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Child-Friendly Mathematics Learning Model in Islamic Elementary Education: A Case Study at SD At-Taufiqiyah Bangkalan

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Abstract

This study aims to formulate a child-friendly mathematics learning model in Islamic elementary education based on the successful practices implemented at SD At-Taufiqiyah Bangkalan. Employing a qualitative instrumental single-case study, the research was conducted from December 2024 to February 2025. Ten informants were selected purposively, comprising the principal, two mathematics teachers, a guidance and counselling teacher, a classroom teacher, and five students. Data were collected through semi-structured interviews, non-participant classroom observations, and document analysis, then examined using reflexive thematic analysis and triangulation. The findings reveal that the model is built upon five interrelated dimensions: ethical-Islamic foundations, contextual and concrete pedagogy, relational and emotional safety, developmental assessment, and distributed institutional support. Islamic values such as *rahmah*, justice, responsibility, honesty, and mutual assistance were translated into non-violent discipline, respectful communication, differentiated instruction, collaborative learning, constructive responses to errors, and formative feedback. These practices strengthened student participation, confidence, mathematical agency, and conceptual understanding while reducing fear and evaluative pressure. The study concludes that child-friendly mathematics learning functions as an integrated pedagogical ecology rather than a set of isolated techniques, offering an adaptable framework for inclusive, meaningful, and sustainable mathematics education in Islamic elementary schools.

Keywords

Child-Friendly Education; Islamic Elementary Education; Mathematics Learning.

INTRODUCTION

Mathematics at the elementary level is a foundation for numerical reasoning, problem solving, and informed participation in everyday life. However, this foundation remains fragile when students experience mathematics merely as the memorization of formulas and rapid calculation procedures. PISA 2022 showed that Indonesian students' mathematics performance remained below the OECD average and that the proportion achieving minimum proficiency was comparatively limited. Consequently, elementary mathematics reform must begin earlier by creating learning experiences that are conceptually meaningful, equitable, and responsive to children's developmental needs (Mathematics, 2000; OECD, 2023; Reid et al., 2019).

Improving mathematics learning cannot therefore be reduced to increasing test scores. High-quality elementary mathematics should enable every child to explore patterns, explain reasoning, use multiple representations, collaborate, and regard mistakes as part of learning. NCTM emphasizes mathematically powerful environments that broaden participation and challenge structures that marginalize particular learners. Similarly, inclusive education positions schools as shared spaces in which knowledge, cooperation, dignity, and human agency are developed together. These perspectives require mathematics classrooms to combine intellectual challenge with inclusion, participation, and emotional security (Jahangiri et al., 2022; Jung et al., 2026; Programme, 2020).

The emotional dimension is important because mathematics is frequently associated with fear, embarrassment, and perceptions of fixed ability. A meta-analysis found a significant negative relationship between mathematics anxiety and achievement across age groups and assessment conditions. Anxiety may consume cognitive resources, encourage avoidance, and reinforce the belief that mathematical competence belongs only to certain students. A systematic review of school-based interventions further indicates that mathematics anxiety already appears in primary school and requires early pedagogical responses. Thus, supportive interaction is not supplementary to achievement; it is part of effective mathematics instruction (Azhra et al., 2026; Fithriyah, 2026; Rustam et al., 2026; Yanti et al., 2025).

Child-friendly education provides a relevant framework for responding to these cognitive and emotional challenges. It understands quality education as learning that is safe, inclusive, participatory, healthy, and respectful of children's dignity and diversity. In such an environment, students are protected from physical punishment, verbal humiliation, discrimination, bullying, and practices that silence their voices. Inclusion also requires schools to recognize differences in ability,

background, language, and learning pace rather than expecting uniform performance. A child-friendly mathematics classroom should therefore protect well-being while ensuring meaningful access to demanding mathematical ideas (Jailani et al., 2025; Sayyi, Muslimin, et al., 2025; Sudirman et al., 2022; Vebrianto et al., 2025).

In Indonesia, the movement toward safe and child-centred schooling has been strengthened through policy and school initiatives. Regulation No. 46 of 2023 established prevention and response mechanisms for physical, psychological, sexual, discriminatory, and technology-mediated violence in educational settings. Research in elementary schools likewise shows that child-friendly programmes depend on teacher commitment, habituation, positive interaction, parental involvement, and child-rights values in classroom learning. Nevertheless, translating these institutional principles into subject-specific pedagogy remains challenging, particularly in mathematics classrooms where correction, competition, and performance pressure may dominate (Lee, 2024; Setyaningsih et al., 2019; Translation, 2023).

This challenge is especially significant in Islamic elementary education, where academic learning is expected to develop knowledge and ethical character simultaneously. A child-friendly mathematics model can connect mathematical reasoning with Islamic educational values such as *rahmah*, justice, responsibility, mutual assistance, and respect for human dignity. These values should be embodied not only through religious expressions or contextual examples, but also through teachers' language, task design, grouping practices, feedback, assessment, and responses to errors. Such integration is consistent with equitable elementary mathematics and school cultures that institutionalize care through collective commitment (Jahangiri et al., 2022; Rusdi et al., 2026).

Although child-friendly school studies have identified policies, leadership, socialization, school culture, and stakeholder participation, they generally examine the school programme as a whole rather than the internal structure of mathematics instruction. Conversely, recent mathematics research has extensively discussed anxiety, achievement, media, and interventions, but has rarely formulated a school-based model integrating emotional safety, mathematical challenge, student voice, inclusive support, Islamic values, and organizational conditions. This review therefore suggests that the intersection between mathematics pedagogy and child-friendly education remains conceptually underdeveloped and empirically insufficient in Indonesian Islamic elementary schools (Polizzi et al., 2021; Sayyi, Asmuki, et al., 2025; Setyaningsih et al., 2019).

SD At-Taufiqiyah in Tramok, Kokop, Bangkalan, provides a significant case for examining this intersection because the school has formulated practices that combine mathematics learning with child-friendly educational principles. The case enables investigation of how respectful communication, contextual mathematical activities, student participation, differentiated assistance, constructive responses to errors, and supportive assessment are organized within daily instruction. It also allows attention to leadership, teacher collaboration, Islamic school culture, and parental communication as conditions supporting classroom practice. Such dimensions reflect the broader demands of child protection and equitable mathematics learning.

Accordingly, this study aims to explore and formulate the child-friendly mathematics learning model implemented at SD At-Taufiqiyah Bangkalan. It investigates the model's foundational values, instructional components, teacher–student interactions, assessment practices, supporting school conditions, and perceived implications for students' engagement and mathematical understanding. The study offers novelty by reconstructing successful practice into an empirically grounded model rather than merely describing a programme or measuring an intervention's effect. The findings are expected to extend child-friendly education into subject-specific pedagogy and provide an adaptable framework for mathematics learning in Islamic elementary schools.

METHOD

This study employed a qualitative approach with an instrumental single-case study design to obtain an in-depth understanding of the child-friendly mathematics learning model developed at SD At-Taufiqiyah, Tramok, Kokop, Bangkalan. The case study design was selected because the investigated phenomenon involved interconnected instructional practices, teacher–student relationships, school culture, assessment, leadership, and child-protection principles operating within a natural educational setting. The unit of analysis was the school-based model of child-friendly mathematics learning rather than the performance of individual teachers or students. The case was bounded by one institution, its mathematics-learning practices, relevant school actors, and the period from December 2024 to February 2025. Such explicit boundaries are essential for distinguishing a rigorous case study from a general qualitative description and for producing a contextualized interpretation of a complex educational phenomenon (Creswell & Poth, 2024; Yin, 2017).

The informants were selected purposively based on their direct involvement in mathematics instruction, child-friendly education, school leadership, student guidance, and classroom learning experiences. The ten informants comprised Fiisyatirrodiyah, and Syaiful Rasyid, as mathematics teachers; Ahmad Burhanuddin Basyaiban, as the school principal; Mamluatus Sholihah, as the guidance and counseling teacher; Kholifah, as a classroom teacher; and five students: Nuril Haikal Syakir Billah, Aminatuh Hamidah, Raihan Iskandar, Al Zaki, and Diana Putri. These informants were considered information-rich because they represented managerial, pedagogical, psychosocial, and student perspectives on the implementation of the model. Participant diversity enabled the researchers to examine how formal school policies were translated into everyday mathematics-learning experiences and how those practices were perceived by children. In the submitted manuscript, student participants should be reported using the codes S1–S5 to protect their identities as minors (Robinson, 2023; Tongco, 2007; Turnbull et al., 2021).

Data were collected through semi-structured interviews, non-participant classroom observations, and document analysis. Interviews with the principal and teachers explored the model's foundational values, instructional planning, learning strategies, teacher language, differentiation, assessment practices, responses to students' errors, child-protection mechanisms, and institutional support. Student interviews employed simple, age-appropriate prompts concerning their experiences of safety, participation, enjoyment, difficulty, teacher assistance, peer collaboration, and freedom to express mathematical ideas. Classroom observations focused on the presentation of mathematical tasks, use of concrete and contextual learning resources, student involvement, teacher feedback, responses to incorrect answers, classroom discipline, peer interaction, and emotional safety. Document analysis examined available lesson plans, teaching materials, student worksheets, assessment records, school regulations, and documents related to child-friendly education. The use of multiple data sources supported triangulation and allowed emerging interpretations to be examined from different perspectives (Braun & Clarke, 2013; Creswell & Poth, 2024; Tongco, 2007).

The data were analyzed iteratively using reflexive thematic analysis. First, interview recordings and observation notes were transcribed, organized, and read repeatedly to achieve familiarity with the entire dataset. Second, meaningful segments were coded by combining inductive coding derived from participants' experiences with theoretically informed categories related to child-friendly education and effective mathematics pedagogy. Third, related codes were

grouped into provisional themes, which were then reviewed against the interview, observation, and documentary evidence. Fourth, the themes were refined, defined, and named to represent the model's values, instructional components, interaction patterns, assessment practices, student participation, and institutional supports. Finally, relationships among the themes were interpreted and reconstructed into an empirically grounded child-friendly mathematics learning model. The analytical flow followed the sequence of data organization, initial coding, theme generation, cross-source examination, theme refinement, and model formulation (Braun & Clarke, 2013; Sayyi, Mashuri, et al., 2025).

Research trustworthiness was strengthened through source and technique triangulation, member reflection, peer debriefing, an audit trail, and thick contextual description. Information obtained from mathematics teachers was compared with accounts from the principal, guidance and counseling teacher, classroom teacher, students, classroom observations, and relevant documents. Provisional interpretations were discussed with key adult informants to confirm factual accuracy while preserving the researchers' analytical responsibility. Ethical safeguards included formal permission from the school, voluntary informed consent from adult informants, parental or guardian consent and child assent for student participation, the right to decline questions or withdraw, confidentiality, and secure data storage. Student identities were replaced with participant codes in transcripts and publication materials. These procedures reflect contemporary educational research ethics that emphasize dignity, inclusion, informed participation, confidentiality, and additional protection for children and other potentially vulnerable participants (Ismail et al., 2025; Miles et al., 2018; Sahrowi et al., 2025).

FINDINGS AND DISCUSSION

Findings

The findings were generated through thematic analysis of interviews with the principal, mathematics teachers, guidance and counselling teacher, classroom teacher, and five students, supported by two classroom observations and documentary evidence. Informant quotations were translated from Indonesian into English while retaining their substantive meanings.

Ethical-Islamic and Institutional Foundations of Child-Friendly Mathematics Learning

The first finding concerns the ethical and institutional foundation underpinning mathematics learning at SD At-Taufiqiyah. The school did not position child-friendliness as an

occasional teaching technique, but as an institutional orientation linking academic development, child protection, and Islamic morality. The principal described the school's aspiration as creating an academically productive environment in which every child felt "valued, accepted, and able to develop according to their potential" (KS). Although the school was relatively small, with 49 students and five teachers, this condition enabled teachers and school leaders to maintain intensive supervision and respond more personally to individual learning needs.

This institutional orientation was operationalised through explicit rules prohibiting physical violence, verbal humiliation, bullying, discriminatory treatment, and punishments that could undermine children's dignity. Behavioural problems were expected to be managed through private dialogue and restorative resolution rather than public reprimand or punitive discipline. The school also required teachers to communicate respectfully and to provide equitable learning opportunities regardless of students' prior attainment. Documentary analysis confirmed that these principles were stated in school regulations, the child-friendly school programme, and procedures for responding to violence. Consequently, emotional and physical protection constituted a formal foundation of mathematics instruction rather than depending solely on individual teacher goodwill.

Islamic values provided the moral language through which these institutional principles were interpreted. The principal identified *rahmah*, justice, responsibility, and mutual assistance as values that should become visible in everyday relationships rather than remain symbolic declarations. *Rahmah* was enacted through gentle communication and patient assistance; justice was expressed through equal opportunities to ask questions and participate; and responsibility required teachers to ensure that no learner was left behind. This orientation was described locally as a "school that soothes," indicating an educational culture intended to reduce fear while maintaining academic expectations. Islamicity was therefore embedded primarily in pedagogical conduct and relational ethics, not merely in religious terminology or ritual openings.

The mathematics teachers articulated conceptions consistent with this institutional vision. GM1 rejected the reduction of elementary mathematics to memorising formulas, describing it instead as the development of logical reasoning, pattern recognition, and everyday problem-solving. GM2 similarly characterised mathematics as a form of "serious play" whose intellectual demands could be approached through enjoyable experiences. Both teachers interpreted child-friendly learning as treating children as subjects with distinctive emotions, learning rhythms, ways of thinking, and levels of confidence. They emphasised invitation rather than coercion, encouragement

rather than intimidation, and adaptation rather than uniform expectations. These shared beliefs supplied the pedagogical rationale for subsequent classroom practices.

The ethical foundation was sustained through leadership modelling and organisational routines. The principal regularly visited classrooms, discussed student development with teachers, prioritised simple mathematics resources, and encouraged pedagogical experimentation within Islamic and child-friendly principles. The monthly *Majelis Guru* enabled mathematics teachers, the classroom teacher, and the guidance and counselling teacher to examine learning difficulties from academic, emotional, and family perspectives. This distributed responsibility prevented students' difficulties from being interpreted simply as low ability or insufficient effort. The first component of the model can therefore be defined as an ethical-institutional ecology integrating Islamic values, child protection, non-violent discipline, pedagogical trust, and collaborative leadership.

Table 1. Ethical and Institutional Foundations of the Model

Core dimension	Empirical manifestation	Function within the model
Child protection	Prohibition of violence, humiliation, bullying, and discrimination	Establishes physical and psychological safety
Islamic ethics	*Rahmah*, justice, responsibility, honesty, and mutual assistance	Provides the moral orientation of teaching
Leadership modelling	Friendly interaction, classroom supervision, and support for innovation	Translates policy into daily practice
Restorative discipline	Private dialogue and collaborative problem resolution	Protects dignity while maintaining responsibility
Professional collaboration	*Majelis Guru*, cross-role consultation, and parent communication	Sustains coordinated support for students

Source: Interview, observation, and documentary data.

Contextual, Concrete, Differentiated, and Collaborative Mathematics Pedagogy

The second finding shows that child-friendly principles were translated into a distinctive instructional design based on contextualisation, concrete representation, flexible participation, and differentiated support. Teachers prepared written lesson plans, concrete media, graded tasks, and alternative explanations before entering the classroom. Planning included anticipation of students who might require additional assistance and those who might need greater challenge. This anticipatory design reduced reliance on spontaneous correction and enabled teachers to respond calmly to differences in understanding. Document analysis further showed that mathematics modules consistently incorporated everyday contexts, small-group work, direct experience, and opportunities for students to explain their reasoning.

The first classroom observation, conducted in Grade V during a lesson on fractions,

demonstrated how abstract ideas were connected to familiar objects. The teacher used cake to represent fractional parts and framed the task through the everyday practice of sharing food during a family gathering. Students divided the cake, discussed equivalent portions, worked in groups, and presented their solutions. Rather than prescribing a single procedure, the teacher allowed different representational approaches and provided progressively structured questions. The activity transformed fractions from symbolic notation into a visible and manipulable relationship between parts and wholes, while the sharing context also introduced ethical discussion concerning fairness and generosity.

A similar pedagogical pattern was evident in the Grade IV measurement lesson. Students used rulers and measuring tapes to determine the length of tables, books, body height, and parts of the school environment. They worked in pairs, selected appropriate instruments, recorded results, and compared measurements. The lesson later moved outside the classroom when students measured the school field, thereby connecting formal units with direct bodily and spatial experience. When different groups obtained different results, the teacher used the discrepancy to introduce measurement accuracy and error. The episode illustrated that uncertainty was treated as a resource for mathematical reasoning rather than as evidence of failure.

Collaborative structures were deliberately organised to broaden participation. Group activities assigned roles such as measuring, calculating, recording, and presenting, ensuring that participation was not monopolised by high-achieving students. Teachers also used number hunts, calculation games, market simulations, role-play, songs, and movement. Competition was framed as improving one's own performance rather than defeating classmates. Peer tutoring emerged naturally when students who had understood a concept explained it in familiar language to classmates. Differentiation was evident through graded tasks, additional challenges, individual guidance, alternative media, extended learning time, and strategically balanced group composition.

Students' accounts corroborated the observed effectiveness of these practices. S1 reported that learning with cake or balls made concepts easier to understand, while S2 recalled using marbles to support calculation. S4 identified the use of cake as particularly helpful in understanding fractions, and S5 noted that blocks and pictures made mathematics more accessible. Across the five students, concrete resources, humour, games, discussion, and peer assistance were repeatedly associated with enjoyment and comprehension. The second component of the model can thus be conceptualised as a contextual–concrete pedagogical cycle: connecting mathematics to lived

experience, representing concepts through manipulable objects, facilitating collaborative inquiry, differentiating assistance, and returning students to mathematical explanation.

Table 2. Pedagogical Design of Child-Friendly Mathematics Learning

Pedagogical principle	Illustrative practice	Observed contribution
Contextualisation	Shopping, food sharing, body height, and school objects	Connects concepts with children's lived experiences
Concrete representation	Cake, marbles, blocks, rulers, and measuring tapes	Makes abstract relationships visible and manipulable
Active inquiry	Measuring, comparing, discussing, and presenting	Develops participation and mathematical reasoning
Structured collaboration	Group roles, paired work, and peer tutoring	Includes students with different confidence levels
Differentiation	Graded tasks, alternative explanations, and additional guidance	Accommodates varied learning readiness
Playful learning	Games, simulations, humour, songs, and movement	Reduces tension and increases engagement

Source: Interview, classroom observation, and learning-document data.

Relational Safety, Error-Friendly Discourse, and Student Mathematical Agency

The third finding concerns the relational practices through which mathematics classrooms became emotionally safe. Teachers consistently used polite Indonesian and Madurese, addressed students by name or affectionate terms such as "Dik" and "Nak," and maintained a calm tone even when correcting behaviour. Classroom discipline was firm but non-humiliating: students were approached individually, asked to explain what had happened, and invited to participate in resolving the problem. Observation confirmed that teachers did not shout, ridicule, or use threatening language. The resulting atmosphere was lively but orderly, enabling students to remain attentive without experiencing the classroom as rigid or intimidating.

The teachers' responses to incorrect answers were central to this emotional ecology. Rather than immediately labelling a response as wrong, GM1 used expressions such as, "Almost correct; look at this part again," or asked students to explain how they had reached their answer. GM2 similarly responded, "Try again; you are almost there," while praising the courage involved in attempting the problem. These responses repositioned error as an informative stage in mathematical inquiry. Students were allowed to revise answers, compare strategies, and receive specific prompts. Consequently, correction operated as guided reasoning rather than judgement, protecting students' self-worth while maintaining conceptual precision.

Student voice was supported through multiple participation channels. Teachers routinely invited questions, requested opinions during explanations, and created opportunities for students

to present group findings. GM1 also used an anonymous suggestion box, allowing quieter students to communicate concerns without speaking publicly. During group work, teachers monitored students who were silent or hesitant and offered accessible questions to build their confidence before moving to more demanding tasks. This approach did not equate participation solely with speaking before the whole class. Instead, student agency included asking questions, writing ideas, manipulating resources, explaining to peers, choosing solution methods, and revising reasoning.

The five student interviews provided convergent evidence that these relational practices reduced fear. S1 stated that an incorrect answer was met with guidance rather than anger, while S2 recalled being told that having the courage to respond was itself important. S3 reported feeling unafraid of making mistakes because the teacher emphasised trying, and S4 associated enjoyment with the teacher's patience and refusal to shout. S5 explained that initial sadness after an incorrect response did not persist because the teacher encouraged another attempt. Although several students still reported brief embarrassment, this emotion did not develop into withdrawal because teacher responses restored their willingness to participate.

Support for mathematics-related anxiety extended beyond the classroom teacher. The guidance and counselling teacher identified possible indicators such as lesson avoidance, visible restlessness before tests, physical complaints, and sudden declines in attainment. Support included private conversations, simple breathing techniques, reframing negative beliefs, coordination with the mathematics teacher, and family involvement. The classroom teacher also reported that previously silent or fearful students had begun raising their hands and attempting problems. These changes suggest that mathematical confidence emerged not from lowering academic expectations but from altering the interpersonal conditions under which challenge was experienced. Relational safety therefore functioned as a mechanism enabling agency, persistence, and intellectual risk-taking.

Table 3. Relational and Emotional Mechanisms

Relational mechanism	Teacher practice	Student-level indication
Respectful communication	Gentle language, attentive listening, and affectionate forms of address	Students reported feeling safe and comfortable
Error-friendly discourse	Guided correction and opportunities to try again	Reduced fear of incorrect answers
Recognition of effort	Specific praise for attempts and progress	Increased confidence and persistence
Multiple forms of voice	Questions, presentations, written responses, and suggestion box	Wider participation, including quieter students
Private restorative response	Individual dialogue rather than public punishment	Protection of dignity and classroom trust

Psychosocial support	Counselling, relaxation, cognitive reframing, and family coordination	Targeted response to mathematics anxiety

Source: Teacher, student, observation, and counselling data.

Development-Oriented Assessment and Distributed Support for Model Sustainability

The fourth finding reveals that assessment was designed primarily to support development rather than rank students. Mathematics teachers combined written tests, oral quizzes, projects, observation, student portfolios, and short formative checks during lessons. Assessment therefore captured not only final answers but also participation, group collaboration, mathematical explanation, persistence, and improvement over time. GM1 frequently asked questions during instruction or requested brief written reflections to identify misconceptions before proceeding. These activities were not always graded; instead, they informed subsequent explanations and adjustments. Assessment was thus embedded within teaching as a diagnostic and responsive process.

Feedback practices reflected the same orientation. Teachers provided specific information about what students had accomplished and which aspect required attention. For example, a student might be told that the calculation procedure was correct but that the operation sign needed rechecking. Documentary evidence showed written comments combining recognition with a concrete direction for improvement. Scores were not announced publicly, and teachers avoided comparing one student's result with another. Students were informed that assessment was intended to identify learning progress rather than determine personal worth. These practices reduced evaluative pressure while preserving expectations for accuracy, revision, and conceptual growth.

Portfolios and daily assessment records expanded the temporal horizon of evaluation. Portfolios contained worksheets, drawings, completed tasks, and reflections, enabling teachers to examine development across multiple learning episodes rather than relying on a single test. Worksheets provided space for students to write or draw their reasoning, thereby recognising that mathematical understanding could be represented in different ways. Teachers also used observations of discussion and group work to identify students who required further explanation. Assessment evidence consequently served three interconnected purposes: documenting progress, guiding differentiated support, and communicating development to students and families.

The model was sustained through distributed institutional support. Mathematics teachers collaborated with the classroom teacher to understand students' habits and with the guidance and

counselling teacher to address emotional barriers. The principal conducted classroom supervision and facilitated monthly discussions on student progress, while parents were engaged through semester meetings and WhatsApp communication. Parents were encouraged to accompany children patiently, praise effort, and avoid intimidation or comparison. This cross-setting coordination was particularly important because the school identified parental beliefs such as the assumption that mathematics required harsh instruction or that slower learners lacked intelligence as a continuing challenge.

The overall findings enabled the reconstruction of the model as an interconnected system rather than a collection of isolated techniques. Its foundational layer comprised Islamic ethics, child rights, and non-violent school policy. Its instructional layer combined contextual tasks, concrete resources, collaboration, play, and differentiation. Its relational layer established respectful communication, error tolerance, student voice, and emotional support. Its evaluative layer used formative evidence, portfolios, constructive feedback, and non-comparative reporting. Finally, its sustainability layer consisted of reflective teaching, leadership support, counselling, professional collaboration, and parental engagement. The model remained constrained by limited resources and the need to transform conventional beliefs, but the alignment across these layers produced a coherent child-friendly mathematics learning ecology.

Table 4. Integrated Structure of the Child-Friendly Mathematics Learning Model

Model layer	Core components	Intended function
Ethical foundation	Islamic values, child dignity, justice, and non-violence	Establishes normative direction
Instructional design	Contextual, concrete, collaborative, playful, and differentiated learning	Makes mathematics meaningful and accessible
Relational climate	Respectful language, error tolerance, student voice, and restorative discipline	Enables safety and intellectual risk-taking
Developmental assessment	Formative checks, portfolios, specific feedback, and non-comparison	Supports improvement without excessive pressure
Psychosocial support	Counselling, individual assistance, peer support, and family coordination	Addresses emotional and learning barriers
Institutional sustainability	Leadership, supervision, teacher reflection, collaboration, and parent education	Maintains and extends the model

Source: Synthesis of interview, observation, and documentary findings.

Discussion

The principal finding of this study demonstrates that child-friendly mathematics learning is not merely characterised by games, concrete media, or gentle teacher language. Rather, it constitutes an integrated pedagogical ecology that combines ethical foundations, instructional design,

classroom relationships, developmental assessment, and institutional support. The alignment among these dimensions explains why students were willing to ask questions, attempt solutions, and revise errors without diminishing mathematical rigour. This finding extends equitable mathematics education by showing that meaningful access to mathematical concepts depends not only on instructional quality but also on emotional safety and institutional protection of children's dignity (Jahangiri et al., 2022; OECD, 2023; Turner et al., 2012).

The integration of Islamic values within the model was substantively pedagogical because *rahmah*, justice, responsibility, honesty, and mutual assistance were translated into observable classroom practices. Religious integration did not stop at prayers, Islamic symbols, or religiously contextualised exercises; instead, it shaped how teachers distributed opportunities to speak, corrected errors, organised cooperation, and resolved behavioural problems without humiliation. This finding suggests that Islamic education becomes pedagogically authentic when its moral principles transform power relations and classroom participation. Accordingly, religious values should be assessed through their capacity to produce equitable interaction, respectful communication, and meaningful recognition of students' voices (Fithriyah, 2026; Jahangiri et al., 2022; Setyaningsih et al., 2019).

The use of cakes, blocks, marbles, rulers, measuring tapes, and everyday commercial situations illustrates that child-friendliness also operates through conceptual accessibility. Concrete resources enabled students to connect direct experiences with visual representations, mathematical language, and symbolic notation, while familiar contexts made mathematical tasks more intelligible. Nevertheless, manipulatives do not automatically generate conceptual understanding. Their effectiveness depends on the teacher's ability to guide students from physical action toward increasingly abstract representation and explanation. Therefore, the strength of this model lies not in the materials themselves, but in the orchestration of representations, differentiation, questioning, and collaborative mathematical discourse (OECD, 2023; Polizzi et al., 2021).

Relational safety and constructive responses to errors emerged as crucial mechanisms linking student well-being with mathematical participation. When incorrect answers were addressed through guiding questions and opportunities for revision, students retained dignity and continued engaging with the problem. Such practices did not lower academic standards; instead, they transformed mathematical challenge from a social threat into an opportunity for reasoning and growth. This interpretation is consistent with evidence that mathematics anxiety is negatively

associated with achievement, whereas positive achievement emotions support engagement and persistence. Emotional climate should therefore be regarded as an essential dimension of effective mathematics pedagogy rather than as an additional pastoral concern (Breit et al., 2025; Polizzi et al., 2021).

Opportunities to ask questions, present group findings, select solution strategies, participate in peer tutoring, and communicate through an anonymous suggestion box positioned students as mathematical agents rather than passive recipients of procedures. Agency emerged when students' ideas were acknowledged and influenced teachers' instructional responses, not merely when students were allowed to speak. This distinction is important because student voice can become symbolic when it does not alter classroom practices. At SD At-Taufiqiyah, multiple participation channels enabled quieter students to contribute through writing, manipulation of materials, small-group dialogue, and peer explanation, thereby strengthening engagement, ownership, and collective responsibility for learning (Breit et al., 2025; Lau et al., 2022).

The use of formative assessment, portfolios, process observation, and specific feedback indicates a shift from ranking-oriented evaluation toward assessment for development. Avoiding public score announcements and interpersonal comparison reduced social pressure, while feedback identifying successful steps and areas for revision maintained mathematical precision. However, formative assessment is not effective merely because it occurs frequently. Its educational value depends on how teachers interpret evidence and use it to modify instruction, provide targeted support, and help students undertake subsequent learning actions. The findings therefore emphasise that responsive follow-up, rather than the number of quizzes or comments, determines the developmental quality of assessment (Rustam et al., 2026; Sayyi et al., 2023).

The sustainability of the model depended on distributed responsibility among the principal, mathematics teachers, classroom teacher, guidance and counselling teacher, and parents. Teacher forums, instructional supervision, counselling support, and family communication prevented mathematical difficulties from being reduced to individual deficiencies. Nevertheless, practices developed in a relatively small school cannot be transferred mechanically to other institutions. What is potentially transferable is the model's underlying principles and mechanisms, while implementation must remain responsive to local resources, student characteristics, and school culture. Its broader implication is the need for practice-based professional development, collaborative reflection, and continuous monitoring of both mathematical understanding and

student well-being.

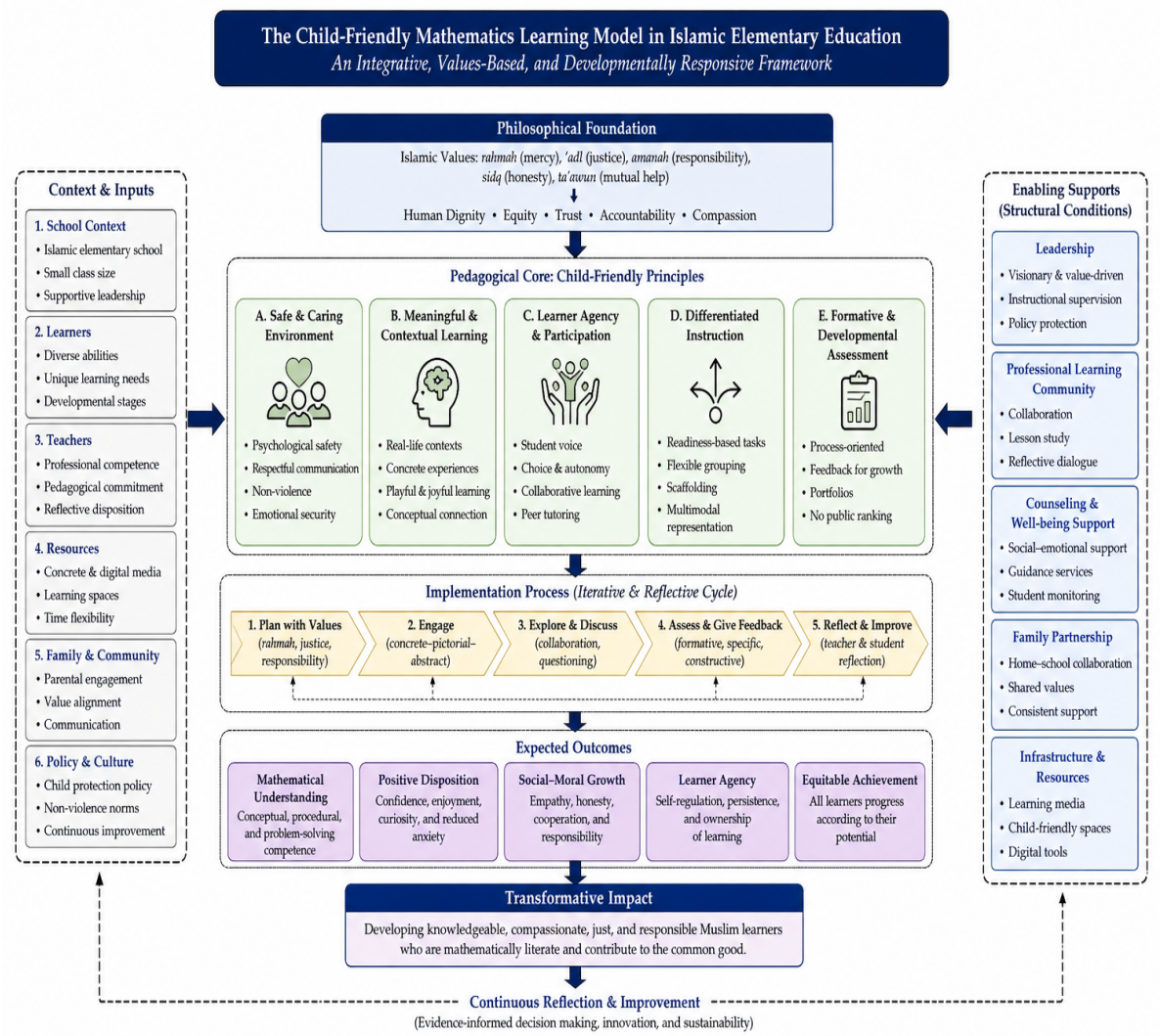

Figure 1. Child-Friendly Mathematics Learning Model in Islamic Elementary Education

CONCLUSION

This study concludes that the child-friendly mathematics learning model at SD At-Taufiqiyah Bangkalan is constructed through the integration of ethical-Islamic values, contextual pedagogy, relational safety, developmental assessment, and institutional support. The model does not treat child-friendliness as an additional classroom technique, but as a coherent educational ecology grounded in *rahmah*, justice, responsibility, honesty, and mutual assistance. These values are translated into concrete practices through non-violent discipline, respectful communication, differentiated instruction, contextual and manipulative activities, collaborative learning, constructive responses to error, and formative assessment. Such alignment enables students to participate more confidently, express mathematical ideas, revise misconceptions, and engage with mathematical challenges without experiencing humiliation or excessive pressure.

The study further demonstrates that the sustainability of the model depends on distributed responsibility among the principal, mathematics teachers, classroom teacher, guidance and counselling teacher, parents, and students. Its main contribution lies in formulating a school-based framework that connects mathematical understanding with emotional security, learner agency, equity, and Islamic moral formation. However, because the study was conducted in a small single-school context, its findings should be understood as analytically transferable rather than universally generalisable. Future research should examine the model across diverse Islamic elementary schools, evaluate its influence on mathematical achievement and anxiety over time, and develop measurable indicators for each component. Even so, the model offers a practical and theoretically grounded reference for developing mathematics learning that is meaningful, inclusive, humane, and sustainable.

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