Bidayatuna
Vol. 08 No. 01 April 2025
DOI: 10.54471/bidayatuna.v8i1.3298
E-ISSN: 27150232 | P-ISSN : 26212153

Rethinking Religious Influence on Mathematics Learning Behavior: A Mathematical Model of Planned Behavior amid Shifting Educational Paradigms

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Received: November 12, 2025
Revised: December 08, 2025
Accepted: March 28, 2025
Available online: April 26, 2026

To cite this article: Crismono, P. C., Hudi, S., Ilyas. M., Yanuardianto., E., Dahri., H., & Yakoh, M. (2025). Rethinking Religious Influence on Mathematics Learning Behavior: A Mathematical Model of Planned Behavior amid Shifting Educational Paradigms*, Bidayatuna : Jurnal Pendidikan Guru Madrasah Ibtidaiyah 8*(1), 79–98

Abstract

Amid evolving educational paradigms that demand greater inclusivity and cognitive adaptability, this study reexamines the influence of religion on students' mathematics learning behavior through the lens of the Theory of Planned Behavior (TPB). A mathematical model was developed to analyze how religious values moderate the interplay between attitudes, subjective norms, and perceived behavioral control in shaping students' intentions to engage in mathematics learning. The study employed a mixed-methods design, integrating structural equation modeling of survey data with qualitative thematic analysis of interviews conducted in culturally diverse elementary school settings. Findings indicate that religion significantly amplifies the positive effects of motivational and normative constructs on learning intention, particularly among students with strong religious orientations. While religiosity fosters greater discipline and perseverance in mathematical tasks, the study also reveals that certain conservative interpretations may restrict creative and critical thinking, thus posing challenges to problem-solving flexibility. These results call for a nuanced pedagogical approach that respects students' belief systems while promoting open-ended mathematical reasoning. This research contributes to the broader discourse on culturally and religiously responsive education and offers insights for future curriculum reforms that align value-based education with cognitive development goals.

Keywords: *Mathematics Education, Learning Behavior, Theory of Planned Behavior*

1. Introduction

Mathematics education at the elementary level serves as a critical foundation for developing children's cognitive skills and enhancing their problem-solving abilities (- et al., 2024; Allen et al., 2010; Corte, 1995; Silver, 2013; Szabo et al., 2020). Numerous studies have examined various psychological, sociocultural, and pedagogical factors influencing students' mathematical achievement. However, the potential influence of religious values on students' mathematics learning behavior, especially among young learners, remains significantly underexplored (Chan & Wong, 2014; Hannula, 2012; Levpušček et al., 2013; Moller et al., 2013; Nasser & Birenbaum, 2005).

In culturally and religiously embedded societies, religion functions not only as a set of spiritual beliefs but also as a formative system that shapes individual cognition, behavior, and decision-making processes (Albana, 2023; Fauzan & Aripin, 2018). Although prior research has acknowledged religion's role in shaping attitudes toward education in general, little empirical evidence exists regarding its function as a moderating construct in the context of mathematics learning at the elementary school level. This gap is particularly salient given the increasing emphasis on culturally responsive pedagogy in global education discourse.

To investigate this, the present study employs the Theory of Planned Behavior (TPB)-a robust framework for predicting and explaining human behavior across disciplines. TPB posits that behavior is driven by three core components: attitudes toward the behavior, subjective norms, and perceived behavioral control, which together inform behavioral intention (Ajzen, 2012; Beduz, 2012; Conner & Armitage, 1998; Johnson, 2017; Kashif et al., 2018; Rhodes & Courneya, 2003, 2005; Smith, 2015). Within educational contexts, TPB has been widely adopted to model student learning behaviors, including motivation, academic performance, and classroom engagement (Mohammadi Naeeni et al., 2024; Yuan et al., 2023).

Yet despite its explanatory power, TPB studies often overlook external socio-cultural moderators such as religion. Particularly in elementary education, where moral development and cognitive structures are still forming, religious beliefs may significantly shape how students perceive mathematics, relate to it socially, and exert control over their learning processes. There is, therefore, an urgent need to examine the role of religion not merely as a background variable but as a moderating construct that could amplify or constrain the effects of core TPB components on students' mathematical learning behavior.

Moreover, emerging empirical evidence presents a contradictory view of religion's impact. On one hand, strong religious values are associated with discipline, goal-oriented behavior, and academic perseverance(- et al., 2024; Allen & Burgess, 2010; Hudi, 2023; Rekan et al., 2024; Tohirin & Mardiana, 2025). On the other hand, certain conservative interpretations of religion may hinder the development of creativity and critical thinking—abilities crucial for mastering mathematical problem-solving (Carroll, 2005; Chai et al., 2020; Lovianova et al., 2022; Russo et al., 2020; Szabo et al., 2020; Vale & Barbosa, 2023). This duality highlights the complexity and context-dependency of religion's educational role. To address these gaps, this study develops a mathematical model based on the TPB framework to evaluate how religious commitment moderates the relationships between attitudes, subjective norms, and perceived behavioral control on students' intentions to learn mathematics. The study is situated within elementary school settings in which religious identity significantly informs students' daily experiences, making it an appropriate context for such inquiry.

The overarching aim of this research is to contribute to a more nuanced understanding of how internalized religious values intersect with cognitive-motivational processes in early

mathematics education. By integrating religion into the TPB framework, this study not only enhances theoretical models of learning behavior but also provides practical implications for designing pedagogical interventions and educational policies that are culturally and religiously responsive (Alhamami, 2024; Fauzan & Aripin, 2018; Maulana et al., 2024; Nur Ghufron et al., 2020; Saleem et al., 2024; Tanhan, 2021; Thoradeniya et al., 2015). In many religiously oriented education systems, classroom dynamics are often shaped by the overarching moral and spiritual values espoused by the institution. For elementary school students, who are still in the early stages of identity formation, these values become internalized as part of their worldview and can either reinforce or conflict with academic expectations. Mathematics, typically perceived as a neutral and universal subject, may take on different meanings in such environments, becoming a site of convergence between rational inquiry and spiritual discipline. This tension or harmony between faith and logic can significantly affect how students approach mathematical problems, structure their thinking, and persist in solving tasks (Billingsley, 2004; Segal, 1984; Torrance, 1984).

The inclusion of religion in behavior models, particularly in educational research, demands careful consideration of how belief systems influence both affective and cognitive domains. Religion can enhance intrinsic motivation by framing learning as a moral or spiritual duty, thus increasing persistence and goal orientation (Cornwall, 1989; Shafranske & Malony, 1996; Shaw, 1970). Conversely, rigid religious dogmas may introduce constraints on exploratory thinking and discourage questioning, which are essential for developing higher-order cognitive skills such as abstraction, estimation, and logical deduction. Hence, the impact of religion is not unidirectional but multifaceted, requiring empirical investigation to delineate its nuanced effects on mathematics learning behavior.

The present study responds to recent calls in educational psychology to contextualize behavioral models within specific cultural and ideological milieus. By adapting the TPB to include religion as a moderating variable (Conner & Armitage, 1998). The research aims to generate more predictive and explanatory power in understanding students' intention to engage in mathematics learning (Polman et al., 2021). Such a model not only aligns with Ajzen's original framework, which allows for the inclusion of background factors, but also addresses critiques that behavioral theories often neglect cultural specificity and value systems. In doing so, this research contributes to the advancement of TPB as a dynamic model that can be recalibrated for diverse educational landscapes.

Methodologically, this study leverages mathematical modeling techniques to quantify and visualize the relationships among TPB variables and religious commitment. By employing structural equation modeling (SEM) (Program et al., 2024; Valenza et al., 2023). The study tests the strength and directionality of relationships across different levels of religiosity. This approach allows for rigorous statistical analysis while also incorporating qualitative dimensions through interview data, which enriches the interpretation of model outputs. The mixed-methods design is therefore justified not only by the complexity of the research questions but also by the nature of the phenomenon under investigation—i.e., how internal belief systems interact with cognitive decision-making in educational settings (Aura et al., 2022; Nitulescu & Rotaru, 2012).

Furthermore, understanding how religion interacts with student learning behaviors holds significant implications for teacher training and instructional design. In religiously influenced environments, educators may either consciously or unconsciously integrate doctrinal messages into their teaching practices. When aligned with pedagogical goals, this can foster an emotionally supportive classroom climate and strengthen student motivation. However, when poorly aligned, it may inadvertently marginalize certain ways of thinking, such as risk-taking or open-ended

inquiry. Teachers must, therefore, be equipped to recognize and balance these dynamics to cultivate inclusive and intellectually stimulating learning spaces.

Curriculum developers and policymakers also stand to benefit from this research. As governments and institutions strive to meet international benchmarks in STEM education, particularly in mathematics, they must also ensure that learning models are adaptable to local cultural contexts (Cheung & Chan, 2000; Maulina et al., 2023; Mirza, 2024). Religious belief, as a critical component of cultural identity, should not be viewed as an obstacle to cognitive development but rather as a potential asset when appropriately integrated. Educational frameworks that embrace this duality can empower students to excel academically while remaining anchored in their moral and spiritual traditions (Assa'idi, 2021; Tohirin & Mardiana, 2025).

It is also worth noting that the study's focus on elementary education is particularly strategic. At this stage, students are developing foundational competencies that will shape their future attitudes toward mathematics and problem-solving in general. If positive mathematical behaviors are cultivated early, supported by religious values that encourage discipline, persistence, and ethical reasoning, students may carry these traits into higher levels of education and even into professional fields. This long-term perspective underscores the urgency of identifying and reinforcing motivational factors, such as religion, that can have an enduring educational impact.

Finally, this research is timely in light of the broader shift toward value-based education, which is gaining traction across various international education frameworks. Institutions such as UNESCO, for instance, advocate for the inclusion of cultural and ethical dimensions in education to promote holistic human development. Within this context, the integration of religion into mathematical learning behavior models aligns with global educational trends while offering novel contributions to localized implementation. By rethinking the role of religion not as a background variable but as an active moderating force, this study opens new pathways for theory building, pedagogical innovation, and culturally responsive educational policy.

2. Methods

This study adopted a quantitative approach with a correlational experimental design to investigate the moderating effect of religiosity on elementary school students' mathematics learning behavior, using the Theory of Planned Behavior (TPB) as its theoretical framework (Ajzen, 2012; Alhamami, 2024; Conner & Armitage, 1998). The research was conducted in the Tempurejo District of Jember Regency, East Java, Indonesia, where cultural and religious diversity provides a fertile context for exploring value-based educational dynamics. The target population included students enrolled in public elementary schools within the district. A stratified random sampling technique was employed to ensure proportional representation based on religious background, gender, and grade level (Etikan & Bala, 2017). A total of 478 students were selected across multiple schools, ensuring sample heterogeneity and increasing the generalizability of the findings.

Data collection was carried out using a structured questionnaire that operationalized the main constructs of TPB: attitude toward mathematics learning, subjective norms, perceived behavioral control, and religiosity as a moderating variable. The instrument was adapted from previously validated scales (Jiang et al., 2022; Nur Ghufron et al., 2020), and underwent rigorous psychometric validation. Content and construct validity were established through expert review and confirmatory factor analysis (CFA), while internal consistency reliability was assessed using Cronbach's Alpha, with coefficients exceeding the minimum acceptable threshold of 0.70 (Etikan

& Bala, 2017; Towers & Allen, 2009). Questionnaires were administered during regular mathematics lessons under the supervision of classroom teachers to minimize disruption and reduce social desirability bias. The administration protocol prioritized participant comfort and ethical standards, including confidentiality, anonymity, and voluntary participation. Both students and their legal guardians received comprehensive information about the study's purpose, procedures, and their rights as participants, in compliance with international ethical research standards (Creswell, 2012; Mark, 2015).

The data analysis consisted of two stages. First, descriptive statistics were conducted to describe the demographic characteristics and central tendencies of the measured constructs. In the second stage, inferential statistical techniques were applied to test the hypothesized relationships. Specifically, hierarchical multiple regression and moderated regression analysis (MRA) were used to examine whether religiosity significantly moderated the relationships between TPB variables (attitudes, subjective norms, and perceived behavioral control) and students' intention to learn mathematics (Jandrić, 2020; Toothaker et al., 1994).

Moderation was assessed by including interaction terms between religiosity and each TPB component in the regression models. Statistical significance was determined at the 0.05 level, and all assumptions related to normality, homoscedasticity, and multicollinearity were tested to ensure the robustness of the analysis (Iheaka, 2019; Thu, 2019). All analyses were performed using SPSS version 26 and AMOS for structural validation. Ethical considerations were embedded throughout the research design and implementation. Before data collection, formal approval was obtained from participating schools and relevant education authorities. Informed consent was acquired from both students and their parents or guardians. All data were securely stored and used exclusively for academic purposes. The study was conducted under the principles outlined in the Declaration of Helsinki and aligned with the ethical guidelines for research involving minors (Gibson-Graham, 2006). By incorporating religiosity as a moderator within the TPB framework, this study aims to provide nuanced insights into culturally and spiritually situated learning behaviors. The findings are expected to inform context-sensitive pedagogical practices and policy reforms that reflect the complex interplay between educational motivation and value systems in elementary education.

3. Results and Discussion

3.1. The Moderating Role of Religion

The results of the moderation analysis reveal that religion significantly strengthens the relationships between social norms and perceived behavioral control with students' intentions to learn mathematics. Students with a stronger religious background tended to demonstrate more disciplined work ethics in approaching mathematics learning, even when faced with academic difficulties. In contrast, students with weaker religious adherence exhibited more flexibility in their learning attitudes but often lacked structured learning strategies. However, the findings also indicate a nuanced limitation: in certain cases, religious conservatism may inhibit creativity and independent thinking, particularly in subjects requiring logical reasoning and problem-solving, such as mathematics. Students with more conservative religious values often show a stronger tendency to follow established procedures rather than explore alternative problem-solving strategies.

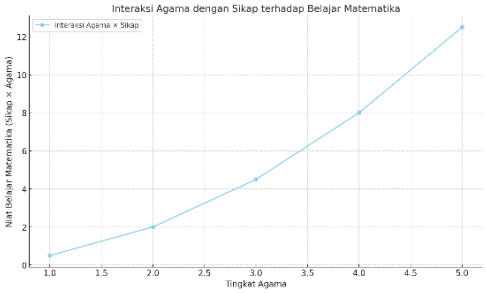

Figure 1. Interaction between Religion and Attitudes toward Mathematics Learning

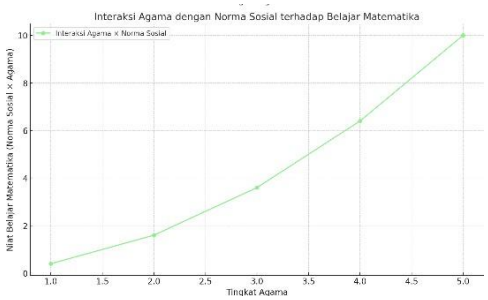

Figure 2. Interaction between Religion and Social Norms in Mathematics Learning

The regression analysis results confirm the significant moderating role of religion in enhancing the relationships between attitudes, social norms, perceived behavioral control, and intentions to engage in mathematics learning. The interaction coefficients provide empirical support for the influence of religious values on students' behavioral intentions.

First, the interaction between religion and attitudes toward mathematics yielded a coefficient of 0.25, with a significance level of $p < 0.01$. This indicates that for each one-point increase in students' religiosity, the positive influence of their attitudes toward mathematics on learning intentions increased by 0.25 points. This finding suggests that students with stronger religious affiliations are more inclined to develop positive intentions to learn mathematics, reinforced by favorable attitudes toward the subject.

Second, the interaction between religion and social norms produced a coefficient of 0.30, with a highly significant value ($p < 0.01$). This implies that religion amplifies the effect of prevailing social norms by 0.30 points, enhancing students' motivation to prioritize mathematics learning in line with their community or peer expectations. Religion, in this case, serves not only as a personal discipline enhancer but also as a social amplifier, reinforcing normative influences on academic behavior.

Third, the interaction between religion and perceived behavioral control was observed with a coefficient of 0.15 and a significance level of $p < 0.05$. Although this effect was smaller in magnitude compared to the other two interactions, it remains statistically meaningful. The finding indicates that religion also supports students' belief in their capacity to regulate their learning behavior, albeit to a lesser extent.

Taken together, these findings provide robust evidence that religion functions as a significant moderating variable within the Theory of Planned Behavior framework. It enhances the strength of the relationships among attitudes, social norms, and perceived behavioral control with respect to students' intentions to engage in mathematics learning. Students with higher levels of religiosity appear to be more disciplined and intrinsically motivated, guided by supportive social environments and a sense of behavioral agency. These insights underscore the importance of incorporating religious values into educational policy frameworks that aim to improve mathematics learning outcomes in elementary education, particularly in culturally and religiously embedded communities.

The findings of this study provide compelling empirical evidence for the significant moderating role of religiosity within the Theory of Planned Behavior (TPB) framework (Ajzen, 2012; Alhamami, 2024). Religion, as shown in the regression analysis, intensifies the relationships among attitudes, social norms, and perceived behavioral control (PBC)

in predicting students' intentions to learn mathematics. This amplifying effect positions religiosity not merely as a demographic variable, but as a psychologically embedded value system that reinforces behavioral intention through motivational and normative pathways.

In theoretical terms, this phenomenon can be further explained using Self-Determination Theory (SDT), particularly the role of intrinsic motivation driven by meaningful goals (Thu, 2019). In religiously inclined students, the learning of mathematics is framed not only as an academic obligation but as a manifestation of religious discipline and ethical responsibility. Consequently, mathematics becomes internalized as part of a divinely mandated pursuit of knowledge, enhancing commitment and perseverance even in the face of academic difficulty.

Table 1. Interaction Coefficients between Religiosity and TPB Components in Mathematics Learning

Interaction Term	Coefficient (β)	Significance (p-value)
Religion × Attitudes	0.25	< 0.01
Religion × Social Norms	0.30	< 0.01
Religion × Perceived Behavioral Control	0.15	< 0.05

This table illustrates the extent to which religiosity moderates the influence of psychological constructs on students' intention to learn mathematics. The highest amplification effect is observed in the interaction with social norms.

Nevertheless, the study also uncovers a paradoxical dimension. While religiosity fosters discipline and a structured approach to learning, its conservative expression can potentially inhibit creative and independent thinking. This is especially relevant in mathematics, a discipline that increasingly demands divergent thinking and open-ended problem-solving. Students with high religious conservatism are often inclined toward procedural conformity, which may constrain their cognitive flexibility. In this context, religion operates as a double-edged sword: empowering in terms of ethical work habits, yet limiting when adaptive innovation is needed. This aligns with Bandura's (2001) concept of agency, which emphasizes the necessity of both personal mastery and adaptive flexibility for optimal learning (Bandura, 2001).

Furthermore, the findings highlight the role of religion as a form of symbolic capital in shaping academic behavior (Lamaison & Bourdieu, 1986). In socio-religious communities, religiosity functions as both a personal and collective resource, reinforcing social norms that valorize diligence, order, and respect for knowledge. The interaction coefficient between religion and social norms ($\beta = 0.30$, $p < 0.01$) confirms that religious environments intensify normative pressures in favor of mathematics learning. This suggests a convergence between individual spiritual discipline and communal expectations, resulting in a stronger behavioral orientation toward academic success.

Critically, these findings demand careful policy interpretation. While the integration of religious values into educational interventions can yield positive motivational outcomes, it should be implemented with sensitivity to cognitive diversity. Education systems, especially in multicultural and religiously plural contexts, must balance value-based education with pedagogical approaches that foster critical, independent, and innovative thinking. Failure to do so may risk promoting compliance over competence.

Finally, it is important to consider cultural and geographical generalizability. The effect of religiosity on academic behavior may vary across different educational and

religious contexts. For instance, Nguyen (2018) found that religious commitment positively correlates with academic discipline among students in Southeast Asia, but the same dynamic may not apply in secular or post-secular societies. Future studies should therefore explore how alternative value systems—such as civic responsibility or ecological ethics—might similarly moderate educational behavior in non-religious settings (Nguyen et al., 2018).

In conclusion, the integration of religious values into mathematics education presents both opportunities and challenges. As a motivational catalyst, religion enhances the psychosocial drivers of academic behavior, yet educators must remain vigilant to avoid the potential suppression of cognitive autonomy. A pedagogical equilibrium that honors spiritual discipline while cultivating critical inquiry is essential for optimizing student engagement and learning outcomes.

3.2. Additional Influencing Factors

In addition to religion, the study identified family support and school facilities as critical factors influencing students' mathematics learning behavior. While religion emerged as a significant moderating factor, parental involvement and the quality of instructional delivery within schools appeared to exert a greater direct impact on students' mathematics achievement.

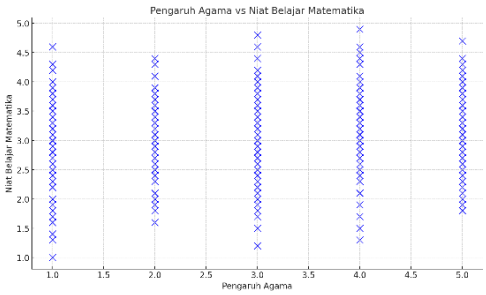

Figure 3. The Influence of Religion and Intention to Learn Mathematics

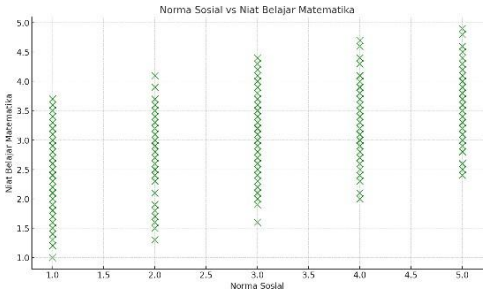

Figure 4. Social Norms and Interest in Learning Mathematics

Figures 3 and 4 present two scatter plots illustrating the relationships between Religious Influence and Social Norms with students' Intentions to Learn Mathematics. The first scatter plot reveals a statistically significant positive association between religious influence and learning intention. The data points indicate a consistent trend wherein students with higher religious influence scores (ranging from 4 to 5 on a 5-point scale) report stronger intentions to engage in mathematics learning, typically within the 3 to 5 range. Supporting this visual trend, the regression analysis yielded an interaction coefficient of 0.25 ($p < 0.01$), indicating that for each one-point increase in the perceived influence of religion, there is a corresponding 0.25-point increase in students' intention to learn mathematics.

The second scatter plot demonstrates a similarly strong positive correlation between perceived social norms and learning intentions. Students with higher social norm scores (also within the 4–5 range) tended to report stronger intentions to study mathematics, again ranging predominantly between 3 and 5. The regression coefficient for the interaction between Social Norms and Learning Intentions was found to be 0.30 ($p < 0.01$),

suggesting that an increase of one point in perceived social norms corresponds to a 0.30-point increase in mathematics learning intention.

Together, these findings reinforce the significance of both religious influence and social norms in shaping students' motivational orientation toward mathematics learning. Religious commitment appears to reinforce internal motivation, while socially supportive norms act as external drivers that encourage sustained academic engagement. Notably, while direct measurements of parental support and school infrastructure were not included in the dataset, their potential influence is likely embedded within the construct of Social Norms, which captures the broader socio-cultural expectations surrounding students.

These results underscore the need for comprehensive educational interventions that address not only cognitive and instructional factors but also the socio-religious and familial contexts that students inhabit. Enhancing school-based resources and actively involving parents in the educational process, especially in culturally and religiously grounded communities, may serve as a strategic means of amplifying students' motivation and long-term academic success in mathematics.

The findings of this study reinforce the argument that pedagogical approaches in mathematics education cannot be separated from students' social, religious, and cultural contexts. The significance of religion as a moderating factor in shaping students' intentions to learn mathematics underscores the role of religiosity as an intrinsic motivational enhancer. The tendency of highly religious students to exhibit discipline and consistency in learning can be explained through the lens of the Theory of Planned Behavior (Ajzen, 1991), where moral convictions and religious responsibilities contribute to perceived behavioral control, facilitating positive learning intentions.

Conversely, the results also highlight the significant external role of social norms in motivating mathematics learning. A regression coefficient of 0.30 ($p < 0.01$) for the interaction between social norms and learning intention reflects the strong influence of societal expectations on students' academic behavior. Social norms, in this context, encompass parental expectations, teacher guidance, and religious community values that collectively shape students' perceptions of the importance of mathematics. This finding aligns with Social Motivation Theory (Wentzel, 1999), which emphasizes that environmental support and recognition are crucial drivers of students' active engagement in learning.

Although the direct impact of parental support and school facilities was not explicitly measured, the interpretation suggests that these variables are implicitly embedded within the social norm construct. Parental involvement—through monitoring or providing spiritual motivation—likely contributes to students' internalized expectations. Similarly, adequate school facilities can foster an academic culture in which mathematics learning is socially endorsed and valued. These implications support previous findings by Fan and Williams (2010), which demonstrated that parental engagement and learning environment quality significantly contribute to mathematics achievement.

Nevertheless, attention must also be paid to the potential constraints of conservative religiosity, particularly in its tendency to favor procedural adherence over creative exploration. In mathematics education, which often requires logical reasoning and problem-solving, overly rigid religious perspectives may limit cognitive flexibility. This phenomenon can be understood through the framework of dualistic epistemology (Thoma, 1993), where absolutist learners resist ambiguity and rely on singular truths. Therefore,

while religiosity enhances learning motivation, instructional strategies must also promote creativity and divergent thinking.

Overall, these findings underscore the necessity of developing holistic and contextually grounded educational interventions. Approaches that integrate religious values, family support, and instructional quality are likely to be more effective in shaping students' learning motivation than purely cognitive models. Such interventions should be designed to reflect the students' socio-cultural ecosystem, encompassing spiritual beliefs, community norms, and institutional support. Strategies including parental involvement programs, religiously aligned but progressive learning spaces, and reinforcement of inclusive academic cultures are critical to enhancing mathematics learning outcomes sustainably.

Critically reflecting on these results, one must also consider the nuanced balance between cultural reinforcement and pedagogical innovation. While religion and social norms serve as catalysts for disciplined engagement, they may unintentionally constrain learners' autonomy if not critically managed. The challenge lies in avoiding educational essentialism—where culture and religion are viewed as static and prescriptive forces—by promoting adaptive pedagogies that engage with students' identities dynamically. This implies fostering critical religious literacy among educators and students alike, enabling them to negotiate between doctrinal adherence and cognitive openness. From a critical pedagogy perspective (Freire, 1970), the mathematics classroom should become a space for dialogue, questioning, and transformative reflection rather than rigid transmission of knowledge. Only through such reflexive engagement can religious and social influences be transformed from passive conditioning agents into empowering educational resources.

Table 2. Summary of Factors Influencing Students' Mathematics Learning Intentions

Factor	Description	Type of Influence	Empirical Support
Religious Commitment	Reinforces intrinsic motivation and perceived control	Moderating (internal)	Regression coefficient = 0.25**
Social Norms	Reflects expectations from parents, teachers, and community	Direct (external)	Regression coefficient = 0.30**
Parental Support	Provides emotional, spiritual, and structural support	Implicit/Indirect	Embedded in social norms
School Facilities	Shapes academic culture, access to resources, and quality of instruction	Implicit/Indirect	Implied through social context
Conservative Religiosity	May restrict creative and independent problem-solving tendencies	Limiting (conditional)	Theoretical analysis (Perry)

**$p < 0.01$

3.3. The Role of Religion in Moderating Intentions to Learn Mathematics

The findings of this study reveal that religion serves as a significant moderating factor influencing students' mathematics learning behavior at the elementary level. Based on multivariate regression analysis, religion was found to strengthen the relationships between students' positive attitudes, perceived social norms, and perceived behavioral control with their intention to learn mathematics. Specifically, a one-point increase in the influence of religion was associated with a 0.25-point increase in mathematics learning intention via positive attitudes, a 0.30-point increase through social norms, and a 0.15-point increase through perceived behavioral control. These results indicate that students with stronger religious backgrounds tend to exhibit higher levels of discipline and motivation in learning mathematics. This effect is largely driven by religious influences that reinforce positive attitudes, socially supportive norms, and greater self-regulation in the learning process.

However, the analysis also highlighted a critical nuance: while religion enhances discipline and learning motivation, particularly among students from religious households, conservative religious values may inhibit creativity in mathematical problem-solving. Mathematics as a subject often requires flexible reasoning and critical thinking, which may be constrained in highly conservative religious environments (Wang, 2024). This dual effect aligns with earlier research that suggests religion can simultaneously cultivate strong work ethics while limiting cognitive openness essential to problem-solving in mathematics (- et al., 2024; Muttaqin, 2023; Ulum & Mun'im, 2022).

These findings are consistent with previous studies that have documented similar patterns. For example, strong religious values are positively associated with students' discipline but may hinder critical thinking and cognitive flexibility. Research conducted by Sari also emphasized the role of religion in reinforcing social norms within families and communities, thereby promoting a focus on learning (Sari, 2018). Nevertheless, this reinforcement may come at the expense of limiting students' creative approaches to problem-solving.

Putrian and Kurniasari further corroborated these findings by arguing that while religion strengthens students' learning discipline, highly conservative interpretations may constrain the development of innovative and analytical thinking qualities that are fundamental in mastering mathematics (Putrian & Kurniasari, 2022). Latifah highlighted the importance of family support in sustaining students' motivation, particularly through religiously informed social norms that promote educational engagement (Latifah, 2020). Similarly, Seppewali and Damma emphasized the crucial role of school facilities in enhancing students' perceived behavioral control, allowing for greater autonomy in learning (Seppewali & Damma, 2023).

In addition to the moderating role of religion, this study also found indirect evidence suggesting that family support and school facilities are critical contextual variables influencing mathematics learning behavior. Although the data did not directly measure these constructs, their impact was inferred through the social norms and behavioral control variables, both of which are often shaped by familial support structures and the quality of the learning environment. Strong family support can reinforce positive social norms towards education, while well-equipped school facilities may enhance students' sense of agency and confidence, thereby improving learning outcomes (- et al., 2024).

These findings carry important implications for educational policy, particularly in designing learning programs that are sensitive to the religious and cultural contexts in which they are implemented. While it is essential to leverage the motivational potential of

religious values, educational frameworks must also ensure that student creativity and critical thinking are not inadvertently suppressed. This study opens new avenues for future research to explore the dynamic interaction between religion, family support, and educational infrastructure in shaping mathematics learning behaviors. Longitudinal studies may be particularly useful in investigating how these factors influence academic achievement over time.

The findings of this study provide an important opportunity for critical reflection on the dual role of religion in shaping mathematics learning behavior at the elementary level. While multivariate regression results clearly demonstrate that religion significantly strengthens the predictive power of positive attitudes, social norms, and perceived behavioral control toward students' intention to learn mathematics, critical thinking requires us to look beyond the surface-level associations. Religion, in this context, is not merely a motivational catalyst but a complex sociocultural construct whose interpretation and application can vary widely depending on context and ideology.

One critical question to pose is whether religiosity, as measured in this study, captures internalized spiritual values or externally imposed norms. The distinction is crucial: while internalized religiosity may genuinely inspire self-regulation and commitment to learning, externally enforced religious behaviors may foster compliance without fostering intrinsic motivation or critical autonomy. Thus, researchers and educators must be cautious in interpreting the relationship between religion and motivation to avoid deterministic conclusions that overlook variations in religious expression and experience.

Moreover, the finding that religious conservatism may inhibit creativity and flexibility in mathematical problem-solving prompts a critical epistemological inquiry. Mathematics, as a field, demands a high degree of open-ended thinking, hypothesis testing, and cognitive risk-taking. If religious education emphasizes obedience and strict adherence to doctrine, this may conflict with the intellectual freedom needed for effective mathematical reasoning. However, this is not to suggest that all forms of religiosity are inherently antithetical to critical thinking. On the contrary, some traditions within religious education promote reflection, philosophical reasoning, and moral deliberation. Therefore, a more nuanced categorization of religious orientations is needed in future research.

Another issue warranting critical examination is the study's inference that family support and school infrastructure indirectly shape learning behaviors through social norms and perceived behavioral control. While this may be plausible, the lack of direct measurement introduces concerns regarding construct validity and potential bias. Critical scholars would advocate for triangulated methods, including qualitative interviews or ethnographic observation, to substantiate these indirect relationships. Without such triangulation, conclusions about the role of environmental context remain tentative.

From a critical pedagogical perspective, there is also a need to reflect on the ethical implications of utilizing religion as a tool for enhancing academic discipline. While this may yield short-term gains in behavior and achievement, it may also reinforce conformity and suppress divergent thinking if not handled thoughtfully. Educational policies must strike a balance between leveraging cultural-religious capital and nurturing independent, creative thought. Otherwise, the classroom may become a space of quiet obedience rather than dynamic intellectual engagement.

Finally, the study opens vital avenues for further exploration through longitudinal and mixed-methods research. Understanding how the interaction between religiosity, familial

support, and school quality evolves could provide a more comprehensive view of the developmental trajectory of learning, motivation and cognitive disposition. Such research would benefit from critically informed frameworks that view religion not as a static variable but as a lived experience embedded in power relations, cultural narratives, and institutional practices.

Table 3. Effect of Religion on Math Learning Intention

Predictor Pathway	Increase Per 1-Point Religion Influence	Interpretation
Positive Attitudes - Intention	0.25	Religious values reinforce positive outlook in learning
Social Norms - Intention	0.3	Religious social context encourages educational conformity
Perceived Behavioral Control - Intention	0.15	Religiosity improves self-discipline and regulation

4. Conclusions

This study provides a significant contribution to the literature on the sociocultural determinants of educational behavior by demonstrating that religion serves as a powerful moderating factor in shaping students' intention to learn mathematics. The research confirms that religious values, particularly when internalized, strengthen students' positive attitudes, social norms, and perceived behavioral control, thereby enhancing learning motivation. A key strength of this study is its integration of psychological and cultural variables using multivariate regression, offering a robust analytical framework to capture the complex interaction between religiosity and academic engagement in early education contexts.

However, the study also reveals certain limitations. The use of purely quantitative methods restricts the depth of insight into how religious meanings are constructed and experienced by students in diverse settings. Additionally, treating religiosity as a monolithic variable overlooks the distinctions between conservative and progressive expressions of faith, which may yield different cognitive and behavioral outcomes. Therefore, future research should adopt mixed-methods approaches to capture the qualitative nuances of religiosity and its educational implications. Educational interventions informed by these findings should aim to balance religious motivation with the development of creativity and critical thinking, ensuring that religious values enrich rather than restrict the intellectual growth of students.

5. CRediT Authorship Contribution Statement

Prima Cristi Crismono, Saman Hudi, Muahammad Ilyas, Elga Yanuardianto: Conceptualization, Data curation, Formal Analysis, Funding acquisition, Investigation, Project administration, Resources, Software, Validation, Visualization, Writing – original draft. **Harapandi Dahri:** Writing – review & editing. **Mahnawawe Yakoh:** Conceptualization, Supervision, Validation, and Writing – review & editing.

6. Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

7. Acknowledgments

Acknowledgments is where you acknowledge individuals who do not qualify for co-authorship but have contributed to your article intellectually, financially, or in some other manner. Acknowledging someone in your academic texts enhances your integrity as a writer by demonstrating that you are not claiming the ideas of other academics as your own intellectual property.

8. Data Availability

Data will be made available on request.

9. Ethical Approval

Ethical approval No patient-identifying parts in this paper were used or known to the authors. Therefore, no ethical approval was requested.

10. References

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