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Science and Qur'an Integrated Curriculum Model in Preparing Competencies for Religious Critical Graduates

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ABSTRACT

Islamic basic education faces ongoing challenges in integrating scientific mastery with the internalization of religious values, particularly in pioneering madrasas. This study aims to describe the integrated curriculum model of science and the Qur'an and analyze its implementation in developing critical and religious competencies at Madrasah Ibtidaiyah Modern Sainqu Ponorogo. Using a qualitative case study approach, data were collected through interviews, observations, and documentation involving the head of the madrasah and teachers. Data were analyzed using descriptive qualitative techniques, including data reduction, presentation, and conclusion drawing. The findings indicate that MIM Sainqu Ponorogo implements the integrated curriculum flexibly and gradually, in accordance with elementary students' developmental characteristics. The integration of science and the Qur'an is carried out through thematic learning and experiential activities, such as outing classes that connect natural phenomena with monotheistic values. Daily religious practices, including Dhuha prayers and Qur'anic memorization, strengthen character formation. Despite limitations in facilities and human resources, adaptive and collaborative strategies enable effective implementation. The study concludes that this integrated curriculum effectively supports the development of critical, religious, and well-rounded graduates.

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INTRODUCTION

Technology has developed very rapidly, since the transformation of information technology which was marked by the presence of personal computers and the forerunner of the internet in the 1980s (Fricticarani, Hayati, R, Hoirunisa, & Rosdalina, 2023). Technology has undergone rapid transformation, especially since the emergence of technology 5.0. (Sefriani, Sepriana, Radyuli, & Hakiki, 2022). One of the forms of technology in the 5.0 era that is currently developing rapidly includes the Internet of Things (IoT), Artificial Intelligence (AI), robotics, three-dimensional printing (3D printing), and Augmented Reality (AR) (Samala et al., 2023). In the 5.0 era, the use of technology reaches various aspects of human life, including the realm of education. Education in this era is focused on 21st century skills and abilities such as creativity, problem-solving, teamwork, critical thinking, and systemic thinking (Mahrunnisya, 2023). In addition, the availability of adequate

infrastructure and capacity of educational resources is an important factor (Sabir, Fitria, & Maryana, 2022). This requires an update in curriculum development and the application of technology-based learning methods, accompanied by an increase in teachers' competence in the use of learning technology. The success of technology integration in education is highly dependent on the ability of educators to manage learning pedagogically and systematically, so that learning is not only oriented towards academic achievement, but also supports the strengthening of students' values and character as a whole (Arifin, Aryani, & Prayitno, 2023).

Competency can be understood as the consistent integration of attitudes, thinking abilities, and actions that reflect the mastery of individual knowledge and skills. Graduate Competency Standards (SKL) are defined as the minimum limit for the achievement of students' competencies to be declared graduates at a level of education (Rahman, 2022). Government Regulation No. 19 of 2005 Based on the National Education Standards, Graduate Competency Standards are formulated as competency qualifications that include the realm of attitudes, knowledge, and skills. Competencies in SKL include all subjects or groups of subjects that are used as assessment references for graduates of educational units (Wulandari & Windarto, 2023). The Content Standards for Primary and Secondary Education units include minimum materials and minimum competency levels, which are required to achieve graduate competencies at certain levels and types of education. Content standards include the basic framework and structure of the curriculum, the learning load, the curriculum at the educational unit level, and the educational or academic calendar. The purpose of establishing the Graduate Competency Standard (SKL) is to realize graduation competency standards nationally and institutionally, provide a reference in the formulation of criteria and basic frameworks for controlling and quality assurance of graduates, and strengthening the professionalism of graduates through the application of national standards while still paying attention to the demands and characteristics of the institution in order to realize the vision and mission of educational institutions (Sunengsih, 2020).

The education system in Indonesia continues to change with the times, as an effort to improve the quality of education and adapt it to global needs and society (Eva Ervia, Risma Delima Harahap, & Ika Chastanti, 2024). Science and technology are two interrelated components, where science contributes to the creation of new technologies, while technology supports the development of knowledge. Although the pace of development of science and technology continues to increase, the human capacity to adapt to such advances tends to be limited. The development of the curriculum is influenced by the advancement of science and technology, which starts from a simple concept as a race track to evolve into a more detailed learning plan (Rohmah, 2021). The initial curriculum places more emphasis on the dissemination of cultural values, while the contemporary curriculum is designed to prepare learners with complex skills (Fauzi, Firdaos, Suwenti, Masdariah, & Kurniawati, 2025). The role of technology in education has a significant impact on curriculum development, so that the demands on the education system continue to experience gradual quality improvement. Therefore, today's curriculum needs to be designed to include digital literacy, strengthening critical thinking, and problem-solving skills in a global environment

The growing global influence requires collaboration between educational curricula that internalize the values of the Qur'an in the learning process (Dalimunthe, 2023). Through the integration of the Qur'an curriculum with education, it is hoped that it will be able to equip students not only with academic competence, but also spiritual and ethical values as a provision to face the dynamics of the times. In this way, students will be able to face global challenges with a broader perspective, so that they can play a positive role in the increasingly complex dynamics of society. Therefore, the integration of the Qur'an-based curriculum in education is seen as a strategic step to form a generation that not only excels in mastering science, but also has noble morals (Hanifah & Sofa, 2025). Taking into account the values and principles contained in the Qur'an, the main goal of the goal is the formation of individuals who have commendable character, extensive knowledge, and commitment to the principles of justice and humanity (Sabila, Safii, Malik, & Afif, 2024). Religion and science are two fields of science that are interrelated and cannot be separated from the foundation of the teachings of the Qur'an and Hadith.

A curriculum that combines the values of the Qur'an with science makes a significant contribution to the development of students' character, especially in increasing critical thinking capacity and strengthening religious values (The Wicked, 2025). Through the integration of Qur'anic values with a scientific approach, the curriculum stimulates students to not only master academic concepts, but also to internalize moral and ethical principles that can guide their actions. Learning can be considered successful and achieved if measured based on the level of students' abilities which include critical thinking skills, creativity, communication, collaboration, and self-confidence (Qolbiyah, Mansur, & Bakar, 2022). An effective curriculum must be able to integrate the teachings of Islam with the challenges and needs that students face in their daily lives. The critical-religious curriculum has the function of empowering students to become individuals of faith, noble character, and able to think critically in dealing with problems in society (Kartika, 2016). Therefore, this curriculum has an important role in shaping individuals who are critical in responding to various challenges without putting aside religious values.

The problems faced in this era include aspects of educational infrastructure, curriculum quality and relevance, teacher issues, and distance learning barriers as central issues in 21st century education (Isma, Isma, Isma, & Isma, 2023). Currently, education is in the era of knowledge *knowledge age* characterized by a significant ability to increase knowledge (Dalimunthe, 2023). The educational orientation that is often referred to in the national context may now become vague and considered outdated, considering that the majority of Indonesian people tend to live pragmatically (Azwar, 2020). News of crimes committed by children is reported almost weekly in various media, both print and electronic, in a number of regions (Suparno, 2020). One case involved a child and his partner, who were also minors, who deliberately took oil palm fruits belonging to PTPN IV Air Batu, which was an illegal act (Pratidina, 2020). Kendari City ranks second in Southeast Sulawesi Province in terms of vulnerability to violence against women and children. There are many cases of violence committed by children, with the highest number reaching 54 cases in a year, most of which occur in the family environment (Ayu, 2024). There are problems that occur in the residential environment, so it is necessary for education to evaluate and implement a supportive curriculum. Given the problems that occur in the community, the educational environment needs to evaluate and implement a supportive curriculum.

One of the various problems that arise in the field of education today is the lack of relevance of the curriculum, therefore it is necessary for schools to implement a relevant curriculum in order to support students in keeping up with the times. The implementation of the Qur'an-based science integration curriculum has been carried out at Madrasah Aliyah in West Java, which shows that increasing the integration of students' spiritual awareness in encouraging them to study and understand the various scientific cues contained in the Qur'an. (Rohmah, 2021). The Qur'an-based science learning approach at SDN Pekayon 03 is effective in integrating religious values. This increases students' motivation to learn, broadens the understanding of science, and builds awareness of the relationship of science to the greatness of God (Rahmah, 2025). Research on the integration of science and religion learning at SD Hidayatul Jannah was also conducted by Abdul Gani. The results of his research are that Islamic education is influenced by the integration of science and technology through a curriculum that encourages students to always associate religious aspects (Gani et al., 2023). Milya Sari's research in the Integrated Science Subject Teacher Conference (MGMP) at MTs throughout Padang City focuses on improving blended learning and the integration of science with the Qur'an. The results show that this approach is able to increase teachers' motivation in developing blended learning-based integrated science learning that is integrated with the values of the Qur'an to be implemented in the learning process. (Sari, Zamista, Asrar, Deswita, & Putra, 2022). Rahmayani conducted research in grade VIII MTs Nurul Huda Tempos about Islamic values being included in science education. Discuss the concept of the Qur'an and how it affects students' spiritual awareness (Rahmayani, Mahsul, & Sholehah, 2022). Research related to the development of a science-based pesantren curriculum at the Salman Assalam Science Islamic Boarding School includes a science curriculum and student development programs with religious moderation as a wasathiyah principle that balances knowledge and is based on kauniyah science (Ijah Bahijah, Nuniek Rahmatika, Aghniawati Ahmad, 2022).

Based on this background, the 21st century era demands education that is equipped with a supportive curriculum to remain relevant to the challenges and needs of life in the future. This research takes the formulation of the problem of questions 1) How to design a curriculum model that integrates science and the Qur'an in accordance with the characteristics and needs of students at MIM Sainqu Ponorogo?. The purpose of the question is to explore an effective approach in combining scientific principles with the spiritual values of the Qur'an, thereby creating a comprehensive and inclusive curriculum, and can be applied in a variety of educational contexts without being tied to a specific institutional identity. Question 2) How is the implementation of the integrated curriculum model in preparing critical and religious competencies for graduates? The purpose of this question is to analyze the impact of the curriculum in developing students' critical thinking skills, as well as instilling deep religious values, so that they can apply scientific and spiritual knowledge in their daily lives in a balanced manner. Question. 3) What are the factors that are challenges in the implementation of the integrated curriculum model of science and the Qur'an at MIM Sainsqu Ponorogo? The purpose of this question is to find out the implementation of the Qur'anic science curriculum model in facing the challenges faced.

The contribution of the Qur'anic science curriculum in the formation of a critical-religious character lies in the integration of scientific knowledge with religious values, which encourages students to not only understand the concepts of science, but also to relate them to the values of the Qur'an. This approach encourages students to think critically through the analysis of natural and life phenomena from scientific and religious perspectives, thus honing analytical and reflective thinking skills. In addition, the Qur'anic science curriculum also instills ethical and moral values as an integral part of Islamic teachings, which support the development of students' character into individuals who show noble morals accompanied by a sense of responsibility. Therefore, this research is expected to contribute significantly to improving the quality of Islamic education that is adaptive to the changing times.

The urgency of this research lies in the urgent need for an Islamic education curriculum model that is able to answer the challenges of the 21st century without losing the foundation of religious values. In the midst of the rapid development of science, technology, and social changes that have an impact on the behavior and character of the younger generation, Islamic educational institutions are required not only to produce graduates who are academically capable, but also to have the ability to think critically based on Islamic values. The reality of increasing social problems, moral crises, and weak integration of spiritual values in science learning shows that the dichotomous curriculum between science and religion is no longer relevant. Therefore, the development and implementation of an integrated curriculum of science and the Qur'an is a strategic need in forming graduates who are critical, religious, and characterful.

The novelty of this research lies in an in-depth study of the integrated curriculum model of science and the Qur'an applied in the context of pioneering madrasah ibtidaiyah, with the characteristics of limited facilities, human resources, and the diversity of students' initial abilities. In contrast to previous research which generally focused on the development of learning tools, the integration of the value of Qur'an verses in science materials, or application at the secondary education level, this study emphasizes on curriculum model design, implementation strategies, and the formation of critical-religious graduate competencies holistically from primary education. In addition, this study reveals the practice of integration through thematic approaches, experiential learning, and religious habituation as school culture, which are rarely studied comprehensively in the context of pilot madrasas.

METHODS

This study uses a field qualitative approach (*field research*) with qualitative descriptive design and case studies. The qualitative approach was chosen because it is able to describe and analyze in depth the social phenomena being researched, especially related to the implementation of the Qur'an-based science curriculum. Qualitative research is descriptive and analytical, where the descriptive approach is interpreted as an effort to explain and explain events, phenomena, and social realities that occur in the field (Waruwu, 2023).

This research was carried out at Madrasah Ibtidaiyah Sains Al-Qur'an Balong, Ponorogo, with research subjects including madrasah heads, curriculum fields, and teachers who are directly involved in the learning process. Data collection was carried out through participant observation, in-depth interviews, and documentation. The research instrument in the form of interview guidelines was used to explore information related to the achievement of Graduate Competency Standards based on the Qur'anic science integration curriculum. The data obtained was analyzed using qualitative descriptive analysis techniques through the stages of data reduction, data presentation, and conclusion drawn. To ensure the validity of the data, this study applies the triangulation technique of sources, techniques, and time(Scott, 2023).

FINDINGS AND DISCUSSION

1. *Science and Qur'an Integrated Curriculum Model in Accordance with the Characteristics and Needs of MIM Sainqu Ponorogo*

Madrasah Ibtidaiyah Sainqu Ponorogo is a relatively new Islamic basic education institution. The characteristics of its students are in the early stages of forming a learning culture. This condition shows that students are in the process of developing academic habits. A strong learning culture has not been fully formed in this madrasah. Therefore, the educational approach needs to be aligned with the initial development stage of the student. This pioneering madrasah faces challenges in building a solid foundation of learning. Students need intensive guidance to develop basic skills. This process involves habituation to discipline and motivation to learn. At this stage, educator intervention is essential to form a positive mindset. Overall, the new status of this madrasah significantly affects the dynamics of learning.

a. Characteristics of MIM Sainqu Ponorogo Students

The limited number of students is the hallmark of this pioneering madrasah. There are 11 students in grade I and 24 students in grade II. This condition provides an opportunity for schools to implement a more intensive learning approach. An individualized approach can be applied more effectively in small classes. This allows assistance for students' academic development from an early age. The religious aspect can also be considered deeply in the learning process. Madrassas can focus on developing spiritual values personally. With a limited number of students, the interaction between educators and learners becomes more intense. It supports strong character formation from scratch. As a result, madrasas can achieve more optimal learning outcomes.

b. Integrated Science and Qur'an Learning Needs

The main need in the learning process at Madrasah Ibtidaiyah Sainqu Ponorogo is the availability of a curriculum that can integrate science learning with the values of the Qur'an in an applicative manner. The curriculum must be able to integrate scientific concepts with religious teachings in daily life practices. As a pioneering madrasah, the curriculum does not solely act as an academic guide. The curriculum also functions as an instrument to shape the religious character of students. An applicative learning approach is used as a means of integrating science with the values of the Qur'an. Science learning based on observation of the natural environment is the main method. This observation is associated with the value of monotheism taught in the Qur'an. This allows students to understand the relationship between God's creation and His teachings. This approach supports the development of a holistic understanding of science and spirituality. Ultimately, this integrated curriculum strengthens the foundation of a balanced education.

c. Integrated Curriculum Structure and Approach

The integrated curriculum structure at Madrasah Ibtidaiyah Sainqu is designed with flexibility and stages. This design is adapted to the condition of the school which is still in the development stage. The curriculum is prepared based on realistic Qur'an memorization targets for each level of education. The target starts from the focus of Juz 30 memorization in the initial class. This gradual approach considers the abilities of students who are still in formation. At the same time, science learning is directed at the introduction of the surrounding environment. Outing class activities are used as a method of adaptation to the limitations of learning facilities. This new school utilizes outside resources to support the learning process. This allows for an educational hands-on

experience. This overall curriculum structure supports harmonious academic and religious development.

The curriculum development approach applied is thematic and interdisciplinary. This approach allows the combination of science materials with Qur'anic values in one learning unit. The values of the Qur'an are not taught separately from academic materials. Instead, these values are internalized through science learning activities. This curriculum model creates a harmonious integration between scientific and spiritual aspects. This supports the formation of a deeper understanding for students. Although Madrasah Ibtidaiyah Sainqu is still a new school, the madrasah already has a clear direction of curriculum development. This direction is relevant to the needs of students in the early stages of learning. The curriculum is designed to meet the demands of holistic education. Ultimately, this approach strengthens the student's foundation of character and knowledge.

2. *Implementation of the Integrated Curriculum Model in Preparing Graduates' Critical and Religious Competencies*

a. Teachers' Strategies in Curriculum Implementation

The implementation of an integrated curriculum between science and the Qur'an at Madrasah Ibtidaiyah Modern Sainqu Ponorogo is carried out in stages. This process is part of the development of the new school. Teachers apply learning strategies that emphasize hands-on experience. Outing class activities are the main method in this approach. The strategy was chosen because it was in accordance with the characteristics of early childhood students. This condition considers the stages of students' cognitive and emotional development. In addition, this strategy adjusts to the limitations of facilities that are common in start-up schools. These limitations include incomplete learning facilities. Thus, outing classes utilize the surrounding environment as a learning resource. This supports the formation of critical competencies through direct observation. Ultimately, this gradual implementation strengthens the foundation of holistic education.

In addition to experiential learning, its implementation is strengthened through daily religious habituation. Activities such as morning rows are carried out consistently. The reading of student promises is also part of the routine. Dhuha prayer is carried out as a form of spiritual strengthening. Murojaah Al-Qur'an is also included in daily activities. This habituation is an element of the school culture that is being built. Its role is important in instilling an attitude of discipline from the start. Responsibility is also developed through these routine activities. Religious consciousness is strengthened as the basis of student character. Overall, this daily habituation supports the readiness of religious competence in graduates.

b. Learning media and methods

The media and learning methods applied at Madrasah Ibtidaiyah Sainqu are adjusted to the conditions of the school that is still developing. Teachers use student worksheets as the main guide in the learning process. Sound recordings of Qur'an memorization are used to support murojaah at home. The surrounding natural environment is used as an effective science learning medium. The learning method is designed in a simple but meaningful way. This approach combines memorization as the basis for memory strengthening. Observation of the environment is an important element in scientific exploration. Light discussions are used to encourage interaction between students. This combination of methods takes into account the limitations of school facilities. This allows for adaptive and relevant learning. Ultimately, this approach supports the gradual development of students' competencies.

c. Student Engagement and Competency Evaluation

The involvement of students in the learning process shows an overall positive response. Students seemed enthusiastic about participating in outing class activities. Learning outside the classroom provides a different experience than conventional methods. The activeness of students was seen in the questioning activities during the discussion. They are also actively involved in answering the quizzes given. Religious activities were followed with high enthusiasm. This positive response is an early indicator of the development of critical thinking skills. Religious ability also begins to be formed through active participation. In this new school, student engagement supports

the formation of holistic character. Overall, this shows the effectiveness of the implementation of an integrated curriculum.

The measurement of critical and religious thinking competencies is carried out through a simple evaluation mechanism, but it is carried out continuously. This measurement process is designed to be able to provide a comprehensive picture of student development. Critical thinking competencies are assessed using instruments in the form of structured quizzes. In addition, this competence is also measured through the level of students' understanding of the results of the observations they make. Understanding the results of observations is seen as an important indicator because it reflects analytical and logistical capabilities. Meanwhile, religious competence is identified and assessed based on the embodiment of students' attitudes and behaviors in daily life. The aspects observed included honesty in acting and speaking. In addition to the facts, consistency in carrying out worship based on religious teachings is also the main indicator. Responsibility in carrying out obligations, both inside and outside the school environment, is used as a reference for assessing religious competence. Although the implementation of this integrated curriculum is still in the early stages of implementation, the results of the evaluation provide positive indications. The findings show that an integrated curriculum contributes to the formation of graduate competencies in a balanced manner between cognitive and religious aspects. Thus, an integrated curriculum has the potential to continue to be developed as a holistic learning model.

3. *Challenges in Implementing the Science and Qur'an Integrated Curriculum Model at MIM Sainqu Ponorogo*

As an educational institution that is still relatively newly established, MI Sainqu Ponorogo faces various challenges in the implementation of an integrated curriculum of science and the Qur'an. These challenges arise both from the aspects of planning, implementation, and learning evaluation. One of the main challenges is related to adjusting the level of complexity of learning materials to the characteristics of early childhood learners. The science material and religious values taught essentially have quite abstract and complex concepts. Therefore, the material needs to be reprocessed so that it is in accordance with the stage of students' cognitive development at the early level of elementary school. In this context, teachers are required to realize scientific concepts without losing the essence of science. Similarly, religious values sourced from the Qur'an must be presented in a concrete, contextual, and easily internalized form by students. This simplification process requires strong pedagogical skills and a good understanding of the psychology of child development. Teachers also need to process the material into learning activities that are interesting and contextual, interactive, and meaningful. Thus, the implementation of an integrated policy of science and the Qur'an at MI Sainqu Ponorogo requires an adaptive and creative learning strategy from educators.

The next challenge is related to considering the level of readiness of human resources who play a role in learning activities. Teachers at MI Sainqu Ponorogo are not only required to master the substance of science and religious material, but are also expected to have qualified pedagogical skills. In addition, teachers need to show high creativity in designing and implementing learning that integrates science with the Qur'an. Flexibility in choosing learning methods, media, and strategies is one of the main components that need to be had. The condition of the school, which is still in the early stages of development, adds to the burden of teachers' responsibilities in implementing it. The role of teachers is not limited to the implementation of learning in the classroom, but also includes curriculum development at the level of educational units. This dual role requires teachers to be actively involved in planning, device development, and integrated curriculum evaluation. In addition, teachers need to collaborate with other stakeholders to ensure alignment with the school's vision and mission. The limitation of experience and references related to the implementation of the integrated curriculum is also an aspect that requires improvement efforts through continuous training and professional development. Thus, the level of readiness and quality of human resources is a determinant of the success of the implementation of the integrated curriculum at MI Sainqu Ponorogo.

From the perspective of facilities and infrastructure, facility limitations are one of the main challenges that are commonly faced by start-up schools. This condition not only affects the smooth

learning process, but also has an impact on efforts to optimize the implementation of an integrated curriculum. MI Sainqu Ponorogo realizes that the availability of adequate learning facilities has not been fully fulfilled. However, schools do not make these limitations the main obstacle in the implementation of learning. Alternatively, MI Sainqu uses the surrounding natural environment as a learning resource as well as a learning medium. The natural environment is used as an open laboratory to observe scientific phenomena directly. Through this approach, students are invited to learn science concepts with the reality they encounter on a daily basis. The strategy of utilizing the environment is a creative and adaptive solution in overcoming the lack of physical facilities. In addition, this approach also supports the realization of science learning that is contextual, meaningful, and relevant to students' lives. Therefore, the limitations of facilities and infrastructure are sought not to reduce the quality of the learning process, but rather to trigger innovation in the design of learning activities.

Another challenge arises from the diversity of individual abilities and characteristics of students at MI Sainqu Ponorogo. A small number of students still face obstacles in reading the Qur'an fluently according to the rules. On the other hand, there are also students with kinesthetic learning style tendencies who require a more active and varied learning approach. This diversity requires schools to implement learning strategies that are responsive to individual differences. As a form of response, the school organized additional guidance for students who were not fluent in reading the Qur'an. The guidance is designed to support students in improving their competence in reading the Qur'an gradually and sustainably. In addition, schools strive to create an inclusive learning environment by providing space for various learning styles, including kinesthetics. Teachers are encouraged to devise learning activities that allow students to move, explore, and actively participate. These efforts aim to ensure that every student gets equal opportunities in developing their potential optimally. The diversity of students' abilities is not seen as an obstacle, but as a basis for developing more humane and non-discriminatory learning practices.

Various efforts have been made to overcome the various challenges applied in the implementation of the integrated curriculum of science and the Qur'an. These efforts are realized, among other things, through the implementation of regular teacher training. This training aims to improve teachers' professional competence, both in the aspect of mastering the material and in the application of integrated learning strategies. In addition, madrasas also carry out intensive assistance for students who need additional assistance. This assistance is designed so that students receive more targeted guidance, especially in improving the ability to read the Qur'an and understand scientific concepts. In addition, parents are actively involved in murojaah activities carried out at home as an effort to strengthen the synergy between education at school and the family environment. These steps show that MI Sainqu Ponorogo, although still a new school, has a strong commitment to the development of an integrated curriculum. This commitment is reflected in the willingness of madrasas to continue to make continuous improvements and adjustments. Thus, the development of an integrated curriculum of science and the Qur'an is not only temporary, but is directed to be a systematic, consistent, and continuous process.

CONCLUSION

This study aims to describe the integrated curriculum model of science and the Qur'an and its implementation in preparing the competencies of critical and religious graduates at Madrasah Ibtidaiyah Sainqu Ponorogo as a relatively new madrasah. The results of the study show that MI Sainqu Ponorogo implements an integrated curriculum flexibly and gradually by adjusting the characteristics of elementary school-age students, where the integration of science and the Qur'an is realized through thematic approaches and direct experiential learning, such as outing class activities that associate natural phenomena with monotheistic values. The implementation of this curriculum is strengthened through daily religious habits which include the implementation of Dhuha prayers, Qur'anic murojaah activities, and the strengthening of Islamic character, which plays an important role in instilling religious attitudes, discipline, and responsibility of students. The main findings of this study show that the integration of science and the Qur'an carried out contextually and experientially is able to increase students' learning engagement, foster curiosity about natural

phenomena, and develop critical thinking skills from the basic education level. In addition, other findings indicate that structured religious habituation functions as a reinforcement of internalized moral and spiritual values, so that graduate competencies develop in a balanced manner in cognitive, affective, and religious aspects. However, this study also found challenges in the form of limited facilities and infrastructure, the readiness of human resources, and the diversity of students' initial abilities, which madrasas responded to through adaptive strategies such as the use of the natural environment as a learning medium, periodic teacher training, intensive assistance for students, and parental involvement in murojaah activities at home. Based on the overall findings, it can be concluded that the integrated curriculum of science and the Qur'an at MI Sainqu Ponorogo has significant potential in forming graduates who are critical, religious, and characterful, especially in the context of pioneer madrasas. Therefore, further research is recommended to test the effectiveness of this curriculum model quantitatively, expand the research subjects at different educational levels and madrasah contexts, and develop a more systematic, measurable, and sustainable critical-religious competency evaluation instrument to strengthen the validity and replication of this integrated curriculum model.

LIMITATION

This study has several limitations. First, it was conducted in only one research setting, namely Madrasah Ibtidaiyah Sainqu Ponorogo, which is still in the development stage as a pioneering madrasah; therefore, the findings cannot be generalized to other educational institutions or different educational levels. Second, the study employed a qualitative approach with a limited number of participants consisting of the principal and teachers, resulting in findings that primarily focus on describing the curriculum implementation process rather than quantitatively measuring its effectiveness. In addition, the evaluation of students' critical and religious competencies was conducted using relatively simple and ongoing assessment methods adapted to the madrasah's context. Therefore, future studies are recommended to involve broader research subjects, apply more standardized assessment instruments, and utilize quantitative or mixed-method approaches to provide a more comprehensive understanding of the effectiveness of the integrated Science and Qur'an curriculum model in developing students' critical and religious competencies.

AUTHOR CONTRIBUTION

TD conceptualized the study, conducted the field research, collected and analyzed the data, and wrote the original draft of the manuscript. ADS contributed to the research design, provided methodological guidance, and assisted in data interpretation. AS and SA supervised the research process, critically reviewed the manuscript, and provided substantial revisions to improve the clarity and academic quality of the final version. All authors read and approved the final manuscript.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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