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Integrating Deep Learning Approaches to Strengthen Students' Religious Moderation and Character Formation

[1,2]Julita Lindriany*, [1]Suyatno, [1]Dody Hartanto, [3]Maritza Dita Fiorenza Aprilia Putri, [3]Phasa Amalia Arzetti Putri
Corresponding author:*2437082010@webmail.uad.ac.id
[1] Universitas Ahmad Dahlan, Yogyakarta, Indonesia
[2] Sekolah Tinggi Ilmu Tarbiyah Muhammadiyah Tanjung Redeb, Berau, Indonesia
[3] Universitas Islam Negeri Sultan Aji Muhammad Idris, Samarinda, Indonesia

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ABSTRACT

Technological advances in the digital era present both challenges and opportunities in the world of education, especially in efforts to instill religious moderation values in the younger generation. This study aims to analyze how deep learning technology can be integrated into religious education to form a generation with character and tolerance. The method used is a literature review, by collecting and analyzing literature from various academic sources such as journals, books, and research reports relevant to the topics of deep learning, education, and religious moderation. The analysis is done thematically to identify patterns of deep learning utilization in filtering extreme content, providing contextual learning materials, and supporting personalization of religious learning. The results show that deep learning has the potential to be a strategic tool in developing an inclusive and adaptive religious education curriculum. This research recommends the need for collaboration between educators, technology developers, and policy makers in designing technology-based education that remains rooted in moderate values.

Keywords
Character Education
Educational Technology
Deep Learning
Inclusive Education
Religious Moderation

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Introduction

The rapid growth of digital technology in Indonesia has changed religious expression and education, but has also created new challenges, including the spread of radical and extremist religious views online [1], [2]. Religious education in Indonesia has a strategic position in the national education system, [3] Ministry of Education's Regulation No. 12 of 2024 on Curriculum for Early Childhood, Primary, and Secondary Education, which emphasizes character strengthening, faith development, and religious moderation as core educational objectives. This is because religious education has formal legality as a compulsory subject to be taught to all students at all levels of education [4]. Religious education is expected to be able to make students into virtuous individuals, behave politely and friendly, inclusive, tolerant, moderate, who are not extreme right (radical) or extreme left (liberal), as the message in religious teachings [5].

Based on the facts on the ground, it is still far from expectations. Moral deviations were found due to attitudes and behaviors that lead to radicalism, carried out both in schools and in society [6]. These intolerant and radical attitudes or behaviors are basically very contrary to the values of religious teachings that highly uphold plurality. As a result, not a few impacts of this behavior result in socio-religious conflicts that culminate in physical and non-physical violence. Religious education that should be able to create a polite person is still far from expectations. Noble religious values such as compassion and tolerance have not been able to be understood, experienced, interpreted, and implemented in everyday behavior [7], [8], [9]. Religious education still often only targets the cognitive domain that teaches knowledge alone or is informative and tends to ignore the affective and psychomotor domains. As a result, it only excels in understanding religious material, but is still very weak in interpreting every religious teaching that is obtained, so that it has not been able to apply it to everyday behavior.

Religious moderation is increasingly important to counter digital radicalization and maintain social harmony in Indonesia's diverse society. Social media and online platforms have become the main space for religious learning and expression in Indonesia, allowing for positive engagement and the rise of religious populism [10], [11], [12]. This situation can challenge traditional religious authority and strengthen the population or be divisive, making it fertile ground for moderate and radical voices [13]. Empirical evidence documents this phenomenon: surveys indicate that approximately 7.7% of Indonesians, or about 600,000 people, are open to radical activities, highlighting the urgency of addressing radicalism through religious moderation as a counter-narrative [14]. Furthermore, studies on religious polarization in Indonesian social media reveal that religious issues frequently trigger polarization among users, particularly during politically charged periods such as the 2019 election, demonstrating

how digital spaces can amplify divisive narratives and influence horizontal conflicts in society [14]. This situation makes digital platforms fertile ground for both moderate and radical voices, necessitating proactive moderation strategies

Young people's attachment to gadgets and social media increases their exposure to intolerance or extremism, especially without proper guidance and supervision [15]. The digital environment has facilitated the spread of radical and extremist ideologies, with some communities using online platforms to promote intolerance, hate speech, and even violence [13], [15]. Radicalization is influenced by local social, political, and economic factors, and is not uniform across Indonesia. The process often involves cognitive shifts and identity searches, which make young people particularly vulnerable.

Moderate Islamic education, both in schools and pesantren, is essential to instill the values of tolerance, inclusiveness, and critical thinking. Revitalizing education management and curriculum to emphasize moderation helps prevent radicalism [16], [17], [18], [19]. Organizations such as Muhammadiyah and Nahdlatul Ulama actively promote pluralism, interfaith dialogue, and peaceful coexistence, reject violence, and support educational initiatives that encourage moderation [20], [21].

Recent bibliometric research shows that the adoption of Artificial Intelligence (AI) and deep learning in religious studies, particularly Qur'anic education, is increasing rapidly by 2023, with significant contributions from institutions in the United States, the United Kingdom, and China [22]. This emphasizes the urgency of exploring the role of deep learning not only in text analysis but also as a strategic tool in building religious moderation. Adapting similar methods in religious education has the potential to increase student engagement and facilitate contextualized learning according to their individual needs. Given the challenge of integrating moderation values into the traditional curriculum, this study becomes very urgent to answer the need to produce a generation with a tolerant character as well as technological literacy.

Ideally, religious education is expected to be able to form students who not only master religious knowledge but also have a moderate character and are able to coexist in a pluralistic society. However, in practice, the Islamic Religious Education (IRE) curriculum in many institutions still focuses on classical and rote approaches, making little use of technology for personalization or interactivity [23]. Research on YouTube shows that up to 21% of first recommendations can lead to intolerant videos against religious minorities, even without a prior history of extreme viewing [24]. This risks radicalizing a younger generation that is highly dependent on online content,

While there are bibliometric studies on the integration of deep learning and AI in education, not many studies have thematically examined how deep learning models can be used to build religious moderation in formal and non-formal curriculum [22]. Technology

developers often lack an understanding of pedagogical needs, while policymakers tend to be slow to respond to AI innovations, so collaboration across stakeholders remains fragmented and presents both opportunities and risks for religious life. [25]. While digital platforms can spread radical ideas, strong educational institutions, community engagement, and proactive moderation strategies are key to fostering religious harmony and countering digital radicalization.

The development of AI, especially deep learning, opens up new opportunities in efforts to build a digital ecosystem that supports religious moderation, especially among the younger generation, who are the dominant users of digital platforms. Deep learning, with the ability to analyze complex data and learn from existing patterns, has the potential to be developed as a supporting instrument for religious moderation through various applications such as sentiment analysis of religious content, detection of religion-based hatred, and personalization of moderate religious education content [26], [27].

There is a gap between the existing religious education curriculum and the real needs in the field. Existing curricula often do not cover material that is relevant to the challenges faced by today's youth, such as issues of religious tolerance and moderation. Research shows that the use of deep learning technology can help filter out extreme content and provide contextualized and relevant learning materials [28]. However, the application of these technologies still requires strong collaboration between educators, technology developers, and policy makers to create an inclusive and adaptive learning environment. Recognizing the potential of deep learning in addressing this gap, this study aims to analyze how deep learning technology can be integrated into religious education to promote religious moderation in young people with character.

Overall, this introduction emphasizes the urgency and relevance of research on the integration of deep learning in religious education as an innovative solution to encourage religious moderation in a character-based generation. The gap between ideal conditions and current reality, both in terms of pedagogy and technology, is the main basis for developing a learning model that is not only effective in improving cognitive understanding but also in building moderate attitudes and behaviors rooted in spiritual and social values. Thus, this research is expected to be an important contribution to the development of educational science, strengthening religious moderation, and developing the character of the young generation of Indonesia in facing the challenges of the 21st century. This article proceeds in four parts. The second section elaborates on the qualitative literature review method adopted in this study. The third section presents the findings regarding the integration of deep learning into religious moderation. The fourth section discusses challenges, ethical considerations, and broader

implications for education and technology. The final section provides conclusions and practical recommendations.

Material and Method

This research method uses a qualitative approach in the form of a literature review, where all academic publications related to deep learning, education, and religious moderation are the main data sources. Supporting data were drawn from journals, books, and research reports published within the last five years (2019–2024). The literature search was conducted using the keywords *"deep learning in education"*, *"religious moderation"*, *"character education personalization"*, and *"digital religious content moderation"*. The inclusion criteria were peer-reviewed articles and research reports published in English or Indonesian, while non-peer-reviewed sources, editorials, and articles outside the specified period were excluded.

The initial search identified approximately 92 studies, of which 32 met the inclusion criteria and were analyzed. The research objects focused on deep learning models, mechanisms of religious content moderation, and strategies for personalized character learning. Data were systematically collected by searching and downloading sources in databases such as Scopus, Google Scholar, and then recorded in a literature review sheet that included the title, author, method, and results of each study. Furthermore, the data were analyzed to identify patterns of using deep learning in filtering extreme content, providing contextualized learning materials, and supporting customization of materials as needed, resulting in an applicable technology integration framework for moderate religious education.

Result and Discussion

This literature review synthesizes findings from 32 peer-reviewed studies to identify thematic patterns regarding the potential integration of deep learning in religious moderation education. As this study employs a literature review methodology, the results represent theoretical analysis and reported findings from secondary sources rather than empirically tested outcomes in the specific context of religious moderation education in Indonesia.

A. Overview of Deep Learning Applications in Religious Moderation

The reviewed literature reveals three primary domains where deep learning technologies intersect with religious moderation efforts: (1) content moderation and filtering, (2) personalized learning and curriculum adaptation, and (3) behavioral pattern analysis for early intervention. Table 1 presents a synthesized framework mapping specific deep learning technologies to their potential applications and expected outcomes in the context of religious moderation education.

Table 1. The Framework of Deep Learning Integration in Religious Moderation Education

Deep Learning Technology	Specific Application	Expected Outcome	Sources
Natural Language Processing (NLP) & Sentiment Analysis	Detection of extreme religious rhetoric in online content; analysis of student discourse patterns	Filtering harmful content; early identification of intolerant attitudes	[24], [26], [30]
Adaptive Learning Algorithms	Personalization of religious education materials based on learner profiles and cultural backgrounds	Contextualized learning that respects diversity; improved engagement with moderation concepts	[31], [32], [34]
Recommendation Systems	Curation of moderate religious content; counter-narrative delivery to balance extremist exposure	Reduced radicalization risk; exposure to diverse religious perspectives	[24], [28], [29]
Pattern Recognition & Predictive Analytics	Analysis of learning behaviors and engagement patterns with religious content	Early detection of misunderstanding or intolerance; targeted pedagogical intervention	[33], [35]
Computer Vision & Multimodal Analysis	Detection of extremist symbols, hate imagery, or divisive visual content	Comprehensive content moderation beyond text; protection from visual radicalization	[26], [27]

This framework demonstrates that deep learning technologies offer a multi-layered approach to supporting religious moderation, ranging from reactive content filtering to proactive personalized education. However, the literature consistently emphasizes that these technologies must be implemented within broader pedagogical frameworks rather than as standalone solutions.

The integration of deep learning methodologies in the domain of religious content moderation has emerged as an important area of research and application, particularly in the context of online platforms where religious discourse can enrich communities and, conversely, fuel conflict or spread hate speech. The complexity of religious content moderation lies in its nuanced nature of balancing freedom of expression with the prevention of harmful or hateful speech and the inherent technological challenges of accurately identifying such content at scale. Deep learning in eLearning creates personalized experiences and reduces content development costs, offering intuitive algorithms and automated content delivery through modern LMS platforms [29].

Going beyond filtering simple keywords, deep learning offers the ability to understand the context, sentiment, and impact of text, images, and videos, enabling the identification of content that subtly encourages intolerance or extremism. But the application of deep learning in religious content moderation also raises significant ethical and practical questions. Biased

algorithms can inadvertently target specific religious groups, while misclassification can silence legitimate religious expression or fail to identify true threats. Deep learning for religious content moderation, therefore, requires careful consideration of fairness, transparency, and accountability, as well as ongoing collaboration between computer scientists, religious experts, and policymakers.

One of the main challenges in religious content moderation is the diversity of religious interpretations and practices that exist in society. Each religion has different nuances and contexts, which can affect the way messages are delivered and received. Therefore, deep learning models used for content moderation should be able to cater well to this complexity. Research shows that deep learning-based approaches can improve accuracy in detecting potentially harmful content by considering the cultural and social context of the content. For example, algorithms trained with diverse data can be more effective in distinguishing between constructive discussions and hate hidden behind ambiguous language [30]. Therefore, it is important to involve religious experts and sociologists in the development of this model in order to create a fairer and more effective moderation system.

In addition, the application of deep learning in moderating religious content also requires attention to privacy and ethical issues. The use of data to train the model may raise concerns about surveillance and privacy violations. Therefore, it is important to develop clear policies regarding data usage and algorithm transparency. Recent research shows that users are more likely to accept content moderation if they understand how the algorithm works and feel that their data is being used in an ethical way [30]. By creating a transparent and accountable system, such platforms can build user trust and encourage active participation.

B. Potential Benefits and Applications: Evidence from Literature

The reviewed literature suggests several promising applications of deep learning technology in educational contexts that may be relevant to religious moderation efforts. Studies indicate that AI-based personalization can adapt learning content according to individual cognitive needs and cultural backgrounds, potentially supporting more inclusive educational approaches [31], [32]. Kant [31] documented how deep learning algorithms enabled content personalization based on learner profiles, which could theoretically be applied to religious education by identifying patterns in students' understanding of multicultural issues and providing contextually appropriate materials such as case studies or interfaith dialogue simulations.

Research by Bo [33] and Maulidin [34] reported positive outcomes in AI-enhanced learning environments, including improved engagement and more adaptive learning behaviors among students. While these studies focused on general educational applications rather than religious moderation specifically, their findings suggest potential pathways for technology integration

in character education. Maulidin [34] particularly noted that AI-based adaptive learning showed promise in inclusive classroom settings with diverse learner needs, which may have relevance for teaching tolerance and religious diversity.

Furthermore, the literature points to deep learning's capacity to analyze behavioral data and learning patterns, enabling educators to gain insights into student engagement with religious content [35]. This analytical capability could theoretically support the early identification of intolerance or misunderstanding; however, such applications would require careful ethical consideration and have not yet been empirically validated in religious education contexts.

C. Implementation Challenges and Limitations

Despite the potential benefits identified in the literature, multiple studies highlight significant challenges that must be addressed for successful implementation. Algorithm bias emerges as a critical concern across the reviewed sources. Peña-López [36] emphasized that deep learning systems trained on biased or incomplete datasets may inadvertently perpetuate existing prejudices or favor particular perspectives, a particularly sensitive issue when dealing with religious content, where neutrality and fairness are essential.

The digital divide presents another substantial barrier. Several studies note that access to technology and digital infrastructure remains uneven, particularly in remote or economically disadvantaged areas [36], [37]. This disparity could limit the reach of technology-based religious moderation initiatives and potentially exacerbate existing educational inequalities. The literature also identifies gaps in technological literacy among educators, with many teachers lacking the training necessary to effectively integrate AI-based tools into their pedagogical practice.

Data privacy and ethical considerations constitute an additional challenge highlighted across multiple sources. The collection and analysis of student data, especially regarding sensitive topics such as religious beliefs, raises concerns about surveillance, consent, and appropriate use of personal information. The reviewed literature consistently emphasizes the need for transparent policies and ethical frameworks to govern such data practices, though consensus on specific guidelines remains limited.

D. Pedagogical Implications and Integration Strategies

The literature reviewed suggests that successful integration of deep learning in religious moderation education would require a holistic pedagogical approach rather than technology adoption alone. Selwyn [37] argued that AI should complement rather than replace human interaction and critical thinking in educational settings, emphasizing that teacher guidance remains essential for contextualizing religious content and facilitating meaningful dialogue.

Several studies advocate for interdisciplinary collaboration involving educators, technology developers, religious scholars, and policymakers to ensure that AI-based platforms are culturally sensitive, ethically responsible, and pedagogically sound [29], [32]. This collaborative approach would help address concerns about algorithm bias and ensure that technological tools align with educational objectives for religious moderation.

The literature also emphasizes the importance of digital literacy and critical thinking skills as complementary competencies. Rather than passive consumption of AI-curated content, students need guidance in evaluating online information, recognizing potential bias, and engaging thoughtfully with diverse religious perspectives. This suggests that deep learning tools should be embedded within broader character education frameworks that prioritize reflective engagement over automated content delivery.

E. Synthesis and Gaps in Current Knowledge

While the reviewed literature indicates theoretical potential for deep learning applications in religious moderation education, significant gaps remain. Most studies documenting positive outcomes of AI in education focus on general learning contexts rather than the specific challenges of teaching religious tolerance and moderation. The transferability of findings from these general contexts to the culturally and religiously sensitive domain of moderation education has not been empirically established.

Additionally, much of the existing research originates from Western educational contexts, raising questions about applicability to Indonesia's unique religious, cultural, and educational landscape. The literature acknowledges these limitations but provides limited guidance on culturally appropriate adaptation strategies. This gap underscores the need for empirical research that tests deep learning interventions specifically within Indonesian religious education settings, accounting for local cultural values, religious diversity, and institutional capacities.

Conclusion

The analysis reveals that, although deep learning presents promising theoretical applications such as personalized learning, content moderation, and behavioral pattern analysis, there remains a considerable gap between technological potential and practical implementation, particularly within the Indonesian educational context. This suggests that the adoption of such technologies cannot be separated from local challenges encompassing cultural, religious, and infrastructural dimensions. One of the pathways highlighted in the literature is content personalization. AI-based adaptive learning systems demonstrate the capacity to tailor educational materials according to individual cognitive needs and diverse cultural backgrounds. In theory, this approach could foster more inclusive models of teaching that promote religious tolerance and appreciation of diversity. Within Indonesia’s pluralistic

society, content personalization is particularly significant for ensuring that students from various religious traditions feel recognized and accommodated in the learning process.

The literature further identifies the role of content moderation through natural language processing (NLP) and sentiment analysis. These technologies show promise in detecting hate speech and extremist rhetoric that frequently circulates on unregulated digital platforms. Given that younger generations increasingly engage with religious content online, AI-driven content moderation may help mitigate the risks of radicalization while creating safer digital spaces. In this regard, deep learning extends its relevance beyond formal education settings to shaping the broader digital ecosystem of religious discourse. Another dimension addressed is behavioral analytics, specifically the use of pattern recognition to identify early indicators of intolerance or misunderstanding among students. Such early detection could enable more timely and targeted pedagogical interventions.

However, this application also raises significant ethical concerns, particularly regarding privacy and potential over-surveillance of learners. Consequently, the successful use of behavioral analytics in religious moderation education depends on the establishment of clear ethical guidelines and the safeguarding of individual rights throughout the educational process. Despite these promising insights, most of the reviewed studies are situated within general educational contexts and largely originate from Western settings. This raises critical questions about the transferability of findings to Indonesia's unique religious, cultural, and infrastructural landscape. Therefore, the review underscores the need for further research specifically focused on applying deep learning technologies to religious moderation education in Indonesia, ensuring that adoption is not only theoretically relevant but also practically effective and contextually appropriate.

Limitation and Suggestions

The literature consistently identifies substantial barriers to effective implementation. Algorithmic bias emerges as a critical concern, where deep learning systems risk perpetuating existing prejudices or favoring particular religious perspectives if trained on non-representative datasets**,** a particular concern in Indonesia's diverse religious landscape. The digital divide presents another barrier, as uneven access to technology and digital infrastructure, particularly in rural and economically disadvantaged areas, could limit the reach of technology-based initiatives and potentially exacerbate educational inequalities.

Pedagogical integration gaps remain significant, with many educators lacking the training and frameworks necessary to effectively integrate AI-based tools while maintaining the human-centered dialogue and critical thinking essential for religious education. Ethical governance issues also persist, as the collection and analysis of student data regarding

religious beliefs raises concerns about privacy, consent, and surveillance that remain inadequately addressed by current regulatory frameworks.

Conflict of Interest

The authors declare that there is no conflict of interest in the conduct and publication of this research.

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Authors



Julita Lindriany is a doctoral student in the Education Program at Universitas Ahmad Dahlan, Yogyakarta. Her research interests include transformational leadership, Islamic education, educational technology, religious moderation, and the integration of artificial intelligence in character education. In addition to her academic pursuits, she serves as a permanent lecturer at Sekolah Tinggi Ilmu Tarbiyah Muhammadiyah (STITM) Tanjung Redeb, East Kalimantan. Julita actively writes and presents her research at national and international conferences and is committed to promoting moderate, digitally integrated Islamic education in remote and underdeveloped regions of Indonesia. (email: 2437082010@webmail.uad.ac.id).



Prof. Dr. Suyatno, M.Pd.I. is a Professor in the Primary Teacher Education Department, Faculty of Teacher Training and Education, Universitas Ahmad Dahlan (UAD), Yogyakarta. His expertise lies in leadership, character education, philosophy of education, and contextual Islamic education. In addition to teaching and supervising students from undergraduate to doctoral levels, he actively publishes in reputable national and international journals. Prof. Suyatno is involved in collaborative research, serves as a speaker in teacher training and curriculum development programs, and currently focuses on transforming education through value-based and technology-integrated approaches. (email: suyatno@pgsd.uad.ac.id).



Prof. Dr. Dody Hartanto is a Professor in the Guidance and Counseling Program at Universitas Ahmad Dahlan. He specializes in guidance and counseling, with a particular focus on family counseling. He has written numerous reference books and research articles published in national and international journals. As a recognized expert in family counseling, he actively contributes to the advancement of counseling practices through both academic work and professional engagement. (email: dody.hartanto@bk.uad.ac.id).



Maritza Dita Fiorenza Aprilia Putri is an active undergraduate student in the Islamic Guidance and Counseling Program at the State Islamic University Sultan Aji Muhammad Idris (UINSI) Samarinda. Her primary interests include Islamic counseling approaches, value-based character development, and the application of religious moderation in youth education. She is currently building her academic portfolio through research engagement and initiatives that support moderate Islamic education in the digital era. (email: maritzadita0422@gmail.com).



Phasa Amalia Arzetty Putri is an undergraduate student in the Islamic Guidance and Counseling Department at the State Islamic University Sultan Aji Muhammad Idris (UINSI) Samarinda. Her academic focus centers on psychosocial issues in Islamic education, particularly in promoting counseling as a tool for fostering empathy, tolerance, and spiritual well-being among students. Throughout her studies, Phasa has been actively exploring the integration of Islamic values with contemporary character-building strategies relevant to the digital generation. (email: phasa221@gmail.com).