International Journal of Modern Education
IJMOE
EISSN: 2637-0905
Volume: 8 Issue: 29 (March 2026) PP. 1433-1450

INTERNATIONAL JOURNAL OF ENTREPRENEURSHIP AND MANAGEMENT PRACTICES (IJEMP)
www.gaexcellence.com/ijemp

GLOBAL ACADEMIC EXCELLENCE

FORMULATING A QURAN-INTEGRATED STEM LEARNING FRAMEWORK FOR PRESCHOOL EDUCATION BASED ON CURRICULUM 2026 AND CHILD DEVELOPMENTAL DOMAINS

Sanarehan Sidik[1*], Noor Hisham Md Nawi[2]

[1]Faculty of Languages and Human Development, University Malaysia Kelantan, Bachok, Malaysia
sanarehan.sidik@gmail.com https://orcid.org/0009-0007-4983-8188
[2]Faculty of Languages and Human Development, University Malaysia Kelantan, Bachok, Malaysia
hisham@umk.edu.my https://orcid.org/0009-0003-9115-6800
[*]Corresponding Author

Article Info:

Article history:
Received date: 22.01.2026
Revised date: 15.02.2026
Accepted date: 26.03.2026
Published date: 31.03.2026

To cite this document:

Sidik, S., & Md Nawi, N. H. (2026). Formulating A Quran-Integrated Stem Learning Framework for Preschool Education Based on Curriculum 2026 And Child Developmental Domains. *International Journal of Modern Education, 8*(29), 1433-1450.

Abstract:

This study aims to explore and develop a conceptual basis for the formation of a STEM learning framework integrating the Quran at the preschool level, in line with the 2026 Preschool Curriculum and the developmental needs of children. This study was conducted due to the lack of a systematic learning framework and clear pedagogical guidelines to support the integration of STEM and the Quran in preschool teaching practices. A basic qualitative research approach (Basic Qualitative Inquiry) was used, involving semi-structured interviews with five participants among preschool teachers and private kindergarten operators. The data was analyzed using manual coding and thematic analysis techniques to identify main patterns and themes. The study findings identified two main themes, namely the need for a systematic STEM learning framework integrating the Quran and the need for pedagogical elements and practical teaching guidelines. This study found that the absence of a clear structure and guidelines caused the integration of the Quran in STEM learning to be implemented inconsistently and symbolically. Therefore, this study contributes to the development of a conceptual basis for the formation of a holistic, integrated and developmentally appropriate learning framework for preschool children, thus supporting efforts to strengthen STEM education based on Islamic values in early childhood.

International Journal of Modern Education
EISSN: 2637-0905
IJMOE
Volume: 8 Issue: 29 (March 2026) PP. 1433-1450

DOI: 10.35631/IJMOE.829086 **Keyword:**

Early Childhood Education, Learning Framework, Preschool STEM, Preschool Pedagogy, Quran Integration

Introduction

Early childhood education represents a critical phase in shaping the cognitive, emotional, social and physical foundations that influence an individual's development across the lifespan. At this formative stage, learning experiences must be meaningful, integrated and contextual in order to effectively nurture thinking skills, curiosity and value formation among young children. In response to the demands of the 21st century, STEM (Science, Technology, Engineering and Mathematics) education has increasingly gained recognition as a powerful pedagogical approach for fostering higher-order thinking skills, problem-solving abilities and creativity from an early age (Bernal Párraga et al., 2024; Revák et al., 2024). Within the preschool context, STEM education is not intended to produce technical expertise, but rather to introduce children to inquiry-based processes, exploration and experiential learning that are developmentally appropriate.

Previous studies have consistently demonstrated that the integration of STEM in early childhood education positively influences cognitive development and children's interest in science and mathematics (Samara & Kotsis, 2025; Syafruddin et al., 2024). Learning approaches such as hands-on activities, project-based learning, and real-world problem-solving enable children to construct conceptual understanding in a natural and engaging manner. Furthermore, an integrated STEM approach supports the development of social and psychomotor skills through collaborative learning, manipulation of materials, and exploration of the learning environment (Pakombwele & Tsakeni, 2024). However, the effective implementation of STEM in early childhood settings requires a clear pedagogical framework that aligns with children's developmental stages and is guided by current curriculum standards.

In Muslim-majority contexts, early childhood education extends beyond the development of foundational academic skills to encompass the formation of faith, moral values, and spiritual awareness. The Quran, as the primary source of Islamic education, contains numerous references to nature, creation, observation, and reflection that can be meaningfully connected to STEM concepts. The integration of Quranic elements into STEM learning therefore holds significant potential for promoting a holistic educational approach that bridges naqli and aqli knowledge, supporting balanced cognitive, affective and psychomotor development in young children (Siron, 2024). Such integration aligns with the principles of holistic education, which emphasize the harmonious development of intellect, emotion, spirituality and physical well-being.

International Journal of Modern Education
IJMOE
EISSN: 2637-0905
Volume: 8 Issue: 29 (March 2026) PP. 1433-1450

Despite the growing recognition of the potential benefits of integrating STEM and Quranic values, the literature reveals a notable lack of a systematic STEM learning framework specifically designed for preschool education. Existing practices are often fragmented and inconsistent, relying heavily on individual teacher initiative without the support of a coherent conceptual framework (Hachey & Mehta, 2024; Siron, 2024). As a result, Quranic integration within STEM learning is frequently implemented at a superficial level, such as through symbolic references to verses or values, without strong pedagogical alignment with STEM activities.

Moreover, empirical evidence indicates that many preschool teachers face challenges due to limited pedagogical guidance on how to simultaneously align STEM learning with Quranic principles and children's developmental needs. Insufficient professional training and the absence of clear instructional guidelines have contributed to lower levels of teacher confidence in implementing integrated STEM learning meaningfully (Erol & İvrendi, 2024; Rúa Martínez et al., 2024). This finding is consistent with broader research on early childhood teacher professional development, which highlights the importance of systematic conceptual and pedagogical support in enhancing the effectiveness of STEM instruction.

The introduction of the 2026 Preschool Curriculum further emphasizes the need for a holistic and integrated learning approach that addresses children's cognitive, affective and psychomotor development. Nevertheless, the literature suggests that there remains a significant gap in the availability of learning frameworks capable of systematically integrating curriculum requirements, STEM education and Islamic values in a coherent and developmentally appropriate manner (Revák et al., 2024; Bernal Párraga et al., 2024). Addressing this gap necessitates foundational research aimed at developing a learning framework grounded in curriculum demands, learning theories and the developmental characteristics of young children.

In response to these issues, this article focuses on the development of a Quran-integrated STEM learning framework for preschool education based on the 2026 Preschool Curriculum and child development domains. Specifically, the study seeks to identify the key factors required for the development of such a framework, as well as to analyse pedagogical elements and instructional guidelines that support meaningful Quran integration in STEM learning, drawing on expert perspectives and current educational practices. This focus aligns with previous research emphasizing the importance of conceptual frameworks in guiding the development of STEM pedagogical innovations and instructional modules (Naser et al., 2023; Hachey & Mehta, 2024).

In terms of significance, this study offers important contributions at multiple levels. For policymakers and government agencies, the findings provide empirical support for strengthening the implementation of the 2026 Preschool Curriculum through a structured, holistic learning framework grounded in Islamic values. For educators and preschool administrators, the proposed framework offers conceptual guidance that may enhance understanding, confidence and consistency in implementing Quran-integrated STEM learning. From an industry perspective, the framework may serve as a foundation for the development of high-quality teaching modules, instructional materials and targeted professional training programs. Academically, this study enriches the literature on STEM integration, Islamic education and early childhood education by contributing to the development of a holistic and contextually grounded learning framework.

International Journal of Modern Education
IJMOE
EISSN: 2637-0905
Volume: 8 Issue: 29 (March 2026) PP. 1433-1450

With regard to scope, this article focuses on the conceptual development of a Quran-integrated STEM learning framework for preschool education. The study is limited to the analysis of relevant literature, curriculum documents and expert perspectives in the fields of early childhood education, STEM and Islamic education. It does not evaluate classroom implementation or effectiveness; rather, it emphasizes design principles, key factors and pedagogical elements as a foundation for future empirical research and module development.

This article is structured as follows: the introductory section outlines the background, problem statement, objectives, significance and scope of the study. This is followed by a review of relevant literature on early childhood STEM education, the integration of Islamic values and child development theories. The research methodology is then described, followed by the presentation of findings and the proposed framework. The article concludes with a discussion of implications and recommendations for future research.

Literature Review

Early childhood education constitutes a fundamental foundation for shaping individuals' cognitive, affective and psychomotor development, while also playing a strategic role in the long-term social and economic advancement of a nation. Contemporary research consistently demonstrates that early exposure to high-quality learning experiences positively influences children's academic achievement, social competence and value formation (Behera & Acharya, 2024). Within this context, STEM education has gained increasing attention as a pedagogical approach capable of strengthening essential 21st-century skills, including critical thinking, creativity, problem-solving and collaboration from an early age (Revák et al., 2024).

In early childhood settings, STEM education does not aim to introduce formal or abstract scientific concepts. Instead, it emphasizes learning through exploration, inquiry and direct experience. Empirical studies indicate that preschool children are capable of engaging meaningfully in engineering practices, design thinking and basic scientific processes when provided with developmentally appropriate learning environments (Ho & Pang, 2024; Kavak & Deretarla Gül, 2024). Integrated STEM approaches have also been shown to support the development of science process skills, algorithmic thinking and creative problem-solving abilities among young learners (Abanoz & Kalelioğlu, 2024; Uyulan & Aslan, 2024).

Despite these documented benefits, the implementation of STEM education at the preschool level continues to face substantial challenges, particularly in relation to teachers' conceptual understanding, pedagogical readiness and the absence of a coherent framework to guide practice. A systematic review by Revák et al. (2024) highlights that, notwithstanding the growing body of early childhood STEM research, ambiguity persists regarding the definition of integrated STEM and its translation into classroom practices. Consequently, STEM implementation often remains fragmented, inconsistent and highly dependent on individual teacher interpretation.

From an Islamic educational perspective, the integration of Quranic values and principles within the learning process is central to the development of intellectually and spiritually balanced individuals. The Quran encourages observation of nature, critical thinking and reflection upon creation, all of which align closely with the epistemological foundations of scientific inquiry. Siron (2024) reports that early childhood educators perceive the integration of Islamic and Quranic values into STEM education as a crucial element in fostering holistic

International Journal of Modern Education
IJMOE
EISSN: 2637-0905
Volume: 8 Issue: 29 (March 2026) PP. 1433-1450

understanding among children. Nevertheless, the same study underscores a persistent lack of practical and systematic guidance for teachers on how such integration can be meaningfully implemented.

The existing literature further reveals that research on Quran-integrated STEM education has predominantly focused on the primary and secondary school levels, particularly within mathematics and science disciplines. Approaches such as problem-based learning and design thinking have been shown to effectively contextualize STEM concepts within Islamic values. However, empirical investigations addressing preschool education remain limited, despite this stage being critical for the formation of foundational thinking patterns and values.

From a pedagogical standpoint, constructivist theory frequently underpins early childhood STEM education, emphasizing knowledge construction through experience, social interaction and reflection. Inquiry-based, experiential and design-based learning approaches have been identified as developmentally appropriate for preschool learners (Hachey & Mehta, 2024). The iSTEM Rope Model proposed by Hachey and Mehta (2024) highlights the importance of a structured conceptual framework to support integrated STEM implementation in early childhood settings; however, this model does not account for the integration of Quranic dimensions or religious values.

Child development literature further emphasizes the necessity of balancing cognitive, affective and psychomotor domains in early learning experiences. STEM education that prioritizes cognitive outcomes alone risks marginalizing the development of attitudes, values and motor skills. In this regard, Quranic integration offers significant potential to strengthen the affective domain by nurturing values, curiosity and environmental responsibility, while simultaneously supporting psychomotor development through hands-on and exploratory activities (Siron, 2024; Pakombwele & Tsakeni, 2024).

At the policy and curriculum level, Malaysia's National Preschool Curriculum and STEM education initiatives advocate holistic, integrated and child-centered learning approaches (Ministry of Education Malaysia, 2017). Although the curriculum provides conceptual space for integrating values and STEM, it lacks explicit guidance on the systematic incorporation of Quranic elements into STEM learning. This absence has resulted in preschool teachers and operators relying heavily on individual creativity and experience, contributing to variations and inconsistencies in practice.

Research on teacher professional development further indicates that many preschool teachers exhibit limited confidence and knowledge in implementing integrated STEM education, particularly when religious elements are involved (Erol & İvrendi, 2024). While STEM-focused professional development programs have been shown to enhance teacher self-efficacy and instructional quality, the integration of Quranic values remains insufficiently addressed within these initiatives.

Based on the reviewed literature, several research gaps are evident. First, there is a lack of studies that establish a conceptual framework for Quran-integrated STEM learning specifically tailored to preschool education. Second, there is limited availability of pedagogical guidelines to assist teachers in aligning curriculum requirements, learning theories and child development domains simultaneously. Third, while many studies evaluate the effectiveness of specific

International Journal of Modern Education
IJMOE
EISSN: 2637-0905
Volume: 8 Issue: 29 (March 2026) PP. 1433-1450

interventions or modules, foundational research aimed at developing a comprehensive conceptual framework remains scarce.

In response to these gaps, this study proposes the development of a conceptual framework for Quran-integrated STEM learning that encompasses four core components: the requirements of the 2026 Preschool Curriculum, pedagogical approaches grounded in child development, the integration of the Quran as a foundational value system and holistic learning that balances cognitive, affective and psychomotor domains. This framework is intended to inform future module development, teacher training programs and empirical research in the field of Quran-integrated STEM education at the preschool level.

Overall, this literature review underscores the urgent need for systematic, contextual and theory-driven research to support the development of a Quran-integrated STEM learning framework. Beyond contributing to the academic discourse in early childhood and Islamic education, this study holds the potential to inform policy, educational practice and community efforts aimed at nurturing a generation of children who are intellectually competent, morally grounded and spiritually balanced.

Methodology

The methodology of this study was designed to facilitate an in-depth understanding of participants' experiences, perceptions and perspectives regarding the phenomenon under investigation through a qualitative research approach. A qualitative approach was deemed appropriate as the study seeks to explore subjective meanings, lived experiences and contextual interpretations within real-world settings, rather than to quantify variables or generate statistical generalisations. Qualitative inquiry enables researchers to examine social realities holistically and prioritises the depth, richness and complexity of data, offering insights that may not be captured through purely quantitative methods (Creswell, 2009; Tracy, 2013).

This study adopted a Basic Qualitative Inquiry design, a flexible qualitative approach that is not confined to a specific methodological tradition such as phenomenology, ethnography, or grounded theory. This design was selected because the primary objective of the study is to understand how participants interpret and make sense of their experiences and professional practices related to the phenomenon, without the intention of developing new theory or conducting in-depth cultural analysis. As noted by Creswell and Poth (2018), Basic Qualitative Inquiry is particularly suitable for studies that aim to explore individual meanings and perspectives in practical and authentic social contexts.

The use of this design provides methodological flexibility, allowing researchers to select data collection and analysis strategies that best address the research questions. Such flexibility is consistent with the views of Lapan, Quartaroli and Riemer (2012), who emphasise that qualitative research should remain adaptive and responsive to the context and purpose of the study rather than being constrained by rigid procedural requirements.

Data were collected using two primary methods: semi-structured interviews and unstructured observations. Semi-structured interviews were employed to ensure alignment with the research objectives while allowing participants sufficient freedom to articulate their experiences, perceptions and reflections in their own words. This approach facilitates the generation of rich,

International Journal of Modern Education
EISSN: 2637-0905
IJMOE
Volume: 8 Issue: 29 (March 2026) PP. 1433-1450

in-depth and narrative data, enabling a deeper understanding of the phenomenon from the participants' perspectives (Tracy, 2013; Liamputtong, 2020).

Unstructured observations were conducted to complement the interview data by providing contextual insights derived from direct observation of participants' behaviours, interactions and working environments. These observations allowed the researcher to examine the consistency between participants' reported experiences and actual practices. The integration of interview and observational data enhances data richness and supports a more comprehensive understanding of the phenomenon (VanderStoep & Johnston, 2009).

The combination of these methods aligns with the study's objective to explore participants' experiences holistically. While interviews capture subjective interpretations and internal experiences, observations provide contextual grounding and empirical depth.

This study employed purposive sampling, as not all individuals within the broader population possessed experiences or expertise relevant to the focus of the research. Participants were therefore selected based on predefined criteria that ensured their ability to contribute meaningful and information-rich data. This approach aligns with qualitative research principles, which prioritise informational relevance over statistical representativeness (Creswell, 2009; Yin, 2016).

A total of five participants were involved in the study, comprising preschool teachers and private kindergarten operators. This sample size was considered appropriate given the qualitative nature of the research, where the emphasis is placed on depth of understanding rather than the number of participants. Miles, Huberman and Saldaña (2014) assert that qualitative sample adequacy is determined by data saturation, the point at which no new themes or insights emerge from additional data. In this study, five participants were deemed sufficient, as each participant possessed substantial relevant experience and contributed detailed, reflective perspectives aligned with the research objectives.

Data analysis was conducted manually using coding and thematic analysis techniques. The analytical process commenced with verbatim transcription of interview data, followed by repeated readings to achieve data familiarisation. Meaning units were then identified and initial codes were assigned to significant segments of data. These codes were subsequently organised into broader categories, leading to the development of key themes aligned with the study objectives. Thematic analysis was selected due to its flexibility and effectiveness in identifying patterns and meanings within qualitative data (Miles et al., 2014; Tracy, 2013).

Manual analysis, supported by basic software such as Microsoft Word, was intentionally chosen to enable close and continuous engagement with the data. This approach enhances the researcher's sensitivity to contextual nuances and subtle meanings embedded within participants' narratives. As noted by Leavy (2014), manual analysis remains a valid and effective strategy, particularly for small-scale qualitative studies that prioritise interpretive depth.

Ethical considerations were given careful attention throughout the study. Ethical approval was obtained from the relevant research institution prior to data collection. Participants were fully informed about the study's objectives, procedures and their rights, including the right to withdraw at any stage without consequence. Written informed consent was obtained, and all

International Journal of Modern Education
IJMOE
EISSN: 2637-0905
Volume: 8 Issue: 29 (March 2026) PP. 1433-1450

data were anonymised to ensure confidentiality and protect participants' identities (Thomas, 2021; Yin, 2016).

To enhance the trustworthiness of the findings, several strategies were employed. These included method triangulation through the integration of interview and observational data, as well as member checking, whereby participants were given the opportunity to review interview transcripts and the researcher's interpretations. These procedures help ensure that the findings accurately reflect participants' experiences and reduce the potential for researcher bias (Creswell & Poth, 2018; Miles et al., 2014).

Overall, the methodology of this study was systematically designed and closely aligned with the research objectives to achieve an in-depth understanding of the phenomenon under investigation. The application of a qualitative approach through Basic Qualitative Inquiry, the use of complementary data collection methods, rigorous thematic analysis and strict adherence to ethical and trustworthiness principles collectively ensure the methodological robustness of the study. This methodological approach positions the study to make a meaningful and credible contribution to the field being explored.

Findings

This section presents the findings of the study derived from semi-structured interviews conducted with five participants comprising preschool teachers and private kindergarten operators. The data were analysed using manual coding and thematic analysis to identify recurring patterns, underlying meanings and key themes related to the development of a Quran-integrated STEM learning framework at the preschool level. The presentation of findings is organised in accordance with the study objectives, with particular emphasis on the core factors influencing framework development, as well as the pedagogical elements and instructional guidelines required by practitioners.

Overall, the findings indicate a strong consensus among participants regarding the urgent need for a systematic, clearly structured and practically applicable framework for STEM learning that integrates the Quran. Participants consistently reported that existing practices are largely fragmented, heavily dependent on individual teacher initiative and insufficiently supported by coherent curriculum structures or explicit pedagogical guidance. As a result, the integration of STEM and Quranic elements in preschool settings is often implemented in an ad hoc manner rather than through deliberate and informed instructional planning.

Three key observations emerged from the analysis. First, the integration of the Quran within STEM learning is frequently symbolic in nature, with Quranic elements introduced superficially rather than being conceptually embedded within STEM activities. Second, both teachers and kindergarten operators expressed limited confidence in implementing integrated STEM and Quran-based learning due to the absence of specific instructional guidance and practical examples. Third, although child development principles are commonly acknowledged in discussions of preschool education, these principles are rarely translated systematically into the planning and execution of STEM learning activities.

Collectively, these findings directly support the study's problem statement, which highlights the absence of a structured framework and clear pedagogical guidelines for Quran-integrated STEM learning at the preschool level. The results underscore the need for a coherent

International Journal of Modern Education
EISSN: 2637-0905
IJMOE
Volume: 8 Issue: 29 (March 2026) PP. 1433-1450

conceptual and pedagogical foundation to guide teachers in implementing integrated STEM learning that is developmentally appropriate, meaningful and aligned with Islamic values.

Coding and Theme Formation Process

Data analysis was carried out through several stages:
1. Verbatim transcription of interviews
2. Repeated reading for comprehensive understanding
3. Open coding
4. Grouping codes into categories
5. Formation of main themes

Figure 1: Relationship between Coding and Theme

Factors Framework Needs
- Preschool Curriculum 2026
- Child Development
- Integration of Quranic Values

→ Theme 1: Systematic Framework Needs

Pedagogical & Teaching Elements
- Teaching and Learning Strategies
- The Role of Teachers
- Practical Guides

→ Theme 2: The Need for Structured Pedagogical Guides

Table 1: Summary of Coding and Themes

Main Code	Code Description	Theme
Vagueness of STEM practices	STEM is implemented without a clear structure	Systematic Framework Requirements
Symbolic integration of the Quran	Quranic verses are just decoration or an opening for teaching and learning	Systematic Framework Requirements
Purely cognitive focus	Lack of attention to affective & psychomotor	Systematic Framework Requirements
Lack of teacher guidance	Teachers have no practical references	Pedagogical Guidance Requirements
Need for examples of activities	Teachers need real Pedagogical examples	Pedagogical Guidance Requirements
Teachers' lack of confidence	Fear of misinterpreting the Quran	Pedagogical Guidance Requirements

International Journal of Modern Education
IJMOE
EISSN: 2637-0905
Volume: 8 Issue: 29 (March 2026) PP. 1433-1450

Theme 1: The Need for a Systematic Quran-Integrated STEM Learning Framework

All participants stated that the absence of a clear learning framework caused the implementation of Quran-integrated STEM to be inconsistent. Teachers often implemented STEM activities based on general modules, while Quranic elements were added in an unplanned manner.

A preschool teacher (P1) stated:
"We do STEM according to our own creativity, but when we want to include the Quran, we usually just read one verse. There is no clear guide on how to relate it to the activity."

A kindergarten entrepreneur (P3) explained:
"Teachers are actually interested, but they need a clear framework. Otherwise, each class does it differently."

This finding shows that participants see the framework as a basic guide that can integrate the curriculum, Quranic values and child development in a holistic learning system.

Observations also showed that the STEM activities carried out often emphasize cognitive aspects such as calculations or simple experiments, but do not highlight values such as gratitude, responsibility or awareness of Allah's creation. This reinforces the interview findings that Quranic integration is still separate from the actual learning process.

Theme 2: The Need for Pedagogical Elements and Clear Teaching Guides

The second theme that emerged consistently was the need for pedagogical elements and practical teaching guides. Participants stated that although they understood the importance of Quranic integration in STEM, they lacked the confidence to implement it without specific guidance.

A teacher (P2) stated:
"Sometimes we are afraid to explain Quranic verses because we are afraid of misinterpretation, so we avoid in-depth explanations."

A kindergarten owner (P5) also stated:
"If there were step-by-step guides, teachers would be more confident. Nowadays, they try a lot on their own."

This finding indicates that teachers need:
• Step-by-step pedagogical guides
• Examples of STEM activities integrating Quran
• Explanation of the relationship between Quranic verses and STEM concepts

Observations found that teachers were more comfortable implementing hands-on activities but would avoid reflective discussions related to Quran due to the absence of scripts or pedagogical guides. This confirms the need for clear and practical pedagogical support.

The findings of this study show that the main problem lies not in the lack of awareness, but in the lack of systematic structure and guidance. Teachers and kindergarten operators have a high

International Journal of Modern Education
IJMOE
EISSN: 2637-0905
Volume: 8 Issue: 29 (March 2026) PP. 1433-1450
willingness and interest in STEM learning integrated with the Quran, but implementation is hindered by pedagogical ambiguity.

The first theme supports Specific Objective 1, which is to identify the main factors in the formation of the framework, which includes:
• Alignment with the 2026 Preschool Curriculum
• Emphasis on the holistic development of children
• Meaningful integration of the Quran

The second theme supports Specific Objective 2 by highlighting the need for pedagogical elements such as an inquiry approach, experiential learning and value reflection.

Unexpected or Contradictory Findings

An unexpected finding was that there was one participant who felt that the integration of the Quran did not need to be too deep at the preschool level.

Participant (P4) stated:
"For me, just the basic values are enough. It does not need to be too technical or heavy, for fear that the children will get confused."

This view was different from other participants who wanted a more systematic integration. However, this difference shows the diversity of teachers' understanding and reinforces the need for a framework that is flexible, gradual and appropriate to the development of the children.

Overall, the findings of this study indicate that the development of a STEM learning framework that integrates the Quran at the preschool level is a clear and urgent need. Two main themes have been identified, namely the need for a systematic learning framework and the need for pedagogical elements and practical teaching guidelines.

These findings confirm that without a clear framework and guidelines, the implementation of STEM that integrates the Quran will continue to occur in isolation and inconsistently. Therefore, the findings of this study provide a solid empirical basis for the development of a learning framework that is holistic, integrated and in line with the 2026 Preschool Curriculum and the developmental needs of children.

Conclusion

This study was conducted to explore the need for the development of a Quran-integrated STEM learning framework at the preschool level, particularly from the perspective of key factors influencing framework formation, as well as the pedagogical elements and instructional guidelines required by preschool teachers and private kindergarten operators. The findings clearly indicate that the primary challenges in current practice do not arise from a lack of awareness or negative attitudes toward STEM education or Quranic integration. Instead, they stem from the absence of a systematic structure and clearly articulated pedagogical guidance. These findings directly confirm the two problem statements of the study, namely the lack of a structured learning framework and the absence of instructional guidelines to support meaningful Quran integration within preschool STEM learning.

International Journal of Modern Education
IJMOE
EISSN: 2637-0905
Volume: 8 Issue: 29 (March 2026) PP. 1433-1450

The thematic analysis revealed two closely interconnected themes. The first theme highlights the need for a systematic and integrated STEM learning framework that incorporates Quranic values. The findings demonstrate that current practices tend to treat STEM education and Quranic integration as separate and fragmented components, largely dependent on individual teacher initiative. This situation aligns with prior research emphasising that the absence of a coherent conceptual framework undermines the effectiveness of early childhood STEM implementation (Hachey & Mehta, 2024; Revák et al., 2024). Within the context of Islamic education, the tendency toward symbolic integration of Quranic elements without strong pedagogical alignment has similarly been identified as a persistent challenge (Siron, 2024).

The second theme underscores the need for clear, practical pedagogical elements and teaching guidelines. The findings indicate that preschool teachers require concrete instructional support to implement Quran-integrated STEM learning in ways that are both meaningful and developmentally appropriate. In the absence of such guidance, teachers tend to exhibit lower confidence in explaining and contextualising Quranic elements, despite recognising their educational value. This finding directly supports the second specific objective of the study and is consistent with the literature emphasising the importance of constructivist pedagogy, experiential learning and developmentally appropriate practices in early childhood education (Creswell & Poth, 2018; Liamputtong, 2020).

Taken together, these themes suggest that the formation of an effective learning framework must extend beyond alignment with the 2026 Preschool Curriculum alone. It requires the deliberate integration of STEM content, Quranic values and holistic child development domains encompassing cognitive, affective and psychomotor dimensions. This finding reinforces the arguments presented in the Introduction and Literature Review, which emphasise that Quran-integrated STEM learning necessitates a systematic, yet flexible approach grounded in learning theory and the contextual realities of early childhood education.

In terms of theoretical contribution, this study enriches the literature in early childhood education by providing empirical evidence on the necessity of developing a Quran-integrated STEM learning framework. It addresses a significant research gap identified in the literature, particularly the limited availability of basic qualitative studies that focus on conceptual framework development rather than solely on evaluating the effectiveness of instructional modules or interventions. The findings further support the view that the integration of STEM and Islamic values should be understood as a planned and intentional pedagogical process, rather than as an add-on or supplementary component of learning.

From a practical perspective, this study offers a strong foundation for the development of Quran-integrated STEM learning frameworks and instructional modules that can serve as practical guides for teachers and kindergarten operators. Such a framework has the potential to enhance teacher confidence, minimise inconsistencies in instructional practice and support the implementation of more holistic and meaningful learning experiences at the preschool level. Additionally, the findings carry important implications for policymakers and teacher education institutions in designing professional development programmes and pedagogical guidelines aligned with the aspirations of the 2026 Preschool Curriculum.

Overall, this study highlights that the development of a Quran-integrated STEM learning framework is not merely relevant but essential in strengthening holistic, value-based preschool education. By providing both conceptual and empirical foundations, this study contributes to

International Journal of Modern Education
IJMOE
EISSN: 2637-0905
Volume: 8 Issue: 29 (March 2026) PP. 1433-1450

the advancement of more systematic educational practices and opens avenues for further research and pedagogical innovation in the field of early childhood education.

Overall, the coding and themes that emerged from this study are:
• Coding: Quran Integration Needs → Theme: Framework Needs Factors
• Coding: Lack of Guidance → Theme: Challenges & Lack of Guidance
• Coding: Interactive Approach & Developmental Awareness → Theme: Pedagogical Elements
• Coding: Practical Guidance → Theme: Guidance Needs & Support

Contribution

This study makes a substantive contribution to the field of preschool education integrating Islamic values and STEM learning. First, it provides an in-depth understanding of the critical factors necessitating the development of a structured learning framework, which may serve as a foundational reference for the design of integrated STEM–Quran curricula or instructional modules. By articulating these factors, the study addresses a key gap in existing literature, particularly in relation to framework-oriented research in early childhood STEM education.

Second, the study underscores the importance of interactive, child-centred pedagogical approaches that align with young children's developmental characteristics. The findings offer practical pedagogical insights that can assist teachers in designing and implementing meaningful, hands-on learning experiences that integrate STEM concepts with Quranic values in a developmentally appropriate manner. This contribution is particularly relevant for practitioners seeking to move beyond symbolic integration toward more intentional and pedagogically grounded practices.

Third, the study highlights gaps in current educational practices and proposes concrete directions for instructional guidance and institutional support that can be adopted by preschool administrators and educational policymakers. These findings have practical implications for improving consistency, quality and coherence in the implementation of Quran-integrated STEM learning across preschool settings.

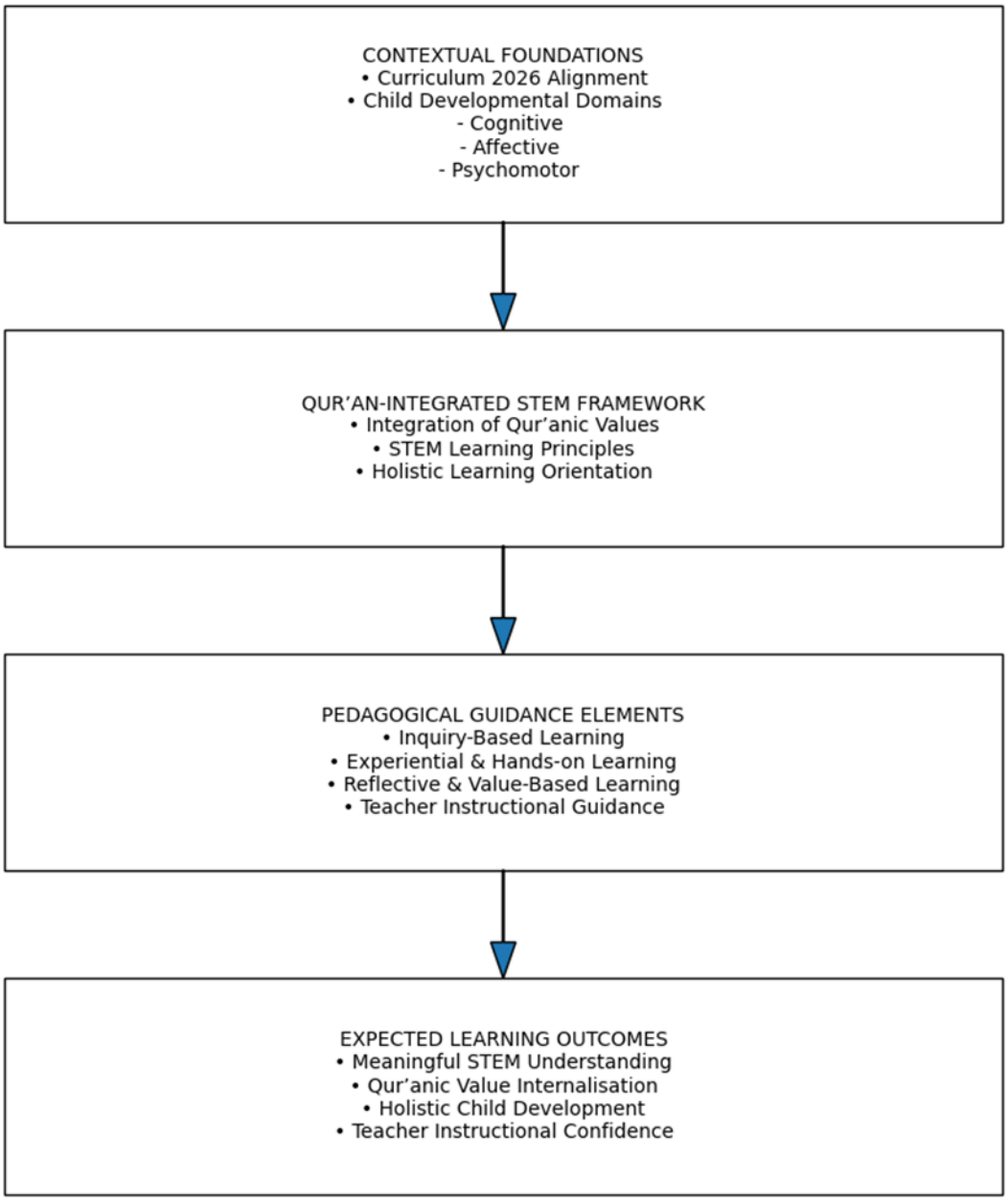
Furthermore, this study extends existing literature on the effectiveness of STEM learning integrated with religious values by providing empirical evidence that is contextually grounded in the Malaysian preschool education system and aligned with the 2026 Preschool Curriculum (Rauf & Zulnaidi, 2024; Rahim, 2017; Wahyuni et al., 2024). In doing so, the study contributes not only to pedagogical practice but also to the theoretical development of Islamic values-integrated STEM education in early childhood contexts.

In conclusion, the findings of this study emphasize that the development of an effective Quran-integrated STEM learning framework requires:
(1) a focused alignment between Quranic values and curriculum-relevant content
(2) the adoption of interactive, experiential and child-centred pedagogical approaches
(3) the provision of clear practical guidance and instructional support for teachers
(4) systematic professional development to address gaps in teachers' conceptual and pedagogical understanding.

International Journal of Modern Education
IJMOE
EISSN: 2637-0905
Volume: 8 Issue: 29 (March 2026) PP. 1433-1450

These conclusions directly address the study objectives and respond to the identified problem statements, while providing a robust conceptual and practical foundation for the development of a coherent, effective and developmentally appropriate Quran-integrated STEM learning framework for preschool education.

Figure 2: Conceptual Framework Diagram Qur'an-Integrated STEM Learning Framework in Preschool Education



International Journal of Modern Education
IJMOE
EISSN: 2637-0905
Volume: 8 Issue: 29 (March 2026) PP. 1433-1450

Explanation of the Conceptual Framework

The conceptual framework proposed in this study was developed through a systematic synthesis of the problem statement, research objectives, empirical findings derived from coding and thematic analysis and relevant supporting literature discussed in the Introduction and Literature Review sections. This integrative process ensured that the framework is theoretically grounded, empirically informed and contextually relevant to preschool education.

The first component, Contextual Foundations, represents the underlying contextual basis of the framework. This component emphasises alignment with the 2026 Preschool Curriculum and the domains of child development, encompassing cognitive, affective, and psychomotor dimensions. Its inclusion is informed by the study's findings, which indicate that insufficient coherence between curriculum requirements and child developmental needs constitutes a primary weakness in the current implementation of Quran-integrated STEM learning at the preschool level. By explicitly foregrounding these contextual elements, the framework seeks to ensure that instructional practices are developmentally appropriate and curriculum aligned.

The second component, the Quran-Integrated STEM Framework, constitutes the core of the model. This component integrates Quranic values, fundamental STEM learning principles and a holistic learning orientation within a unified instructional structure. The empirical findings revealed that existing practices tend to rely on symbolic references to the Quran, rather than conceptual integration. Consequently, this component is designed to shift practice toward a more systematic and conceptually grounded approach, positioning the Quran and STEM as interconnected sources of knowledge within an integrated learning system.

The third component, Pedagogical Guidance Elements, was developed in response to the second major theme identified in the study, namely the need for clear and practical pedagogical guidance. This component incorporates inquiry-based learning, experiential learning, reflective and value-based learning, as well as explicit teacher instructional guidance. These elements directly address issues related to teachers' limited confidence and the absence of practical support in implementing Quran-integrated STEM learning, thereby translating conceptual intentions into actionable classroom practices.

The final component, Expected Learning Outcomes, outlines the anticipated outcomes resulting from the implementation of the proposed framework. These outcomes include the development of meaningful STEM understanding, appreciation of Quranic values, holistic child development across cognitive, affective and psychomotor domains and enhanced teacher confidence in instructional practice. Collectively, these outcomes align with the objectives of the study and support the broader aspiration of holistic, value-based preschool education.

International Journal of Modern Education
EISSN: 2637-0905
Volume: 8 Issue: 29 (March 2026) PP. 1433-1450

Acknowledgements: The authors would like to express her sincere gratitude to the Faculty of Languages and Human Development, University Malaysia Kelantan, for providing the necessary academic support, resources and a conducive research environment throughout the completion of this study.

Special appreciation is extended to Dr. Noor Hisham Md Nawi for his invaluable guidance, continuous support and insightful feedback, which have significantly contributed to the successful completion of this research.

The authors also wish to thank all participants, including preschool teachers and kindergarten operators, for their willingness to share their experiences and perspectives, which greatly enriched the findings of this study.

Finally, heartfelt thanks are extended to colleagues and peers for their constructive comments, encouragement and intellectual contributions that have enhanced the overall quality of this paper.

Funding Statement: No Funding

Conflict of Interest Statement: The authors declare that there is no conflict of interest regarding the publication of this paper. All authors have contributed to this work and approved the final version of the manuscript for submission to the International Journal of Modern Education (IJMOE)

Ethics Statement: This study was conducted in accordance with ethical research standards and received approval from the relevant institutional authority at University Malaysia Kelantan. Informed consent was obtained from all participants prior to data collection. Participation was voluntary, and confidentiality and anonymity were assured. All data were used solely for academic purposes.

Author Contribution Statement: All authors contributed significantly to the development of this manuscript. [Author 1] was responsible for the conceptualization, methodology, and overall supervision of the study. [Author 2] handled data collection, analysis, and interpretation of results.

International Journal of Modern Education
IJMOE
EISSN: 2637-0905
Volume: 8 Issue: 29 (March 2026) PP. 1433-1450

References

Abanoz, T., & Kalelioğlu, F. (2024). *Unleashing the potential: Illuminating pedagogical strategies employed by early childhood educators in STEM education for cultivating algorithmic thinking skills in young learners*. European Early Childhood Education Research Journal.

Bernal Párraga, A. P., Ninahualpa Quiña, G., Cruz Roca, A. B., Sarmiento Ayala, M. Y., Reyes Vallejo, M. E., Carrillo, M., & Benavides Espín, D. S. (2024). Innovation in early childhood: Integrating STEM from the area of mathematics for significant improvement. *Ciencia Latina, 8*(4), 5675–5699.

Barbosa, E. F., & Maldonado, J. C. (2006). *Towards the establishment of a standard process for developing educational modules*. Frontiers in Education Conference, 5–10.

Behera, C., & Acharya, A. K. (2024). *Early childhood care and education: A systematic literature review in Indian context*. International Journal of Innovative Science and Research Technology.

Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry & research design: Choosing among five approaches* (4th ed.). SAGE Publications.

Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods pproaches* (3rd ed.). SAGE Publications.

Erol, A., & İvrendi, A. (2024). STEM professional development of early childhood teachers. *Psychology in the Schools*.

Hachey, A. C., & Mehta, P. J. (2024). *The iSTEM Rope Model: Defining integrated early childhood STEM education and its pedagogical linages to the Reggio Emilia-inspired approach*. Journal of Research in Innovative Teaching & Learning.

Ho, T. E., & Pang, V. (2024). *Outcomes of an integrated STEM with design thinking module on preschoolers' engineering practices*. Eurasia Journal of Mathematics, Science and Technology Education.

Kavak, Ş., & Deretarla Gül, E. (2024). *Impact of STEM education on preschool children's scientific process skills*. E-Kafkas Eğitim Araştırmaları Dergisi.

Liamputtong, P. (2020). *Qualitative research methods* (4th ed.). Oxford University Press.

Lapan, S. D., Quartaroli, M. T., & Riemer, F. J. (2012). *Qualitative research: An introduction to methods and designs*. Jossey-Bass.

Leavy, P. (2014). *The Oxford handbook of qualitative research*. Oxford University Press.

Liamputtong, P. (2020). *Qualitative research methods* (5th ed.). Oxford University Press.

Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook* (3rd ed.). SAGE Publications.

Naser, K. M. M., Alamassi, S. M. S., Shana, Z., & Halili, S. H. (2023). Designing of a flipped STEM classroom engineering-based module: Fuzzy Delphi approach. International Journal of Interactive Mobile Technologies, 17(10), 4–29.

Pakombwele, A., & Tsakeni, M. (2024). *Designing learning centres that facilitate knowledge construction on science process skills in early childhood classrooms*. Journal of Ecohumanism, 3(7), 755–764.

Revák, I., Csernoch, M., Czimre, K., Dávid, Á., Tóth, B. K., Malmos, E., Sütő, É., & Kurucz, D. (2024). *A systematic review of STEM teaching-learning methods and activities in early childhood*. Eurasia Journal of Mathematics, Science and Technology Education, 20(8), em2481.

Rúa Martínez, F. de J., Merchán, M., & Camacho-Tamayo, E. (2024). *Teaching sequences based on the STEM approach for the development of inquiry in early childhood*

education: A systematic review. Eurasia Journal of Mathematics, Science and Technology Education, *20*(10), em2517.

Rauf, R., & Zulnaidi, H. (2024). *Integrasi STEM dan Pendidikan Islam dalam Kurikulum Prasekolah*. Kuala Lumpur: Dewan Bahasa dan Pustaka.

Rahim, M. (2017). *Pedagogi Islam dalam Pendidikan Awal Kanak-Kanak*. Shah Alam: Penerbit Universiti Teknologi Mara.

Samara, V., & Kotsis, K. T. (2025). The use of STEM as a tool for teaching the concept of magnetism in kindergarten. *Journal of Research in Environmental and Science Education, 2*(1), 1–17.

Siron, Y. (2024). Integrating Islamic values into STEM education: Perspectives from in-service and pre-service early childhood educators. *ThufuLA, 12*(2), 231–252.

Syafruddin, S., et al. (2024). Effectiveness of Think-Pair-Share and STEM models on critical thinking in early childhood education. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini, 8*(5), 1320–1330.

Siron, Y. (2024). *Integrating Islamic values into STEM education: Perspectives from in-service and pre-service early childhood educators*. ThufuLA, 12(2), 231.

Thomas, C. G. (2021). *Research methodology and scientific writing*. Springer.

Tracy, S. J. (2013). *Qualitative research methods: Collecting evidence, crafting analysis, communicating impact*. Wiley-Blackwell.

Uyulan, V., & Aslan, S. (2024). *Development of students' critical thinking skills with STEM activities in early childhood science education*. Anadolu Üniversitesi Eğitim Fakültesi Dergisi.

VanderStoep, S. W., & Johnston, D. D. (2009). *Research methods for everyday life: Blending qualitative and quantitative approaches*. Jossey-Bass.

Yin, R. K. (2016). *Qualitative research from start to finish* (2nd ed.). The Guilford Press.Wahyuni, S., Nur, H., & Aminah, F. (2024). *Implementasi STEM Berasaskan Nilai Islam di Pendidikan Prasekolah*. Johor Bahru: Universiti Teknologi Malaysia Press.

Zakaria, Z., Md Sallehan, S., Wan Kamaruddin, W. A. Z., Ahmad Helmi, A. B., & Islaieh, A. R. I. S. (2018). Challenges in early Quran education: Identifying factors that affect Permata Insan summer camp students' performance. *3*(3), 9–14.