TEACHING : Jurnal Inovasi Keguruan dan Ilmu Pendidikan
Vol. 5. No. 4, Desember 2025
E-ISSN : 2775-7188
P-ISSN : 2775-717X
Online Journal System : https://jurnalp4i.com/index.php/teaching

MANAGEMENT OF THE INTEGRATED ISLAMIC SCIENCE-BASED CURRICULUM AT NONFORMAL EDUCATION: A CASE STUDY OF ABATA MOVEMENT INDONESIA

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ABSTRAK

Kurikulum berbasis sains yang terintegrasi dengan nilai-nilai Islam terus berkembang seiring perkembangan zaman dan semangat ijtihad atau inovasi dalam menghadapi permasalahan kehidupan yang kompleks di era abad ke-21. Penelitian ini bertujuan untuk menganalisis perencanaan dan implementasi manajemen kurikulum sains yang berlandaskan nilai-nilai Islam. Penelitian ini menggunakan metode kualitatif dengan pendekatan studi kasus. Instrumen yang digunakan meliputi wawancara dengan tim koordinator program yayasan dan para guru, observasi dengan mengamati serta berpartisipasi dalam proses pelaksanaan inovasi Abata Sains Quran di lembaga pendidikan nonformal Abata Movement Indonesia, serta kajian literatur terhadap penelitian-penelitian yang telah ada pada lembaga pendidikan formal dan nonformal terkait penerapan inovasi kurikulum berbasis sains, khususnya dalam pembentukan sistem pembelajaran STEAM (Science, Technology, Engineering, Art, and Mathematics) dalam Program Abata Sains Quran (ASIQ). Data dianalisis menggunakan teknik analisis kualitatif Miles dan Huberman pada konsep program yang telah dilaksanakan. Hasil penelitian menunjukkan bahwa Program ASIQ (Abata Sains Quran) di Yayasan Abata Movement Indonesia direncanakan oleh Manajer Program melalui penyusunan *cetak biru* dan sosialisasi kepada para pemangku kepentingan seperti guru dan relawan yang terlibat dalam program ini. Berbagai tantangan dan faktor pendukung juga dihadapi oleh Manajer Program, seperti kebutuhan untuk mengkontekstualisasikan berbagai istilah dalam sains agar sesuai dengan pemahaman anak-anak.
Kata Kunci: *STEAM, Abata Sains Quran, Manajemen Kurikulum, Pendidikan Nonformal.*

ABSTRACT

Science-based curriculum integrated with Islamic values continues to be carried out based on the development of the times and the spirit of ijtihad or innovation in overcoming complex life problems in the 21st century era. This study aims to analyze the planning and implementation of the science curriculum management based on Islamic values. This study uses a qualitative method with a case study approach. The instruments used were interviews with the coordinator of the foundation's program team and teachers, observations by observing and participating in the process of implementing curriculum innovation Abata Sains Quran at the non-formal educational institution Abata Movement Indonesia, and studies of existing research literature on educational institutions, both formal and non-formal, in implementing science-based curriculum innovation, especially in order to form a STEAM learning system (Science, Technology, Engineering, Art, and Mathematics) in Abata Sains Quran Program (ASIQ). The data were analyzed using qualitative analysis techniques by Milles and Huberman on the concept of the program that has been implemented. The result indicated that the ASIQ (Abata Sains Quran) program at Yayasan Abata Movement Indonesia was planned by the Manager Program through compiling the blueprint and socializing to the stakes holders such as teachers

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and volunteers who were involved in this program. Challenges and supporting factors are also faced by Manager Program such as contextualization of various terms in science which are suitable for children.
Keyword: *STEAM, Abata Sains Quran, Curriculum Management, Nonformal Education*

INTRODUCTION

The development of the 21st century has brought significant transformations in various aspects of life, including a shift in job types that are increasingly being replaced by technology and artificial intelligence. In the Indonesian context, two major challenges have emerged: strengthening the character of the younger generation and addressing the low level of scientific literacy. Low scientific literacy leads to limited research-based innovation, weak public engagement in environmental issues, and increased vulnerability to misinformation. OECD (2019) emphasizes that scientific literacy is an essential competency for modern citizens to understand natural phenomena, communicate scientific information, and make data-driven decisions. At the same time, UNESCO (2021) states that future education must integrate digital literacy, scientific literacy, and ethical literacy to meet the demands of the Society 5.0 era. Within Islamic education, the integration of religious values with modern scientific knowledge has become an important discourse. Hashim (2017) highlights that Islamic education must not only cultivate spirituality but also develop intellectual competencies relevant to contemporary challenges. Thus, scientific literacy is not merely an academic skill but a process of shaping values, attitudes, and critical thinking abilities essential for daily life (Dewi et al., 2024).

International assessments consistently show that the scientific literacy of Indonesian students remains low. Indonesia's average PISA scores between 2006 and 2018, ranging from 382 to 403, remain far below the international average (Hidayah et al., 2019). This condition underscores the need for more effective science learning strategies at the primary school level. Science learning based on observation, experimentation, and scientific discussion has been proven to enhance conceptual understanding and higher-order thinking skills. An inquiry-based approach has become a crucial foundation in modern science education because it actively engages students in scientific investigation and helps them understand complex global issues. NASEM (2016) emphasizes that inquiry-based learning places investigation and design at the center of instruction, enabling students to develop scientific thinking that is relevant to real-world problems. Similarly, Harlen (2015) highlights that understanding the *big ideas of science* through inquiry helps students recognize the connections between scientific knowledge, social responsibility, and global challenges such as climate change. Thus, both sources illustrate that inquiry-based approaches not only strengthen scientific competencies but also foster students' social and environmental awareness. Entering the Society 5.0 era, education is required not only to strengthen cognitive skills but also to integrate technology with moral values. This need is reflected in the development of integrated Islamic scientific knowledge, which integrates modern scientific understanding with Islamic values to create meaningful and holistic learning (Al-Attas, 2018). According to Hashim and Holilah (2022), integrated Islamic education seeks to unify knowledge by eliminating the separation between religious teachings and modern scientific disciplines, enabling students to view learning as a holistic and interconnected process. However, studies on knowledge integration in Islamic education have largely focused on formal institutions such as schools and madrasahs.

In reality, non-formal institutions such as Taman Pendidikan Al-Qur'an (TPQ) play a strategic role in shaping students' character and foundational competencies. Since the 1990s,

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TPQs have developed as institutions that teach Qur'anic literacy while strengthening Islamic moral character. Rusydi and Huda (2018) argue that the Islamic curriculum aims to eliminate the dichotomy between religious and general knowledge. Moreover, the 2020 Decree of the Director General of Islamic Community Guidance (Dirjen Bimas Islam No. 91/2020) structurally opens opportunities for integrating Qur'anic learning with character development and basic competencies. Although integration of scientific knowledge and Islamic values has been widely studied in formal education settings, similar research in non-formal institutions such as TPQs remains limited. This research gap indicates the need for deeper exploration of how an Islamic values–based science curriculum is designed and managed in non-formal education contexts. The investigation of TPQ's potential in developing integrated Islamic scientific knowledge therefore becomes the central focus of this study.

RESEARCH METHOD

This study employed a qualitative research design with a descriptive approach. The research instruments included an observation guide, a semi-structured interview guide, and documentation sheets. The observation guide was used to observe the process of curriculum socialization and the implementation of the Integrated Islamic-Science curriculum conducted by the program manager, teachers, and volunteers. The interview guide supported the collection of in-depth information regarding curriculum planning, implementation processes, and the supporting and inhibiting factors. Documentation was obtained from the blueprint of the Integrated Islamic-Science curriculum and video archives of the Abata Sains Quran learning activities uploaded on the Abata Kids YouTube channel. The informants of this research consisted of one program manager as the primary informant and seven supporting informants, including four teachers, two volunteers, and one group of students aged 8–13 years involved in the Abata Sains Quran program. Data analysis followed the stages proposed by Miles and Huberman, namely data reduction, data display, and conclusion drawing/verification.

RESULTS AND DISCUSSION

Results

The Planning Management of Integrated Islamic-Science Curriculum

The process of management curriculum planning is started by making a grand design consisting of the goal of Abata Sains Quran, syllabus, guideline, and estimated cost budget, worksheet, and stakes holder participating in this curriculum project.
This syllabus of integrated islamic science guidelined in the below:

Table 1. The concept of Abata Sains Quran Experiments

Theme of Eksperiment	The Goal of Experiment	The context of daily activities	Quran Integrated and Islamic Values
The Process of Rain Formation	Interpreting the process of rain formation as a manifestation of the balance of nature and God's power	In life, good results require a process. Be patient and continue the process, like water vapor slowly becoming rain.	QS Ar Rum verse 48

Fun Bloating Experiment	Take a lesson from Allah's command to eat halal and Thayyib food	Learn about awareness of maintaining eating patterns as a preventative measure to keep the body healthy and prevent disorders in our digestive organs.	QS Al Baqarah verse 172
Breathing Balloon Experiment / Respiratory System	Understand the phenomena that occur in the lung organs when breathing	The role and function of God's creation has been arranged in such a way that humans can take oxygen from nature which is provided free by God.The role and function of God's creation has been arranged in such a way that humans can take oxygen from nature which is provided free by God.	QS Al Hijr verse 29
Walking Color Experiment / Absorption Principle Experiment	To foster awareness of the greatness of God's creation, including living creatures like plants, which, by God's permission, are able to absorb water from their roots.	To learn how plants grow and obtain nutrients, from seeds to trees that grow and reproduce.	QS Yasin verse 33
Invisible Color Experiment	Observing color changes due to heat as an observable phenomenon	Contemplating and demonstrating the greatness of Allah from something invisible to something visible. All forms of processes and endeavors are sunnatullah (the law of Allah) and will yield results according to His will and intention. QS. Al-Baqarah: 164	QS. Al-Baqarah verse 164

The program team provided worksheets for teachers and students, each containing the title, objectives, tools and materials needed for the experiment, steps, observation guides, discussions, and conclusions. These teacher handouts served as a guide, and when implemented in the field, the students learned to explore the process and results of their observations.

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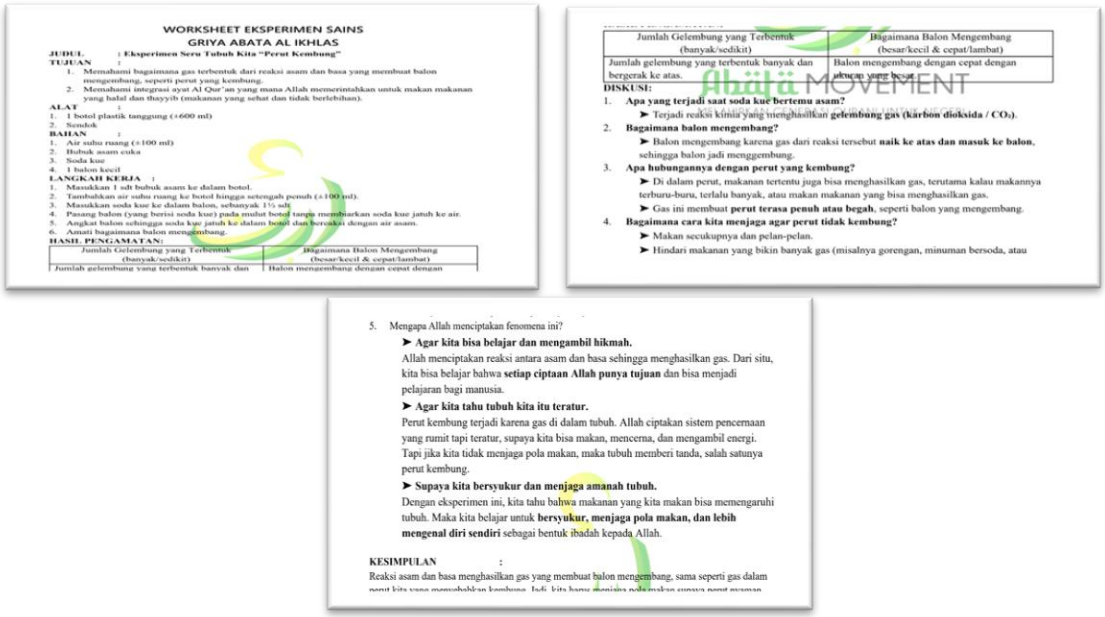

Figure 1. Teacher's handheld experiment worksheet

The program manager also compiles a worksheet for each experiment, which contains several reflection questions. These worksheets are designed to help students connect the scientific concepts explored during the activities with the Islamic values taught in the program. The reflection questions encourage students to think critically, review and evaluate the experimental process, and understand the spiritual meaning behind scientific phenomena. In addition, the worksheets function as formative assessment tools to measure students' level of understanding and their ability to apply the concepts in their daily lives.

Figure 2. Worksheet for student

The Organizing Management of Integrated Islamic-Science Curriculum

Based on an interview of the research subject, the program manager of Abata Movement Indonesia, Deby Putri, stated that there is a routine program named Pembinaan Bulanan / Monthly Coaching for teachers and volunteers. In this session the program manager delivered

guidelines for each experiment in a month. Besides, the program manager gave practice directly on the steps of the experiment. The process of the experiment consisting of:

1. Conveying the theme of the experiment.
2. Explain the goal of the experiment based on science.
3. Giving demonstration of the experiment
4. Reflection after the experiment process based on the daily activity context.
5. Reflection toward islamic values based on the verse released on the Quran.

The results of interviews with teachers when implementing experiments conveyed that the children were enthusiastic as stated by Ustadzah Umma who teaches at one of the foster places *"The children were very enthusiastic when doing experiments. They wanted to try other experiments again"*. According to the program team coordinator in the interview, through ASIQ (Abata Sains Quran) the aim was to instill in students a different perspective regarding the phenomena that occur around them, for example, the event of a bloated stomach is not only interpreted as being sick and taking medicine, but also thinking again for example *"what did I consume that could be like this"*. In addition, children can also be invited to dialogue regarding the phenomenon as a regularity of the digestive system that has been regulated by Allah. So that through this activity, religious values are increasingly instilled in children from an early age.

The Challenges in Planning and Organizing of Integrated Islamic-Science Curriculum

According to in-depth interviews, the program coordinator who developed this learning concept faced challenges such as:

1. Language appropriate for students
   The learning development team must be able to translate complex scientific concepts into language that is easily understood by children. For example, the discussion of density (in science) becomes "density," "react" (in science) becomes "undergo change," and "capillarity" becomes "absorption."
2. Research and Reflection between Science and the Integration of Islamic Values
   The development team requires references that align with the values being taught and align with the integration of Islamic values in the Quran and Hadith. Therefore, discussions with Arabic language experts and, if possible, exegetes are necessary to comprehensively understand the meaning of the verses and Hadith.
3. Contextualization in Life
   Experimental activities, then integrating the values contained in the Quran, are not sufficient; they must be contextualized in everyday life, especially for children, with simple understandings that can be emulated in their lives.

Discussion

The science curriculum, which is part of STEAM learning, has led researchers to adopt insights from the literature on the implementation of STEAM in formal education. Research conducted by Brown et al. (2024) on STEAM integration curriculum in elementary schools in the United States showed an increase in students' knowledge of how devices and applications work, as well as their problem-solving abilities using technology. Students demonstrated better recognition in robot programming and technology utilization, and their attitudes also improved across various dimensions, including interest in considering future careers in STEAM fields. STEAM teaching and learning strategies contribute to the development of competent and competitive human resources and exert a positive impact on the education sector.

Based on a literature review conducted by Wiryanto et al. (2023), the implementation of the STEAM approach in Indonesian elementary schools generally involves several stages, such as formulating questions, designing projects, developing implementation schedules, coordinating activities, testing and assessing outcomes, and evaluating the entire learning process. Meanwhile, international elementary schools tend to emphasize introducing material components, designing learning elements, implementing collaborative projects, and presenting outcomes in teams. In general, the STEAM approach has a positive impact on students, particularly in developing soft skills and final competency outcomes.

The Ministry of Religious Affairs of the Republic of Indonesia, through the Decree of the Director General of Islamic Community Guidance Number 91 of 2020, provides curriculum guidelines for Qur'anic Educational Institutions, which include plans and arrangements regarding objectives, content, learning materials, and methods used as references for implementing learning activities to achieve educational goals. The program manager developed the integrated Islamic-science curriculum based on the relevance of daily life contexts and Islamic values. This perspective aligns with constructivist theory, which emphasizes the importance of learning experiences connected to students' real-life contexts, including their cultural and religious backgrounds (Ismail & Wardi, 2025).

Based on observations, it was found that the program manager provided socialization sessions to teachers and volunteers involved in the Abata Sains Quran (ASIQ) learning process. This indicates that, to support the implementation of the curriculum concept that has been prepared during the planning stage, it is necessary to strengthen human resources as the involved stakeholders. This aligns with Wahyuni's (2020) argument that, in the context of integrating Islamic values into science education, human resources are one of the key pillars in translating a designed curriculum into instructional practice.

Empirical findings of the study reveal that the ASIQ curriculum planning process begins with the development of a blueprint that includes objectives, experimental themes, guidelines of Islamic values, and students' life contexts. This aligns with curriculum management theory at the planning stage, which emphasizes the importance of determining objectives, selecting content, and establishing systematic learning strategies. At the organizing stage, the program manager conducted training and socialization for teachers and volunteers to ensure the readiness of curriculum implementers. This step corresponds with the concept of curriculum organizing, which positions human resource empowerment as a key element in successful implementation. Meanwhile, the implementation stage is reflected in science-experiment activities combined with Qur'anic value reflection, active student engagement, and the use of worksheets as learning guides. Thus, the findings demonstrate a strong connection between curriculum management theory and the practical implementation of a science- and Islamic-values-based curriculum in non-formal educational institutions.

The integration of experimental models with daily life contexts and Qur'anic verses, as reflected in the Abata Sains Quran syllabus, indicates that curriculum design is adapted to students' needs through science learning experiences that foster curiosity, critical thinking, character formation, and spiritual experiences as Muslims. Through the application of various learning models such as thematic-integrative learning, Islamic science-based learning, and Islamic-based STEAM, students develop an understanding of the world from a scientific perspective while connecting this knowledge to the greatness of Allah as reflected in the verses of the Qur'an (Sutiana & Nugraha, 2025).

CONCLUSION

Curriculum management, particularly in the context of integrating science with Islamic values in the Abata Sains Quran program, involves the program manager as the primary subject in its planning stage. The program management team develops a syllabus guideline that includes experimental themes, objectives, contextualization within everyday life, and integration of lessons from Quranic verses relevant to the topic being studied. In its implementation, program management provides demonstrations to teachers and volunteers, who play a key role in field practice with students. Regarding the supporting factors and challenges faced in the planning and implementation of this program, the key areas include developing scientific language for easy understanding by children, as well as developing critical thinking skills to simplify the meaning of the Quran so that its values are effectively conveyed to children.

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