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Religious Moderation As *Counter-Algorithm* In Mitigating Digital Radicalism Within The Madrasah Ecosystem

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Abstract

The rapid development of digital technology and artificial intelligence has fundamentally restructured how religious information is produced, distributed, and consumed. Personalization-based algorithms employed by social media platforms do not merely simplify access to information; they also reinforce confirmation bias through echo chamber mechanisms, thereby increasing students' vulnerability to radical religious narratives. This study aims to analyze the role of religious moderation as a counter-algorithm in mitigating digital radicalism within the madrasah ecosystem. The term counter-algorithm, as conceptualized in this article, refers to a cognition-based mechanism grounded in moderation values that serves to interrupt the deterministic influence of digital algorithms. A qualitative approach using library research and conceptual analysis was adopted, drawing on literature concerning digital algorithms, radicalism, and Islamic education. The review was conducted on sources indexed in SINTA 1–3 and Scopus, published between 2019 and 2026. Findings indicate that religious moderationthrough the values of tawazun, i'tidal, tasamuh, tawassuth, and tabayyun can function as a cognitive mechanism to counterbalance algorithmic influence. Implementation involves curriculum integration emphasizing critical thinking, repositioning teachers as digital navigators, strengthening students' digital literacy, and establishing a moderate digital culture within the madrasah environment.

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Religious moderation thus functions not merely as a normative value but also as an adaptive strategy for building cognitive resilience and mitigating digital radicalism in the era of artificial intelligence.

Keywords: Religious Moderation; Digital Radicalism; Artificial Intelligence; Madrasah; Counter-Algorithm.

INTRODUCTION

There is a scene that has become almost ordinary in Indonesian madrasah today: a student, phone in hand after the Fajr prayer, scrolling through a flood of religious contensermons, opinions, articlenone of which was chosen by his teacher or his parents. Every piece of content was selected by an algorithm. An invisible system that grows smarter with every click, every second of viewing, every share. This is the quiet but consequential reality now facing Islamic educational institutions across the country, and it demands an urgent, thoughtful response.

The rapid development of artificial intelligence has fundamentally altered how people access, process, and form their religious beliefs. We are increasingly dependent on AI that presents content tailored to personal taste through processes that are often invisible to the user. This dependence is not without risk. A national survey by PPIM UIN Jakarta found that the internet has played a significant role in rising intolerance among Generation Z and Millennials: 54.37% of students and university students now rely on the internet as their primary source of religious learning. More troublingly, the research revealed that those with higher internet access tend to hold less moderate views than those without access(Hakim, Fadlillah, and Rofiq 2024). This is not a coincidencit is the predictable outcome of algorithmic design.

Algorithms are not merely filters for information; they are active machines that shape the way people think. With student internet access reaching 84.94%, algorithms can easily draw students into echo chambers that continuously reinforce confirmation bias. In the context of religious education, this is especially dangerous: platforms tend to prioritize content that is provocative and emotionally engaging, regardless of its scholarly validity. The result is a steady diet of one-sided narratives that, over time, erodes the capacity for tolerant and critical thought (Bail et al. 2018) If left unaddressed, this phenomenon will have serious consequences. Students may be physically present in a peaceful educational environment, yet mentally they are being quietly shaped by algorithms that push them toward a sense of absolute certaint the conviction that they alone possess the truth. Madrasah must therefore build a strong ecosystem to ensure

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that students' worldviews remain on a moderate and tolerant path, even as they are immersed in a flood of digital information that is difficult to dam (Widiana et al. 2025); Aziz, Rabi'ah, and Ihromi 2023).

The problem grows more complex with the emergence of generative AI capable of producing religious content at extraordinary speed content that looks authoritative and convincing but may have no verified scholarly foundation whatsoever. The risk of narrative manipulation and the reinforcement of extreme ideologies rises sharply when persuasively packaged misinformation gains psychological legitimacy simply because it sounds right (Hadi and Suroyya 2026). Faced with this situation, we cannot simply prohibit the use of technology. What is needed is a genuinely educational response: the strengthening of algorithmic literacy. And this is precisely where religious moderation enters as a practical solution.

In this article, religious moderation is positioned as a counter-algorithm a conceptual construction referring to a cognition-based mechanism grounded in moderation values to interrupt the deterministic influence of digital algorithms. The values of moderation thus become a balancing tool to resist algorithmic tendencies to narrow the mind and fragment communities. Prior studies have addressed moderation and radicalism prevention(Widiana et al. 2025), digital technology and Islamic education (Hakim, Fadlillah, and Rofiq 2024), and moderation in the digital age (Mubarok and Sunarto 2024)but none has explicitly constructed moderation as an operationally defined counter-algorithm. This article addresses that gap. Through the sections that follow, it maps connectivism, constructivism, and social learning theory as foundational lenses, then builds a model in which Islamic moderation values function as a counter-algorithmic cognitive system within the madrasah ecosystem offering a concrete contribution to Islamic education scholarship and practice in the age of artificial intelligence.

OVERVIEW OF CONNECTIVISM

Modern-day learning is increasingly taking place through network connections, as people exchange skills, information, and viewpoints across digital platforms at a scale and speed that previous generations could not have imagined. Connectivism, proposed by (Siemens 2005) and (Downes 2010), is a learning theory purpose-built for this digital age. It posits that knowledge does not reside solely within the individual mind but is distributed across nodes in a network whether those nodes are people, databases, or digital systems. Learning, in this framework, is the act of traversing and strengthening connections between those nodes (Goldie 2016)

Pragmatists view learning as the result of an interplay between thought and practice

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(Siemens 2008). The internet has irrevocably expanded the boundaries of where and how this interplay occurs. Yet connectivism also reveals a critical vulnerability: when personalization algorithms act as silent gatekeepers deciding which nodes are most visible and which are buriedthey do not merely shape what students encounter. They shape what students believe is worth encountering. For madrasah students, the implication is urgent: they are already embedded in vast digital learning networks through their devices, and the quality of what they learn depends heavily on which sources and which curators they have been algorithmically taught to trust. Religious moderation, as a counter-algorithm, reclaims that curatorial function for human judgment, scholarly authority, and ethical values (Kropf 2013).

OVERVIEW OF CONSTRUCTIVISM

According to constructivism, people learn not through passive reception of transmitted facts but through active engagement with experience and reflection. Drawing from the foundational work of Piaget and Vygotsky, constructivism asserts that learners actively build their own understanding by connecting new information to existing cognitive schemas(Phillips 1995). By engaging with real-world experiences including digital ones learners do not simply absorb what they see; they interpret and reconstruct meaning through a lens shaped by prior knowledge, cultural context, and social interaction.

In the context of digital religious learning, this constructivist perspective illuminates why echo chambers are so cognitively powerful: they exploit the very mechanism by which human beings learn most naturally. When a student repeatedly encounters algorithmically curated content that reinforces a single religious worldview, they do not just passively accept it they actively construct a reality that increasingly mirrors what the algorithm presents (Tam 2000). This is what makes (Rizqi, n.d.2024) finding so important: digital disruption accelerates the spread of intolerant content precisely because algorithms feed the constructive mechanism of the human mind with a carefully curated diet of one-sided information. Religious moderation, taught constructively through reflection, dialogue, and structured exposure to diverse perspectives can disrupt this self-reinforcing cycle by equipping students to critically examine the schemas their digital environments are quietly building for them (Mvududu 2005).

SOCIAL LEARNING THEORY

Social Learning Theory, most systematically articulated by Bandura (1977), asserts that social behavior is learned primarily through observation, imitation, and modeling. Unlike

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behaviorist theories that focus exclusively on direct reinforcement, Bandura demonstrated that individuals can acquire new knowledge, attitudes, and behaviors simply by observing others a process requiring attention, retention, reproduction, and motivation (Salomon & Perkins, 1998). In the digital ecosystem, the "others" being observed are no longer confined to one's immediate community; they include influencers, anonymous content creators, and algorithmically amplified voices from across the globe, many of whom carry no scholarly accountability whatsoever.

Humans have an extraordinary capacity for social learning that has been central to cultural and cognitive evolution across millennia (Boyd, Richerson, & Henrich, 2016). This adaptive strength, however, is also a vulnerability in the digital age. When social learning is mediated by algorithmic systems that systematically privilege extreme or emotionally charged content, the very mechanisms that once fostered cultural cohesion can become vectors for radicalization. Students in madrasah are not only learning religious doctrine from their teachers; they are simultaneously and often more intensively learning from the digital social environments their platforms construct for them. Without critical thinking skills as a filter, continuous interaction with these algorithms will steadily reinforce narrow ways of thinking that culminate in intolerant attitudes (Hakim et al., 2024; Moskalenko & McCauley, 2021).

THEORETICAL INSIGHT

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CULTURAL EVOLUTION AND PRIMARY EDUCATION

The transmission of values across generations lies at the heart of cultural evolution. The underlying premise is that non-genetic transmission of knowledge, norms, and beliefs what we call culture is the primary mechanism through which human communities adapt to and shape their environments (Boyd, Richerson, and Henrich 2011). Primary and basic education represents the most critical site of deliberate cultural transmission, because it is during these formative years that fundamental cognitive schemas, values, and epistemic habits are established. What a child learns to trust, to question, and to believe at this stage tends to anchor their intellectual and spiritual identity for life.

Within the madrasah as a primary educational institution, the transmission of Islamic moderation values has historically been achieved through direct instruction, lived community norms, and the moral example of teachers. Today, these traditional transmission channels face direct and powerful competition from digital platforms that are engineered to be maximally engaging. (Aziz, Rabi'ah, and Ihromi 2023) showed that unfiltered information flows amplify religious perception conflicts precisely because they bypass the careful, relational process through which moderation values have traditionally been transmitted. Integrating moderation values into the madrasah curriculum at the foundational level is therefore not merely a religious imperative; it is an educational public health measure against digital radicalism. Early exposure to the habits of tabayyun verification before acceptance and tawazun seeking balance before conclusion can significantly buffer against the radicalization effects of algorithmic echo chambers(Hobbs 2020)

HIGHER EDUCATION SHIFT

Several research organizations, including the Pew Research Center and UNESCO, have documented a profound transformation in how higher education institutions engage with digital technology and platform-based learning. The emergence of MOOCs, AI-driven tutoring systems, and algorithmically curated learning pathways has fundamentally altered the relationship between institutions, educators, and learners. For Islamic higher education including postgraduate programs at institutions such as IAIN Ternate this shift carries particular urgency. These institutions are simultaneously preparing teachers and scholars who will guide the next generation in an increasingly algorithmically mediated religious landscape (Daniel 2012).

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This transformation compels a reconceptualization of what it means to be a religious scholar or educator in the digital age. (Hadi and Suroyya 2026) emphasize that although AI opens significant opportunities for pedagogical innovation, it also risks displacing the teacher's authority as the primary source of values, depth of knowledge, and spiritual formation dimensions that no algorithm can replicate. The traditional figure of the Islamic scholar as the accountable transmitter of sacred knowledge now coexists and often competes with algorithmically curated religious content that can reach millions in hours. Islamic higher education institutions must therefore cultivate in their graduates not only religious expertise but the meta-cognitive capacities necessary to navigate, evaluate, and respond to digitally mediated religious environments with both scholarly rigor and pastoral wisdom. Table 1 illustrates how this digital shift is reshaping the key dimensions of the educator's role.

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Table 1. Dimensions of the Digital Shift and Their Implications for Islamic Education

Dimension	Traditional Mode	Digital-Age Challenge
Knowledge Authority	Transmitted by qualified scholars (ulama) through verified chains (sanad)	Competed by AI-generated content with no scholarly accountability
Content Curation	Curated by educational institutions and religious authorities	Curated by engagement-optimizing algorithms, not accuracy
Learner Agency	Guided through structured curriculum and mentorship (murabbi)	Self-directed, shaped by personalized algorithmic feeds
Critical Evaluation	Embedded in traditional fiqh methodology (tabayyun, ijtihad)	Undermined by confirmation bias and echo chamber effects
Community of Learning	Face-to-face, relational, embedded in shared moral norms	Platform-mediated, dispersed, vulnerable to filter bubbles
Counter-Strategy	Direct instruction in moderation values (wasatiyyah)	Operationalizing moderation as a cognitive counter-algorithm

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SOCIAL LEARNING THEORY - ACADEMIC PERSPECTIVE

A learning theory is described as a collection of constructs that links observed changes in behavior with what is assumed to cause those changes(Driscoll and Burner 2005) . From an academic perspective, Social Learning Theory occupies a pivotal position at the intersection of behaviorism, cognitive psychology, and sociocultural theory. It insists that learning is inherently relational: shaped by the models we observe, the communities we inhabit, and the feedback we receive from our social environments(Salomon and Perkins 1998). In the digital ecosystem, this relational dimension has been dramatically expanded and dramatically distortedby algorithmic amplification.

In academic research on digital radicalization, Social Learning Theory provides the most direct explanatory framework. When students observe peers sharing radical religious content, when influencers model exclusivist interpretations of Islam, and when platforms algorithmically amplify these models while suppressing moderate alternatives, the conditions for social learning of radicalism are structurally in place. This is precisely what (Rizqi 2024) found: digital disruption accelerates the spread of intolerant content through the social imitation mechanisms that Bandura identified. Yet the same theory also illuminates the pathway of counter-intervention. Just as radicalism can be modeled and learned, so too can moderation. Teachers, scholars, and community leaders who actively and visibly model the values of tawassuth and tabayyun in digital spaces create counter-models that compete directly with algorithmic amplification of extreme voices (Moskalenko and McCauley 2009)

The academic literature also underscores the importance of self-efficacy the belief in one's own capacity to evaluate and respond to information critically (Carver and Scheier 2001). Students who genuinely believe they possess the cognitive tools to critically evaluate digital religious content are significantly more resilient to algorithmic manipulation than those who approach digital information passively. This insight reinforces the centrality of constructivist pedagogy in the madrasah: students must not only be told what moderation means; they must actively practice it through verification, balance-seeking, and tolerant engagement until these become genuine habits of mind rather than memorized norms.

CONNECTIVISM'S IMPLICATIONS FOR TEACHING AND LEARNING

Digital radicalism is fundamentally a phenomenon of networked learning gone wrong: students are learning from the wrong nodes, curated by algorithms rather than by scholarly discernment. Connectivism's implications for madrasah teaching and learning therefore center on

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reclaiming curatorial agency. The specific implications are as follows:

1. Madrasah institutions must take an active role in shaping the digital networks to which students are connected, rather than leaving network formation to commercial platform algorithms. This includes curating trusted digital resources, fostering connections with credible Islamic scholars and educators online, and establishing institutional digital channels that model moderate religious discourse (Kathleen Dunaway 2011;Garcia, Brown, and Elbeltagi 2012);
2. The role of the teacher as digital navigator cannot be overstated. Within a connectivist framework, the madrasah teacher must guide students to identify high-quality nodes of knowledge, recognize algorithmically amplified misinformation, and build networks that reflect the diversity of legitimate Islamic scholarship rather than the monoculture of algorithmic echo chambers.(Syahputra 2025)) confirms that PAI teachers who actively guide students in navigating digital content demonstrably reduce students' vulnerability to radical narratives (Siemens 2008);
3. Curriculum design must explicitly account for the architecture of the platforms through which students learn. Integrating counter-algorithmic awareness teaching students to recognize how filter bubbles and echo chambers are constructed and how to deliberately seek alternative perspectives adds a critical dimension to Islamic education that traditional curricula have not yet addressed. This is not a replacement for traditional religious instruction; it is its necessary extension into the digital age(Kropf 2013;Couros 2009);

When properly trained in connectivist digital literacy, students themselves become counter-algorithmic nodes in their social networks actively disrupting the spread of radical narratives by modeling the habits of verification, balance-seeking, and tolerant engagement that the counter-algorithm framework demands(Williams, Karousou, and Mackness 2011).

CONNECTIVISM'S IMPLICATIONS FOR TEACHING AND LEARNING

If connectivism tells us about the network architecture of digital learning, constructivism tells us about the internal cognitive process through which students build or rebuild their religious understanding. The constructivist implications for madrasah practice are concrete and actionable as follows::

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1. Inspire and recognize students' existing capacity for critical thought. Begin by acknowledging and building upon the epistemic habits students already bring from their family and community contexts, before introducing the more demanding skills of digital source evaluation and algorithmic awareness. Students who feel their existing knowledge is respected are more receptive to having it constructively challenged(Naylor and Keogh 1999);
2. Use authentic and varied materials including real examples of algorithmically amplified religious content, case studies of digital radicalization, and comparative analyses of moderate and extreme religious narratives. (Muis et al. 2025) demonstrate that integrating AI literacy into Islamic education curricula, when done with concrete and meaningful examples, significantly strengthens students' capacity for critical religious reasoning in digital contexts(Mvududu 2005);
3. Elicit students' prior conceptions of digital information and religious authority before formal instruction. Understanding what students already believe about why they see certain content online and whether they trust algorithmically curated religious sources is essential to designing learning experiences that genuinely shift cognitive schemas rather than simply adding new information on top of old assumptions (Phillips 1995);
4. Motivate students to engage in dialogue with their teachers and with each other about digital religious content they encounter. (Widiana et al. 2025) found that the high prevalence of religious hoaxes is driven by low verification literacy; collaborative sense-making in a structured, moderation-valuing environment directly addresses this gap by modeling the tabayyun-based verification that the counter-algorithm framework demands(Bereiter, 1994);
5. Empower students to become active producers as well as critical consumers of digital religious content. Constructivist learning is most powerful when students create, share, and receive feedback on their own contributions, thereby developing both the skills and the confidence of counter-algorithmic agency. This directly operationalizes the tawazun and i'tidal values as lived practices rather than memorized principles(Van den Bossche et al. 2011);
6. Encourage students to encounter perspectives that challenge their initial conceptions including the rich diversity of mainstream Islamic scholarship and guide structured reflection on how their understanding has evolved. This is the constructivist analog of tasamuh (tolerance), and it lies at the heart of the counter-algorithm framework

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proposed in this article. (Hakim, Fadlillah, and Rofiq 2024) confirms that integrating moderation as a curriculum-wide thinking skill, not merely a standalone subject, produces the most durable results.

DISCUSSION

A teacher's role in the madrasah of the digital age extends far beyond transmitting religious content. It encompasses assisting students in constructing learning pathways that are genuinely resilient against algorithmic manipulation. The three theoretical frameworks examined in this article connectivism, constructivism, and social learning theory converge on a single, urgent insight: in digitally mediated learning environments, the architecture of how information is encountered is as educationally significant as the content of the information itself. Algorithms are not neutral conduits; they are active pedagogical agents that shape what students learn, believe, and feel about their religion.

The counter-algorithm framework proposed here operationalizes Islamic moderation values as a structured cognitive response to this challenge. Tawazun (balance) counteracts the filter bubble by actively compelling the student to seek diverse perspectives before forming conclusions. Tabayyun (verification) functions as an internal data validation process the human equivalent of the quality check that algorithms bypass in their pursuit of engagement. Tasamuh (tolerance) expands the cognitive space to receive and fairly evaluate perspectives that the algorithm would never surface. I'tidal (justice) calibrates evaluation against a standard of proportionality, preventing drift toward either extreme. And tawassuth (the middle path) provides the overarching orientation that protects against ideological radicalization. These five values, taken together, do not merely prescribe what to believe; they prescribe how to think (Widiana et al. 2025)

The evidence consistently shows that moderation values are most effective as anti-radicalization tools when they are lived and practiced institutionally, not merely taught didactically. (Setyaningsih et al. 2025) found that radicalism develops precisely in the gaps of systemic weakness when tolerance values are not deeply internalized. (Syahputra 2025) confirmed that PAI teachers who actively model verification and balance-seeking in digital contexts produce measurably more resilient students. And (Hadi and Suroyya 2026) demonstrated that while AI opens significant pedagogical opportunities, the role of the teacher as murabbi the moral exemplar who integrates knowledge with character remains irreplaceable. The madrasah institution, with its centuries of tradition in forming both knowledge and character, is uniquely

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positioned to be the site where counter-algorithmic resilience is built.

Moreover, the generative AI dimension of this challenge deserves specific attention. As AI systems become capable of producing religious content indistinguishable from human scholarship, the Islamic tradition's deep insistence on sanad verified, accountable chains of knowledge transmission becomes not a relic of the past but a prescient solution for the present. The traditional Islamic emphasis on knowing who said something, on what authority, and through what chain of transmission, is in effect a pre-digital counter-algorithm against the epistemic chaos of AI-generated religious content (Hakim, Fadlillah, and Rofiq 2024). Madrasah that cultivate this tradition of epistemic accountability are building precisely the cognitive infrastructure their students need to navigate the age of artificial intelligence.

CONCLUSION

The rapid development of digital technology and artificial intelligence has transformed the landscape of religious information consumption through personalization algorithms that risk trapping madrasah students in filter bubbles and echo chambers. These mechanisms do not merely limit what students see; they actively shape what students think, believe, and feel often without their awareness. At the same time, they risk displacing scholarly religious authority in favor of instant, unverified digital content. Facing this challenge, religious moderation must be reconceptualized as a counter-algorithm: a mental operational system grounded in the values of tawazun, i'tidal, tasamuh, tawassuth, and tabayyun that functions as a cognitive defense mechanism, enabling students to filter, evaluate, and critically respond to the flow of digital information.

This reconceptualization demands systemic transformation: the strengthening of critical-thinking-based curricula, the redefinition of the teacher's role as digital navigator who guides students through the complexities of digital space, and the development of students' metacognitive digital literacy so that they are no longer passive objects of algorithmic manipulation. By making religious moderation both the foundation and the strategy for engaging with technological challenges, madrasah can play a strategic role in producing Muslim graduates who are not only digitally capable but deeply committed to the inclusive, moderate, and humane values of Islamic tradition. This is the contribution that Islamic education is uniquely positioned to offer in the age of artificial intelligence.

FUTURE DIRECTIONS

Evaluation of the significance of different activities and interventions in counter-

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algorithmic religious education should be a priority in future research. Specifically, empirical studies including quasi-experimental designs, longitudinal ethnographies, and mixed-methods field studies are needed to test whether madrasah students who receive explicit instruction in the counter-algorithm framework demonstrate measurably greater resilience to digital radicalization. The development and validation of moderation-based digital literacy assessment instruments that educators can apply practically within the madrasah curriculum represents another urgent research priority.

Comparative studies across different national contextsincluding Muslim-minority settings in Western countries where madrasah operate under very different social and digital conditionswould enrich the generalizability of this framework. Research on the specific role of generative AI in reshaping religious authority, and the conditions under which Islamic institutions can reclaim epistemic leadership in algorithmically mediated environments, represents a particularly fertile and urgent frontier. Finally, policy-oriented research that translates the counter-algorithm framework into actionable Ministry of Religious Affairs guidelines for curriculum development would bridge the gap between conceptual scholarship and institutional practice ensuring that the insights of this article reach the classrooms and communities where they are most needed.

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