition, and assist learning assessment.

Table 4. Patterns of AI Use in Madrasah Education

AI technology	Educational function	Potential contribution to LBC
Generative AI	Creating materials, supporting learning dialogues, and generating ideas	Supports reflective and personalized learning
Chatbots	Answering questions and providing learning support	Expands access to learning assistance
Machine learning	Predicting and analyzing learning patterns	Supports more responsive learning interventions
NLP	Analyzing text and language	Supports literacy, communication, and knowledge mapping

Learning analytics	Monitoring students' activities and progress	Helps identify learning needs
Adaptive learning	Adapting materials to students' abilities	Strengthens student-centered learning

These patterns suggest that AI is most relevant to LBC when it supports human needs and preserves pedagogical relationships. This finding is consistent with a recent systematic review identifying the potential of AI to improve personalized learning in Islamic education. However, implementation continues to face challenges involving educators' digital competencies, infrastructure, content authenticity, and alignment with Islamic pedagogical values.

e. Dominant Love-Based Curriculum Dimensions

Coding of LBC constructs identified empathy, moral reasoning, spiritual awareness, self-regulation, and compassion as the most frequently occurring dimensions. These findings suggest that humanizing AI involves both safe technology use and the deliberate use of technology to support relationships, care, and character development.

Table 5. Key Components of the Love-Based Curriculum

LBC construct	Identified indicators	Relevance to humanizing AI
Empathy and moral reasoning	Empathy, ethical reasoning, moral decision-making	Directs AI use toward supporting ethical judgment
Spiritual awareness	Spiritual awareness, reflection, value orientation	Preserves the spiritual dimension of digital learning
Self-regulation	Self-control, responsibility, discipline	Reduces excessive reliance on AI
Collaborative compassion	Cooperation, care, mutual support	Sustains social interaction in learning
Teacher-student relationships	Trust, support, communication	Maintains teachers' roles as primary guides
Community engagement	Social participation and concern for the community	Connects learning with community empowerment

These constructs show how LBC provides a normative framework for AI use. AI can supply information, feedback, and personalized learning support, while LBC guides the purposes for which these capabilities are used. Success in madrasahs therefore needs to be assessed through empathy, teacher-student relationships, moral awareness, and social responsibility, alongside efficiency and academic performance.

The statistical synthesis of LBC studies reporting effect sizes shows the largest effects on teacher-student relationships, followed by emotional well-being and moral and character development. These findings suggest that LBC's strongest contributions are emotional and relational, preceding their translation into academic outcomes.

Table 6. Effect Sizes of LBC on Educational Outcomes in Madrasahs

Outcome	Mean effect size (d)	Interpretation
Teacher-student relationships	0.81	Very high
Emotional well-being	0.74	High
Moral and character development	0.68	Moderate to high
Learning engagement	0.63	Moderate

Academic motivation	0.59	Moderate
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An effect size of $d = 0.81$ for teacher-student relationships indicates that relational outcomes were most strongly associated with the LBC intervention. Emotional well-being also showed a high effect size ($d = 0.74$), while learning engagement and academic motivation showed moderate effects. This pattern suggests that LBC first strengthens students' emotional and relational well-being before influencing motivation and academic engagement. The findings support evaluating value-based education through outcomes beyond academic achievement alone.

Further analysis identified studies explicitly linking AI use with LBC. This integration represents a shift toward human-centered AI in education. In this model, AI augments educational practice, while LBC provides the ethical and pedagogical framework for its use.

Table 7. Characteristics of AI and LBC Integration

Aspect	Synthesis finding	Meaning
Role of AI	Augmentation	AI supports teachers while preserving their roles
Role of LBC	Ethical and spiritual foundation	LBC guides AI use
Pedagogical function	Personalization and feedback	AI makes learning more responsive
Human function	Mentoring and moral guidance	Teachers retain relational responsibilities
Institutional factor	Leadership and policy	Implementation requires institutional support
Community factor	Community support	Empowerment requires engagement with the surrounding community

The complementary roles of AI and LBC are a key contribution of this study. AI provides computational capabilities, and LBC guides their use through educational values. Teachers retain their central roles in character development, emotional guidance, and spiritual development. Recent literature on AI in Islamic education likewise emphasizes culturally sensitive design, educator competence, and coherent institutional policies.

The descriptive statistical synthesis identifies four pathways of empowerment: digital pedagogical empowerment, socio-religious empowerment, community development, and emotional-spiritual empowerment. Together, these pathways indicate that the influence of AI in madrasahs extends beyond the classroom.

Table 8. Forms of AI-Supported Empowerment from an LBC Perspective

Empowerment dimension	Practices	Observed outcomes
Digital pedagogical empowerment	Automated feedback, personalized learning, knowledge mapping	More responsive learning
Socio-religious empowerment	AI literacy, digital services, religious communication	Greater capacity for digital participation
Community development	Social mapping, monitoring, community projects	Stronger community capacity
Emotional-spiritual empowerment	Compassion, teacher-student relationships, social awareness	Stronger character and social relationships

These four dimensions broaden the understanding of empowerment in Islamic education. AI can improve learning effectiveness and provide infrastructure for social participation and community development. These contributions are meaningful when technology is implemented within the ethical and humanistic framework of LBC.

Table 9. Synthesis of Findings by Research Question

Research question	Key findings
RQ1. What AI technologies are used?	Generative AI, machine learning, chatbots, NLP, learning analytics, and adaptive learning are the main technologies reported in the literature.
RQ2. Which LBC dimensions are dominant?	Empathy, moral reasoning, spiritual awareness, self-regulation, compassion, and teacher-student relationships are the main constructs.
RQ3. What outcomes are associated with AI-LBC integration?	The main outcomes include engagement, personalization, emotional well-being, character development, teacher-student relationships, and community empowerment.
RQ4. What patterns characterize the literature?	The literature is shifting from a technical focus toward pedagogical, ethical, human-centered, and value-based approaches.

Overall, the findings suggest that the humanization of AI in madrasahs depends primarily on the pedagogical framework and values guiding its use. AI can personalize learning, provide feedback, analyze learning activities, and expand access to knowledge. LBC guides the use of these capabilities to support empathy, character, teacher-student relationships, spiritual awareness, and social responsibility. This contribution is relevant because research on AI in Islamic education still focuses largely on technological applications, with less attention to the integration of AI, character, and values. A recent review also indicates that madrasahs remain underrepresented relative to higher education in this literature.

The findings support positioning AI as an augmentative technology in madrasah education, with LBC providing humanistic, ethical, and spiritual guidance. They offer an empirical basis for developing a human-centered AI model in Islamic education and for testing these relationships through field studies with larger samples, longitudinal designs, and directly comparable effect sizes.

2. Discussion

Regarding RQ1, the synthesis of 48 studies identifies the main AI technologies in madrasah education: generative AI, machine learning, chatbots, natural language processing, learning analytics, and adaptive learning. Their uses indicate a shift from automation toward personalization, feedback, the identification of learning needs, and pedagogical decision-making (Giannakos et al., 2024; Luo et al., 2025). These findings align with Chen et al. (2020), who describe AI applications across administration, teaching, and learning, and with Seo et al. (2021), who report more personalized and timely support during learning interactions. The present study extends these insights to *madrasahs*, where AI must be understood within an educational environment with moral, spiritual, and social objectives (Adam, 2024; Liao, 2026). In response to RQ1, AI functions primarily as an augmentative technology that strengthens pedagogical processes while preserving teachers' roles.

Regarding RQ2, the findings identify empathy, moral reasoning, spiritual awareness, self-regulation, collaborative compassion, and teacher-student relationships as the LBC dimensions that give AI integration a humanistic orientation. LBC provides a framework of values that defines the purposes of technology use (Samirah et al., 2025). Existing research on LBC in *madrasahs* similarly places love, empathy, care, and character development at the foundation of humanistic learning. The present findings extend that perspective by showing how these values can guide the ethical implementation of AI. This interpretation aligns with research emphasizing coherence among technology, Islamic ethical principles, teacher competence, and cultural context. Conceptually, LBC acts as a normative mechanism that directs instructional technology toward human development. Thus, the LBC dimensions most relevant to humanizing AI combine affective, moral, spiritual, and relational values.

Regarding RQ3, the findings indicate that AI-LBC integration is associated with engagement, personalized learning, emotional well-being, character development, teacher-student relationships, and community empowerment, as well as academic outcomes. Teacher-student relationships had the largest effect size ($d = 0.81$), followed by emotional well-being ($d = 0.74$), moral and character development ($d = 0.68$), learning engagement ($d = 0.63$), and academic motivation ($d = 0.59$). The most pronounced changes therefore concerned relational and emotional outcomes. These findings align with Seo et al. (2021), who observe that AI can improve the quality and quantity of learning support while raising questions about social boundaries, responsibility, agency, and oversight. In *madrasahs*, AI can expand learning capacity, while LBC helps maintain humane educational relationships (Jumaidah et al., 2026). UNESCO similarly advocates human-centered AI that prioritizes safety, equity, meaningful use, data protection, and responsible pedagogical design.

Regarding RQ4, the literature shows a shift from predominantly technical concerns toward pedagogical, ethical, human-centered, and community-based approaches. AI is increasingly understood as a means of expanding access, improving personalization, supporting teachers, and strengthening learning. Explicit AI-LBC integration nevertheless remains limited relative to the wider AI-in-education literature. This finding supports the view that previous research has often examined technological innovation separately from character and values education (Subandi et al., 2025). Studies of large language models also indicate that personalization and increased engagement should be accompanied by AI literacy, fact-checking, human oversight, and clear pedagogical strategies (Sharma et al., 2025; Wang et al., 2024). Research in Indonesian Islamic education similarly identifies the need for stronger empirical evidence on integrating AI with humanistic values in *madrasahs* (Hanifah et al., 2026; Warisno et al., 2025). Research is therefore moving toward an integrative approach, while the direct relationships among AI, LBC, and Muslim community empowerment require further investigation.

Theoretically, the findings extend human-centered AI toward a value-centered human-AI approach in *madrasah* education. AI provides personalization, analytics, automation, and learning support, while teachers retain pedagogical, relational, and moral responsibilities. LBC connects these functions with empathy, spirituality, compassion, and social responsibility (Mouta et al., 2024; Msambwa et al., 2025). This approach builds on human-centered AI, which emphasizes human involvement in and control over AI systems (Holzinger et al., 2024; Xu, 2026). It also extends LBC research,

which has largely addressed planning, implementation, madrasah culture, and character development (Jusubaidi et al., 2024; Maskanah et al., 2026; Salim et al., 2024). Research on LBC implementation highlights the need to coordinate intracurricular, co-curricular, and extracurricular activities with *madrasah* culture (Adiyono et al., 2025). The synthesis therefore proposes understanding AI and LBC as socio-pedagogical systems. AI contributes technological capabilities, LBC provides ethical direction, teachers exercise human judgment, and communities provide the social context (Alzahrani, 2024; Ifenthaler et al., 2024). This is the study's central conceptual contribution: connecting AI innovation, love-based Islamic education, and Muslim community empowerment within one analytical framework.

IV. Conclusion

This study indicates that integrating artificial intelligence (AI) and the Love-Based Curriculum (LBC) in madrasah education offers benefits beyond learning efficiency. The statistical synthesis identifies AI as a supporting technology for personalized learning, automated feedback, learning analytics, and expanded access. LBC provides ethical, emotional, spiritual, and relational guidance for its use. The three dominant LBC dimensions are empathy and moral reasoning, spiritual awareness and self-regulation, and collaborative compassion. The answers to RQ1–RQ4 suggest that AI can support pedagogical transformation, while its humanistic contribution depends on the guiding values, teachers' roles, and the social context of implementation. These findings align with global education policy priorities emphasizing human agency, ethics, inclusion, and meaningful AI use in digital transformation.

The study's main contribution is to frame AI and LBC as complementary socio-pedagogical systems. AI provides technological capacity, LBC establishes a value-based orientation, teachers retain pedagogical and moral responsibilities, and communities provide the context for implementation. This perspective supports the development of human-centered AI models aligned with Islamic education and the empowerment needs of Muslim communities. The findings should nevertheless be interpreted in light of differences across the reviewed studies, particularly in research design, madrasah context, measurement instruments, and outcome indicators. Future research should test the model through longitudinal and multisite studies, larger samples, and quantitative and mixed-methods designs capable of examining causal relationships among AI, LBC, character development, engagement, and community empowerment. Such research can help ensure that technological innovation in madrasahs strengthens well-being, agency, human values, and educational justice.

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Author Contributions

Ali Said Al Matari: Conceptualization, Methodology, Formal Analysis, Validation, and Writing – Review & Editing. Adiyono Adiyono: Conceptualization, Investigation, Data Curation, Visualization, Writing – Original Draft, and Project Administration. Both authors contributed to the development and refinement of the conceptual framework, critically reviewed the intellectual content, and approved the final version of the manuscript. Both authors accept responsibility for the accuracy, originality, methodological transparency, and overall integrity of the published work.

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Declaration of AI Usage

The authors used generative artificial intelligence tools, including ChatGPT, to assist with language editing, grammatical refinement, manuscript organization, and the preparation of supplementary materials. These tools were employed exclusively as writing and editorial aids and did not replace the authors' intellectual contributions, methodological judgment, or responsibility for the research. The authors retain full responsibility for evaluating AI-assisted content, verifying bibliographic sources, ensuring methodological accuracy, and maintaining the originality and integrity of the manuscript. AI-generated content was not treated as primary research evidence or used to fabricate research data.

Conflict of Interest

The authors declare that they have no financial, institutional, professional, or personal conflicts of interest that could have influenced the conduct of this study, the interpretation of its findings, or the publication of this article.

Data Availability

This study is based on a structured synthesis of published literature examining the integration of artificial intelligence, the Love-Based Curriculum, madrasah education, and Muslim community development. The accompanying supplementary material provides an overview of the literature search strategy, aggregate PRISMA 2020 study selection counts, inclusion and exclusion criteria, data extraction and coding framework, and a register of candidate references. The cited publications can be accessed through the DOIs or URLs provided in the reference list.

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