

REFLECTIVE PEDAGOGICAL MEDIATION AND VALUE FORMATION IN DIGITAL ISLAMIC EDUCATION: LONGITUDINAL EVIDENCE FROM RELIGIOUS ATTITUDE DEVELOPMENT

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ABSTRACT

Research on digital learning in Islamic education has predominantly emphasized short-term instructional outcomes, providing limited understanding of how digitally mediated learning influences students' religious attitudes over time, particularly in non-Western educational contexts. Moreover, the pedagogical processes through which digital environments facilitate value internalization remain underexplored. This study investigated the longitudinal development of students' religious attitudes in digital Islamic education, with particular attention to the role of reflective pedagogical mediation. Employing a quantitative longitudinal quasi-experimental design, the study followed 120 madrasah students across three measurement points: initial, midpoint, and final. Data were collected using a validated 18-item Likert-scale questionnaire and analyzed through repeated measures ANOVA and independent-samples *t*-tests. The findings revealed a significant and gradual improvement in students' religious attitudes throughout the study period. Students who experienced digitally mediated learning supported by reflective and value-oriented pedagogy demonstrated greater attitudinal gains than those exposed to more instructional, non-reflective approaches. Although positive changes were sustained over time, the rate of improvement slowed during the later stages of the intervention. These findings suggest that the educational value of digital learning depends less on technological exposure itself than on pedagogical processes that promote reflection and engagement with religious values. The study contributes longitudinal evidence to the emerging field of digital religious education by identifying reflective pedagogical mediation as a mechanism associated with sustained value formation and offers practical insights for aligning digital innovation with the broader aims of moral and religious development.

Keywords: Digital Religious Education, Longitudinal Research, Pedagogical Mediation, Reflective Pedagogy, Religious Attitudes, Value Formation

INTRODUCTION

The rapid expansion of digital technologies has fundamentally reshaped educational practices worldwide, transforming how knowledge is accessed, delivered, and experienced (Sheikh & Nath, 2026). Across diverse educational settings, digital learning environments are increasingly promoted for their potential to enhance flexibility, interaction, and access to educational resources (Alenezi et al., 2023; Zou et al., 2025). These developments have intensified global discussions regarding the broader purposes of education in technologically mediated societies, particularly concerning the extent to which digital innovation supports not only academic achievement but also students' moral, ethical, and value development (Barragán-Giraldo et al., 2026). Within this context, questions surrounding the relationship between digital learning and value formation have become increasingly relevant, especially in educational traditions that explicitly emphasize character and religious development.

In Islamic education, the integration of digital learning presents both opportunities and challenges. Digital platforms are increasingly utilized to facilitate access to Islamic knowledge, support religious discussions, and diversify instructional practices (Muslim, 2024; Sanusi, 2024; Wajdi et al., 2025; Sadik et al., 2025). However, the goals of Islamic education extend beyond the transmission of religious knowledge to encompass the cultivation of religiosity, ethical awareness, and appropriate conduct (Afandi & Zurqoni, 2026; Herlina et al., 2025; Basri et al., 2026). The concepts of *tarbiyah* and *adab* emphasize that educational development occurs gradually through guidance, habituation, reflection, and meaningful engagement with values (Al-Attas, 1993). From this perspective, students' religious attitudes cannot be understood merely as immediate instructional outcomes but rather as developmental processes shaped through sustained pedagogical interactions. Consequently, understanding how digital learning contributes to the internalization of religious values has become an important concern within contemporary Islamic education.

Despite increasing scholarly attention to digital learning, existing research has predominantly focused on short-term instructional outcomes, including cognitive achievement, learning motivation, and student engagement (Tamim et al., 2011; Schmid et al., 2014; Almazroui, 2023; Assalihee et al., 2024; Kunthi et al., 2025). While these dimensions represent important indicators of educational effectiveness, they provide limited insight into how digital learning supports the formation of religious attitudes over time. Moreover, prevailing technology-oriented frameworks primarily explain technology integration or acceptance but offer limited guidance regarding the pedagogical processes through which values become internalized. Similarly, research on digital religion demonstrates that digital media influence religious experiences and identity formation (Campbell, 2017; Sahin, 2018), yet often does not specify how these dynamics unfold within formal educational settings. Existing studies also rely heavily on cross-sectional designs that capture outcomes at a single point in time, providing limited understanding of the developmental trajectories through which religious attitudes emerge and stabilize (Franck & Thalén, 2018; Anand & Krishnan, 2026). Consequently, two important gaps remain insufficiently addressed: the lack of understanding regarding the pedagogical mechanisms through which digital learning shapes religious attitudes and the scarcity of longitudinal evidence concerning value formation in digital religious education contexts.

To address these gaps, this study adopts an integrated theoretical framework that conceptualizes religious attitude development in digital Islamic education as a pedagogically mediated process of value formation. From a broader educational perspective, Biesta (2015, 2022) argues that education extends beyond qualification to include processes of socialization and subjectification, through which learners develop identities, values, and orientations toward the world. Within Islamic educational philosophy, the concepts of *tarbiyah* and *adab* similarly emphasize that religiosity develops gradually through guidance, habituation, and the internalization of ethical dispositions rather than through the acquisition of knowledge alone (Al-Attas, 1993). Empirical studies in religious education further demonstrate that educational experiences contribute significantly to the formation of students' religious identities and attitudes over time (Yusuf & Sterkens, 2015). At the same time, scholarship on digital religion suggests that digital environments are not neutral channels of information delivery but social spaces that shape how individuals engage with, interpret, and negotiate religious meanings and practices (Campbell, 2017; Sahin, 2018, 2021). However, the educational implications of these environments depend largely on how they are pedagogically structured. Drawing on Dewey's (1933) theory of reflective thinking, this study proposes that reflective pedagogical mediation, including guided questioning, dialogue, and value-oriented reflection, is an important mechanism by which digital learning experiences may foster the sustained development of

religious attitudes. Accordingly, digital learning is conceptualized not as an independent determinant of religious outcomes but as a pedagogical resource whose influence on students' religious attitudes is shaped by processes of reflection and value engagement.

Responding to these theoretical and empirical gaps, this study investigates the longitudinal development of students' religious attitudes within digitally mediated Islamic education, with particular emphasis on the role of reflective pedagogical mediation. By integrating perspectives from educational theory, Islamic educational philosophy, digital religion scholarship, and reflective pedagogy, this study contributes to emerging discussions on digital religious education in three ways. First, it provides longitudinal evidence concerning the development and stabilization of students' religious attitudes in digitally mediated learning environments. Second, it advances understanding of reflective pedagogical mediation as a potential mechanism linking digital learning experiences with value internalization processes. Third, it offers contextually grounded insights from the madrasah setting that may inform broader debates regarding the role of pedagogy in aligning digital innovation with the moral and character-building aims of education.

METHOD

This study employed a quantitative longitudinal quasi-experimental design to investigate changes in madrasah students' religious attitudes within digitally mediated Islamic education. Three waves of data collection were conducted at pre-test (T1), midpoint (T2), and post-test (T3) to capture both developmental trajectories and potential stabilization effects over time (Menard, 2002; Singer & Willett, 2003; Farrington, 2016; Willeboordse et al., 2022). The study involved 120 students from three public Islamic senior secondary schools (MAN Kotawaringin Timur, MAN Kota Palangka Raya, and MAN Kapuas), selected based on comparable digital infrastructure and institutional commitment to digital learning implementation. Participants were recruited through purposive sampling to ensure sustained participation throughout the study period (Hajaroh & Dwiningrum, 2023). Students were assigned to two intact-class learning conditions: (1) a reflective pedagogical digital learning group and (2) an instructional digital learning group. The intervention was implemented through a madrasah-based Learning Management System (LMS) incorporating instructional videos, interactive digital modules, and teacher-moderated online discussions aligned with the national Islamic education curriculum. Learning activities were conducted for 90–120 minutes weekly. Consistent with Dewey's (1933) theory of reflective thinking, the reflective condition emphasized guided questioning techniques, engaging participants in value-oriented dialogue, and encouraging case-based reflection as central components of the learning process. In contrast, the instructional condition primarily concentrated on content delivery, with little to no structured opportunities for reflection or interactive questioning, thereby highlighting the differences in pedagogical approach.

Religious attitudes are conceptualized as a multidimensional construct comprising cognitive, affective, and behavioral components. Specifically, this construct encompasses three distinct dimensions: (1) religious belief, which pertains to the cognitive acceptance and internalization of Islamic teachings; (2) religious appreciation, reflecting affective engagement, personal valuation, and emotional connection to religious principles; and (3) religious behavior, indicating the outward enactment and practice of religious values in everyday activities. This comprehensive conceptualization aligns with established frameworks used in attitudinal measurement within value-based educational contexts (DeVellis, 2017). The operationalization of this construct, including detailed measurement procedures, is presented in Table 1.

Table 1. Operationalization of Religious Attitudes Construct

Dimension	Definition	Indicators	Number of Items
Religious Belief	Cognitive acceptance of Islamic teachings and principles	Understanding of Aqidah, belief in Islamic values, acceptance of teachings	6
Religious Appreciation	Affective engagement and personal valuation of religious teachings	Feeling of closeness to religion, valuing Islamic teachings, reflection	6
Religious Behaviour	Behavioral enactment of Islamic values in daily life	Practice of worship, moral conduct, application of values	6

Table 1 details the operational definitions of the three dimensions of religious attitudes examined in this study. Religious Belief focuses on the cognitive domain, encompassing understanding and acceptance of Islamic teachings and aqidah (6 items). Religious Appreciation captures the affective dimension through emotional engagement, personal valuation of religious teachings, and reflective practices (6 items). Religious Behavior represents the behavioral component, emphasizing the enactment of Islamic values in daily life, including worship and moral conduct (6 items). This multidimensional operationalization enabled a comprehensive assessment of students' religious development across cognitive, emotional, and practical domains.

Data were collected using an 18-item self-report Likert-scale questionnaire with response options ranging from 1 (strongly disagree) to 5 (strongly agree). Content validity was established through expert review involving specialists in Islamic education and educational measurement, while exploratory factor analysis demonstrated acceptable construct validity, with all items exhibiting factor loadings above .50. Reliability testing indicated satisfactory internal consistency across dimensions (Cronbach's $\alpha = .82-.87$; overall $\alpha = .89$), supporting the instrument's suitability for longitudinal investigation (DeVellis, 2017).

Data were analyzed using repeated measures ANOVA to examine within-subject changes in religious attitudes across the three measurement points and independent-samples *t*-tests to compare gains between the two pedagogical conditions. Prior to hypothesis testing, statistical assumptions were evaluated to ensure analytical robustness. Normality was assessed using the Shapiro-Wilk test and visual inspection of Q-Q plots, whereas homogeneity of variance was examined using Levene's test. The assumption of sphericity was evaluated through Mauchly's test, and Greenhouse-Geisser corrections were applied where violations occurred. Bonferroni-adjusted post hoc comparisons were conducted to identify differences between T1-T2, T2-T3, and T1-T3. To enhance interpretive transparency, effect sizes were reported using eta squared (η^2) for within-subject effects and Cohen's *d* for between-group comparisons, accompanied by 95% confidence intervals for mean differences (Garg et al., 2020). Although advanced longitudinal approaches such as growth curve modeling and linear mixed-effects models can provide deeper insights into individual variation over time, repeated measures ANOVA was deemed suitable for this study due to its robustness and simplicity. The primary aim was to identify overarching patterns of change and stabilization within a carefully balanced longitudinal design that included complete observations for all participants (Singer & Willett, 2003). This approach allowed for effective analysis of the data while maintaining interpretability, especially given the study's focus on detecting general trends rather than detailed individual trajectories.

RESULTS AND DISCUSSION

Longitudinal Development of Students' Religious Attitudes

To examine changes in students' religious attitudes over time, descriptive and inferential analyses were conducted across three measurement points: pre-test (T1), midpoint (T2), and post-test (T3). Table 2 presents the descriptive statistics of students' religious attitudes across the three waves of data collection. The results show a progressive increase in mean scores, rising from 3.42 (SD = 0.51) at T1 to 3.67 (SD = 0.48) at T2 and 3.89 (SD = 0.46) at T3. In addition, standard deviations decreased slightly across measurement occasions, indicating reduced variability in students' responses over the study period.

Table 2. Descriptive Statistics of Students' Religious Attitudes at Three Measurement Points

Measurement Time	Mean (M)	Standard Deviation (SD)
Start (T1)	3.42	0.51
Midpoint (T2)	3.67	0.48
End (T3)	3.89	0.46

As shown in Table 2, students' religious attitudes exhibited a consistent upward trend across the three waves of data collection. The mean score increased progressively from 3.42 (SD = 0.51) at T1 to 3.67 (SD = 0.48) at T2, and further to 3.89 (SD = 0.46) at T3. The slight decrease in standard deviation over time suggests decreasing response variability, indicating the intervention may have led to more uniform positive shifts in religious attitudes across the sample. Figure 1 shows students' religious attitude changes across three measurement points.

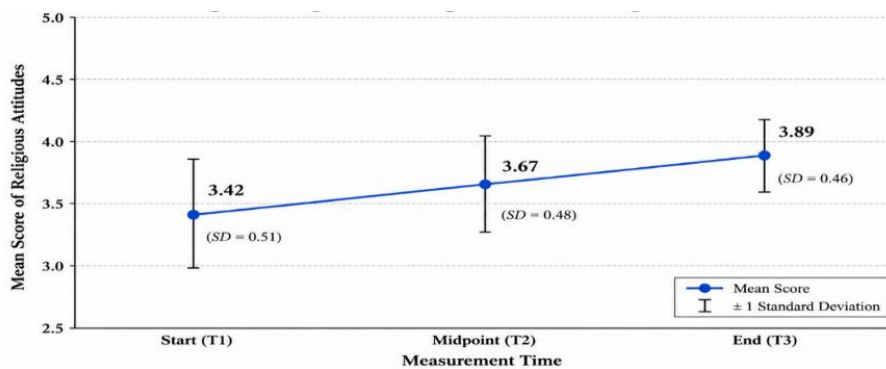


Figure 1. Trajectories of Religious Attitude Development Across T1, T2, and T3

Figure 1 clearly illustrates the steady improvement in religious attitudes over the study period. The line graph reveals a consistent upward trend, with the most significant increase between T1 and T2. This pattern supports the effectiveness of the digitally mediated Islamic education in promoting sustainable development in students' religious attitudes. The figure shows a continuous rise in mean religious attitude scores from T1 to T3, indicating ongoing progress. The repeated-measures design captures developmental changes over time, not just pre-post comparisons.

To assess if the changes were significant, a repeated measures ANOVA was conducted after confirming normality and sphericity. Table 3 shows the ANOVA results regarding students' religious attitudes.

Table 3. Repeated Measures ANOVA Results for Students' Religious Attitudes

Source of Variation	df	F	p-value	Effect Size (η^2)
Time	2, 118	9.34	< .001	.14

As presented in Table 3, there was a significant effect of time on students' religious attitudes, $F(2, 118) = 9.34, p < .001, \eta^2 = .14$. According to conventional benchmarks, this effect size indicates a moderate magnitude of change, suggesting that variation in religious attitudes across the three measurement points was substantial.

To identify the specific time intervals in which changes occurred, Bonferroni-adjusted pairwise comparisons were performed. The results revealed significant increases in religious attitudes between T1 and T2 ($p < .05$) and between T1 and T3 ($p < .05$). Although the mean score at T3 remained higher than that observed at T2, the difference between these latter measurement points did not reach statistical significance ($p > .05$). These findings indicate that the largest improvements in religious attitudes occurred during the earlier phases of the intervention, whereas subsequent changes were comparatively smaller.

Overall, the results demonstrate that students' religious attitudes changed significantly across the study period and followed a pattern characterized by progressive improvement over time. The combination of increasing mean scores and statistically significant differences across measurement points provides evidence that religious attitudes were responsive to the educational experiences implemented throughout the intervention period.

Reflective Pedagogical Mediation and Differences in Attitudinal Development

To examine whether different pedagogical approaches within digitally mediated learning environments were associated with distinct patterns of religious attitude development, gain scores were calculated by subtracting pre-test (T1) scores from post-test (T3) scores for each participant. Table 4 presents the descriptive statistics and comparative analysis of gain scores across the two instructional conditions.

Table 4. Comparison of Mean Gain Scores Between Learning Conditions

Learning Condition	Mean Gain	SD	<i>t</i>	df	<i>p</i>	Cohen's <i>d</i>	95% CI
Reflective pedagogical digital learning	0.54	0.21	4.87	118	< .001	0.89	[LL, UL]
Instructional digital learning	0.31	0.19					

According to Table 4, students who participated in reflective pedagogical digital learning exhibited higher mean gains in religious attitudes ($M = 0.54, SD = 0.21$) than those who participated in instructional digital learning without structured reflective activities ($M = 0.31, SD = 0.19$). Moreover, an independent-samples *t*-test revealed a statistically significant difference in mean gain scores between the two learning conditions, $t(118) = 4.87, p < .001$. The magnitude of this difference was substantial, as indicated by a large effect size (Cohen's $d = 0.89$). The confidence interval further supported the stability of the observed group difference. These findings indicate that students in the reflective pedagogical condition exhibited greater improvements in religious attitudes over the study period compared with students participating in more instructional forms of digital learning.

To further examine patterns of change over time, Figure 2 presents the trajectories of religious attitude scores across the three measurement occasions for each learning condition. Both groups demonstrated increases in mean scores from T1 to T3; however, the reflective pedagogical group exhibited steeper gains across successive measurement points. Although the two groups began with relatively similar levels of religious attitudes at T1, differences became increasingly apparent at T2 and remained evident at T3. This pattern suggests that variations in religious attitude development were observable throughout the intervention period rather than emerging solely at the final stage of measurement.

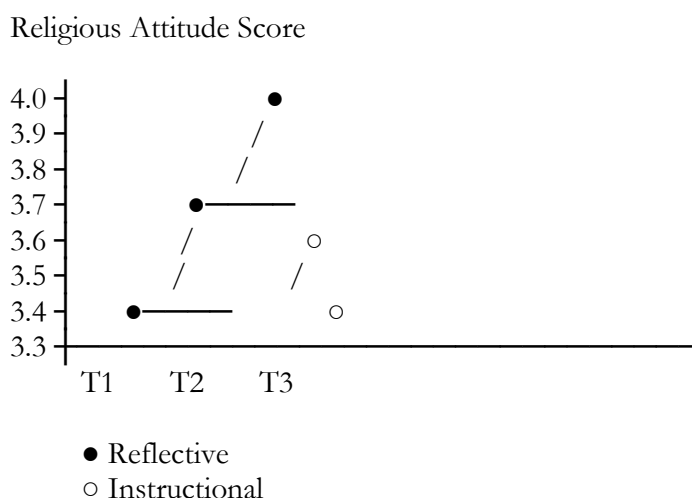


Figure 2. Comparative Longitudinal Trajectories of Religious Attitudes by Learning Condition

To further illustrate patterns of attitudinal development across instructional conditions, Figure 2 presents the comparative trajectories of religious attitude scores among students participating in reflective pedagogical digital learning and those experiencing instructional digital learning. As shown in the figure, both groups demonstrated positive changes in religious attitudes across the three measurement points (T1, T2, and T3). However, the trajectory of the reflective pedagogical group exhibited a steeper upward trend compared to that of the instructional group. While the two groups appeared to begin with relatively similar levels of religious attitudes at the initial measurement point, differences in the rate of improvement became increasingly evident during subsequent phases of the intervention. By the final measurement occasion, students in the reflective pedagogical condition showed consistently higher levels of religious attitudes than those in the instructional condition.

These visual patterns are consistent with the gain score analysis presented in Table 4, which indicated significantly greater attitudinal improvements among students exposed to reflective pedagogical mediation. The comparative trajectories therefore suggest that differences in pedagogical approaches within digitally mediated learning environments were associated with distinct patterns of religious attitude development over time. Specifically, learning environments incorporating reflective elements appeared to be linked with stronger and more sustained attitudinal gains than those emphasizing primarily instructional forms of digital learning.

Sustainability and Stabilization of Religious Attitude Development

To assess whether the positive changes in students' religious attitudes persisted over an extended period or showed signs of leveling off, Bonferroni-adjusted pairwise comparisons were performed across the three different measurement points. This analysis aimed to identify any significant differences between each phase, highlighting how attitudes evolved or stabilized throughout the intervention process. Special emphasis was placed on measuring the magnitude of change between consecutive phases, providing insights into the intervention's progression and durability. Table 5 thoroughly details the mean differences, significance levels, and effect sizes for each pairwise comparison, offering a comprehensive view of the trends and impact observed at each measurement stage.

Table 5. Pairwise Comparisons of Religious Attitudes Across Measurement Points

Comparison	Mean Difference	<i>p</i> -value	EffectSize (η^2)
T1 –T2	0.25	<.05	.11
T1 – T3	0.47	<.05	.14
T2 – T3	0.08	.083	.03

As shown in Table 5, significant increases in religious attitudes were observed between T1 and T2 and between T1 and T3. The largest improvement occurred during the earlier phase of the study, as reflected in the significant difference between the initial and midpoint measurements (Mean Difference = 0.25, $p < .05$, $\eta^2 = .11$). Similarly, the comparison between T1 and T3 demonstrated a statistically significant increase, indicating that overall improvements in religious attitudes were maintained throughout the study period (Mean Difference = 0.47, $p < .05$, $\eta^2 = .14$).

In contrast, the difference observed between T2 and T3 did not reach statistical significance ($p = .083$), despite a continued increase in mean scores. The mean difference during this interval was comparatively smaller (Mean Difference = 0.08), accompanied by a reduced effect size ($\eta^2 = .03$). These findings suggest that the magnitude of attitudinal change during the later phase of the intervention was less pronounced than that observed during earlier stages.

Overall, the longitudinal findings indicate that improvements in students' religious attitudes were sustained across the duration of the intervention, as evidenced by significant differences between the initial measurement and subsequent time points. At the same time, the comparatively smaller and non-significant changes observed between the midpoint and final measurements suggest a slowing in the rate of improvement during the later stages of implementation. The repeated measurement design employed in this study therefore enabled the identification of not only whether changes in religious attitudes occurred, but also how the pattern of development evolved over time within digitally mediated Islamic education contexts.

The longitudinal results show that students' religious attitudes improved and these gains were sustained throughout the study, as indicated by significant differences between the initial assessment and later time points. However, the smaller and non-significant change between T2 and T3 suggests that the rate of improvement slowed during the later stages of implementation. These findings highlight the importance of repeated measurements to understand not only if change occurs but also how developmental patterns unfold over time in digitally mediated Islamic education.

The findings of this study demonstrate that students' religious attitudes improved progressively across the three measurement points, with the most substantial gains occurring during the transition from the initial phase (T1) to the midpoint (T2), followed by a slower rate of improvement toward the final phase (T3). This pattern suggests that religious attitude development is better understood as a gradual and cumulative process rather than an immediate consequence of instructional exposure. The observed trajectory indicates that value-related outcomes emerge through repeated engagement with learning experiences, allowing students to interpret, negotiate, and internalize religious meanings over time. From a broader educational perspective, these findings support Biesta's (2015, 2022) argument that education extends beyond qualification to encompass processes of socialization and subjectification, through which learners gradually develop identities, values, and orientations toward the world. Consequently, religious attitudes should not be viewed as static outcomes

that can be transformed through isolated interventions, but rather as developmental dispositions shaped through sustained educational experiences.

Within the context of Islamic education, the gradual pattern of attitudinal change observed in this study aligns with the concepts of *tarbiyah* and *adab*, which emphasize continuity, habituation, and reflective engagement in the formation of religious character. Al-Attas (1993) conceptualizes education as a process directed toward the cultivation of proper conduct and the recognition of ethical responsibilities grounded in Islamic values. Similarly, empirical studies have demonstrated that educational experiences play a significant role in shaping students' religious identities and attitudes over time (Yusuf & Sterkens, 2015). The increasing mean scores observed across the three measurement points, accompanied by a slight reduction in variability during the final phase, may therefore indicate a tendency toward more stable and consistent attitudinal orientations among students. At the same time, the moderate effect size ($\eta^2 = .14$) suggests that although digital learning environments may contribute to the development of religious attitudes, they do not fully determine it. Religious attitudes are likely influenced by a broader constellation of factors, including family environments, peer interactions, prior religious experiences, and wider sociocultural contexts. Thus, digital learning should be understood as one component within a larger ecology of value formation rather than as an independent mechanism of religious development.

The findings further reveal that changes in religious attitudes were not uniform across pedagogical conditions. Students participating in digitally mediated learning environments characterized by reflective pedagogical practices demonstrated significantly greater attitudinal gains than those exposed to more instructional, non-reflective approaches. This difference suggests that the educational significance of digital learning depends less on technological exposure itself and more on the pedagogical processes through which learners engage with religious content. Drawing on Dewey's (1933) theory of reflective thinking, activities such as guided questioning, dialogue, and value-oriented discussion may facilitate the transformation of learning experiences into opportunities for meaning-making and self-examination. Reflection, in this sense, functions not merely as a cognitive exercise but as a pedagogical mechanism through which learners connect educational content with their personal beliefs, experiences, and moral commitments. The stronger gains observed among students in the reflective condition therefore provide empirical support for the proposition that pedagogical mediation plays a central role in fostering deeper forms of attitudinal development.

These findings are also consistent with emerging scholarship emphasizing that digital technologies do not automatically generate meaningful educational outcomes, particularly in domains related to values, identity, and character formation. Studies have highlighted that digital learning environments require intentional pedagogical structuring to support reflective engagement and value internalization (Khudarova et al., 2024; Yalvaç Arıcı, 2025). Research in Islamic educational contexts further suggests that digital media may facilitate students' spiritual awareness and provide opportunities to articulate religious and humanitarian values when integrated into ethically grounded educational practices (Haliza et al., 2025; Haliza & Surawan, 2025). However, such outcomes emerge not from technology itself but from the ways in which technology is pedagogically framed and socially enacted. This interpretation resonates with scholarship in digital religion, which conceptualizes digital environments as socially embedded spaces that shape religious experience through interaction and interpretation rather than through technological affordances (Campbell, 2017; Sahin, 2018, 2021). The present findings extend this perspective by demonstrating that within formal educational settings, reflective pedagogical mediation is associated with greater development of religious attitudes over time. Collectively, these results suggest that digital learning contributes to value

formation not through technological determinism but through pedagogical practices that support reflection, dialogue, and sustained engagement with religious values.

The gradual pattern of change observed in this study suggests that students' religious attitudes develop through sustained engagement with educational experiences rather than through isolated exposure to digital content. This finding resonates with sociocultural and constructivist perspectives that conceptualize learning as an active process of meaning-making shaped by interaction, dialogue, and reflection (Vygotsky, 1978; Zajda, 2021). However, the present findings extend these perspectives by demonstrating that the development of value-oriented outcomes requires time to unfold. From Biesta's (2015, 2022) perspective, education encompasses not only qualification but also processes of socialization and subjectification, through which learners gradually form identities, values, and orientations toward the world. The progressive improvements in religious attitudes observed across the three measurement points therefore suggest that value formation is not an immediate consequence of instruction but rather a developmental process that emerges through repeated pedagogical engagement. In this regard, digitally mediated learning environments may function as supportive spaces for reflection and interaction when accompanied by educational practices that encourage learners to connect religious knowledge with their lived experiences.

The longitudinal findings of this study also contribute to the growing body of literature on digital learning by highlighting that attitudinal development may involve phases of growth and stabilization. Previous meta-analytic research has predominantly emphasized short-term outcomes of digital learning, including academic achievement, engagement, and motivation (Tamim et al., 2011; Schmid et al., 2014). By contrast, the present study demonstrates that changes in religious attitudes can be sustained over time, although the rate of improvement may diminish during later stages of implementation. The significant differences observed between T1 and T2, alongside the comparatively smaller changes between T2 and T3, suggest that initial gains may be followed by periods of consolidation rather than continuous acceleration. Such a pattern is consistent with scholarship in religious education emphasizing that the internalization of values occurs gradually through ongoing opportunities for reflection, dialogue, and practice rather than through one-time interventions (Francis & Ziebertz, 2020; Lahmar, 2020; Sahin, 2021). These findings therefore underscore the importance of longitudinal approaches for understanding the temporal dynamics of value formation within educational contexts.

Another important finding concerns the role of pedagogical mediation in shaping attitudinal outcomes. Students exposed to reflective pedagogical practices demonstrated greater improvements in religious attitudes than those participating in more instructional forms of digital learning. Drawing on Dewey's (1933) theory of reflective thinking, this difference may be explained by the capacity of reflective activities to transform educational experiences into opportunities for deeper meaning-making and self-examination. Guided questioning, value-oriented dialogue, and reflective discussion encourage learners to critically engage with ideas, examine their assumptions, and connect abstract principles with personal experience. The stronger gains observed among students in the reflective condition therefore suggest that attitudinal development is supported not merely by access to religious content but by pedagogical processes that facilitate active interpretation and value engagement. This interpretation is consistent with previous studies highlighting the importance of reflection in promoting moral reasoning, ethical awareness, and value-based learning outcomes (Ayers et al., 2020; Chika-James, 2020; Colomer et al., 2020; Bosio, 2023).

The findings further indicate that the contribution of digital learning to the development of religious attitudes depends largely on how digital environments are pedagogically structured. Contemporary scholarship increasingly recognizes that technology

does not function as a neutral or deterministic force in education but acquires educational significance through social interaction and pedagogical practice (Selwyn, 2016; Biesta, 2022). Similarly, studies in religious education caution against equating technological adoption with educational effectiveness, particularly in domains related to identity, values, and character formation (Franck & Thalén, 2018; Buchanan, 2020; Sahin, 2021; Wajdi et al., 2025). Research on digital religion likewise suggests that digital environments shape religious experiences through processes of interaction, interpretation, and negotiation rather than through technological affordances alone (Campbell, 2017; Sahin, 2018). The present study extends these perspectives by demonstrating that, in formal Islamic educational settings, digitally mediated learning is associated with stronger development of religious attitudes when embedded in pedagogical practices that promote reflection and sustained engagement with values. Collectively, these findings suggest that the educational potential of digital learning lies not in technology itself but in its capacity to support pedagogical conditions conducive to long-term processes of value internalization and attitudinal formation.

Taken together, the findings of this study indicate that the contribution of digital learning to students' religious attitude development is associated less with technological exposure itself and more with the pedagogical processes through which technology is implemented. Although digital platforms expand opportunities for access, interaction, and participation, their educational significance appears to depend on whether they facilitate reflective engagement with values and religious meanings. The stronger attitudinal gains observed among students in the reflective pedagogical condition suggest that technology functions primarily as a pedagogical resource whose impact is shaped by instructional design and implementation. This interpretation aligns with perspectives emphasizing that educational technologies acquire meaning through the social and pedagogical contexts in which they are embedded rather than through their technical features alone (Biesta, 2022; Selwyn, 2016). While the present study was conducted within Indonesian madrasah settings, the observed patterns may hold relevance for other value-based educational contexts seeking to integrate digital innovation with broader educational aims related to character and identity formation.

The findings also indicate that attitudinal development may involve periods of stabilization following initial improvement. The reduced magnitude of change observed during the later stages of the intervention suggests that religious attitude formation may follow a non-linear trajectory characterized by phases of growth and consolidation. This interpretation resonates with perspectives on character development and value internalization, which propose that attitudinal change often emerges gradually through repeated practice and reinforcement before reaching periods of relative stability (Lickona, 1991; Datuk, 2020; Surdu et al., 2021). Nevertheless, caution is warranted in interpreting this pattern. Given that the differences between the later measurement points were not statistically significant, the findings should not be regarded as definitive evidence of complete value consolidation. Rather, they provide preliminary indications that the pace of attitudinal development may diminish over time, highlighting the need for continued investigation into the temporal dynamics of value formation.

Several alternative explanations may also account for the observed stabilization pattern. The reduced rate of change may partly reflect ceiling effects associated with increasingly higher scores on the religious attitude scale, thereby limiting the extent of observable improvement during later phases of the study. It is also possible that the novelty of digitally mediated learning diminished over time, resulting in lower levels of engagement as students became more familiar with the instructional environment. Furthermore, repeated exposure to the same measurement instrument across multiple waves may have contributed to response consistency independent of substantive attitudinal change. At the same time, the

persistence of stronger gains among students in the reflective pedagogical condition suggests that pedagogical engagement remains an important factor influencing developmental trajectories even when the overall pace of improvement slows. These considerations underscore the complexity of religious attitude development and suggest that educational outcomes likely emerge through the interaction of pedagogical, social, and contextual influences.

From both conceptual and practical perspectives, the findings emphasize the importance of aligning digital learning practices with pedagogical approaches that promote reflection and value engagement. The comparatively stronger outcomes observed among students participating in reflective learning environments reinforce arguments that educational effectiveness in religious education depends on pedagogical coherence rather than technological sophistication alone (Yusuf & Sterkens, 2015; Metcalfe & Moulin-Stožek, 2021). Similarly, international policy discussions increasingly recognize that sustainable digital transformation requires educational systems to prioritize pedagogical purposes alongside technological innovation. This means not only integrating new technologies but also ensuring that these tools enhance teaching methods, foster critical thinking, and support holistic student development (OECD, 2021; Deroncele-Acosta et al., 2023). The present findings contribute to this ongoing conversation by suggesting that digital initiatives in Islamic education may be more effective when they incorporate opportunities for guided reflection, dialogue, and the application of religious values to students' lived experiences. Such approaches can help bridge the gap between technological advances and meaningful spiritual and moral growth, ultimately promoting a more balanced and impactful educational experience.

Several limitations should be acknowledged when interpreting these findings. First, the quasi-experimental design without random assignment introduces the possibility of selection bias and limits the extent to which causal inferences can be drawn. Second, the absence of a non-digital comparison group restricts conclusions regarding whether the observed changes are attributable specifically to digitally mediated learning rather than to religious instruction more generally. Third, the reliance on self-report measures may be susceptible to social desirability bias, particularly given the sensitive nature of religious attitudes. Finally, the relatively homogeneous sample drawn from Indonesian madrasah contexts may constrain the transferability of the findings to other educational settings. Future research should therefore employ more diverse samples, incorporate mixed-methods approaches, and utilize advanced longitudinal techniques, such as growth curve modeling, to further elucidate the mechanisms by which reflective pedagogical practices influence value formation over time.

Within broader international debates concerning the educational implications of digital transformation, the present study offers empirical support for perspectives that challenge technologically deterministic accounts of educational change. Rather than assuming that the adoption of digital tools will automatically enhance value-oriented outcomes, the findings suggest that the impact of digital learning depends on how technology is pedagogically enacted within particular educational contexts. In line with scholarship emphasizing the socially situated nature of educational technologies (Biesta, 2022; Selwyn, 2016) and research in digital religion highlighting the role of interpretation and interaction in shaping religious experience (Campbell, 2017; Sahin, 2018, 2021), this study indicates that digital learning functions most effectively as part of a broader pedagogical ecology oriented toward reflection, dialogue, and sustained engagement with values. Consequently, efforts to strengthen digital Islamic education should move beyond questions of technological adoption to consider how pedagogical practices can support long-term processes of religious attitude development and value internalization.

CONCLUSION

This study demonstrates that the development of students' religious attitudes within digitally mediated Islamic education occurs as a gradual and ongoing process, unfolding over time through distinct phases of growth and stabilization. It is not an immediate or automatically achieved outcome simply from exposure to instructional content. The findings further indicate that students participating in digitally mediated learning environments supported by reflective pedagogical practices tend to exhibit stronger attitudinal gains. These gains outweigh those seen in students experiencing more traditional, less reflective instructional approaches. This emphasizes the crucial role of pedagogical mediation, specifically reflective and value-oriented teaching methods, in fostering meaningful attitude development and deepening students' engagement with religious and moral principles in a digital learning context. These results suggest that the educational contribution of digital learning extends well beyond merely providing access to technology. It significantly depends on how digital experiences are deliberately structured to promote reflection, encourage dialogue, and deepen engagement with religious values. By offering longitudinal evidence within the specific context of madrasahs, this study enriches ongoing discussions on digital religious education. It advances the idea that the formation of religious attitudes is a pedagogically mediated process that involves the gradual internalization of values over time. The findings highlight the importance for educators and policymakers of not only incorporating digital innovations but also ensuring they are integrated with reflective pedagogical strategies. Such approaches are vital to supporting the broader goals of Islamic education, including character development, fostering religiosity, and cultivating ethical principles, thus contributing to a more holistic and meaningful learning experience within religious settings.

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