STEAM Learning Model in Madrasah Ibtidaiyah

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ABSTRACT. This research explores the application of the STEAM (Science, Technology, Engineering, Arts, and Mathematics) learning model in Madrasah Ibtidaiyah as an innovative strategy to improve the quality of education and 21st century skills. The STEAM model is adapted to integrate science, technology, engineering, arts, and mathematics with religious values and characters relevant to the context of Madrasah Ibtidaiyah. Through this approach, the study aims to evaluate the effectiveness of STEAM in developing critical thinking, creativity and collaboration skills among students, as well as analyzing its impact on the understanding of academic concepts and character building. The results are expected to provide new insights on how to optimize the curriculum in Madrasah Ibtidaiyah to prepare students for global challenges by integrating discipline-based learning and moral values.
Keywords: *STEAM Learning Model, Madrasah Ibtidaiyah.*

INTRODUCTION

Education in Madrasah Ibtidaiyah (MI) plays an important role in shaping the scientific foundation and character of children from an early age. However, with technological developments and global demands, traditional learning methods are often inadequate to prepare students for the challenges of the 21st century (Kurnia Sari, 2021). In this context, the STEAM (Science, Technology, Engineering, Arts, and Mathematics) learning model emerges as a promising alternative to improve the quality of education with a more integrative and relevant approach. This model not only focuses on developing academic skills, but also integrates character and religious values that are an integral part of the MI curriculum.

The STEAM model is designed to combine five disciplines-science, technology, engineering, art and math-in one holistic approach to learning. This concept facilitates more contextualized and connected learning, allowing students to apply their knowledge and skills in real-world situations (Pratiwi & Santosa, 2021). In MI, the implementation of the STEAM model can provide an opportunity to integrate religious and moral aspects in the learning process, thus supporting students' character development simultaneously with their academic abilities (Nuragnia et al., 2021).

In practice, implementing the STEAM model in MI requires adjustments to the curriculum and teaching methods to ensure that all STEAM elements can be effectively integrated (Carter et al., 2021). This includes the development of relevant teaching materials, training for teachers, and provision of resources and facilities that support project-based learning and experimentation. This study aims to explore how the STEAM model can be adapted for the MI environment and identify challenges and opportunities in its implementation.

This study also aims to evaluate the impact of the STEAM model on students' critical thinking, creativity and collaboration skills. By adopting a project-based and interdisciplinary learning approach, students are expected to develop better skills in problem-solving and teamwork, while maintaining important character values. The evaluation involved analysis of student learning outcomes, classroom observations, as well as feedback from teachers and parents (Utomo et al., 2023).

The results of this study are expected to provide new insights into the effectiveness of the STEAM model in the context of MI, as well as provide practical recommendations for future curriculum development and teaching practices. By understanding how the STEAM model can be implemented effectively, it is hoped that MI can better prepare students to face global challenges, while still appreciating and applying the religious values on which their education is based (Hsiao & Su, 2021).

METHOD

1. Research Design:

This study used a qualitative approach to explore the implementation of the STEAM learning model in Madrasah Ibtidaiyah (MI). This method enabled the researcher to gain an in-depth understanding of the experiences, perceptions and challenges faced in implementing the STEAM model in the context of MI education.

2. Data Collection Techniques:

In-depth Interviews: Interviews will be conducted with various stakeholders, including teachers, principals, and education experts. The aim is to explore their views and experiences regarding the implementation of the STEAM model, as well as the challenges and successes experienced during implementation. Interviews will be semi-structured to allow flexibility in exploring relevant topics.

Classroom Observation: Observations will be conducted in some of the classrooms implementing the STEAM model to observe the learning process firsthand. The researcher will record how the STEAM method is applied, the interaction between students and teachers, and the application of project-based activities and experiments. These observations will be conducted using field notes and videos for further analysis.

Documentation Study: Analysis of documents such as lesson plans, teaching materials, and student assessments used in STEAM implementation will be conducted. These documents provide insight into how the STEAM model is integrated in the curriculum and teaching practices.

Focus Groups: Group discussions with students, teachers and parents will be conducted to gain a broader perspective on the impact of the STEAM model. These discussions will focus on learners' experiences, changes in skills, and acceptance of this new learning approach.

RESULT AND DISCUSSION

Result

Context of STEAM Model Implementation in Madrasah Ibtidaiyah:

The implementation of the STEAM (Science, Technology, Engineering, Arts, and Mathematics) model in Madrasah Ibtidaiyah (MI) offers a new paradigm in education that combines five disciplines in an integrated learning approach (Masud et al., 2023). In the context of MI, where religious education and character values play an important role in the formation of students' personalities, the integration of STEAM with the traditional curriculum requires careful adjustment to ensure that this approach is in line with the objectives of Islamic education.

The STEAM model provides a unique opportunity to integrate science and technology with religious principles and values, thus enabling students to develop academic skills relevant to future challenges while maintaining and strengthening the moral and ethical values that are at the core of Islamic education (Ali Al-Mutawah et al., 2022). By integrating STEAM into the MI curriculum, students will not only acquire the necessary knowledge and skills to adapt to technological developments and global needs, but will also get the opportunity to apply and uphold solid

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character values, such as honesty, responsibility and cooperation, in every aspect of their learning. This approach not only aims to improve students' academic results and practical skills but also to form faithful and responsible individuals, who are ready to face the challenges of the modern world with integrity and confidence.

Impact of STEAM Model on Students' Academic Skills and Character:

The implementation of the STEAM model in Madrasah Ibtidaiyah (MI) shows a significant impact on the development of students' academic skills, with a wide range of benefits (Ridlo, 2023). Through the project-based approach and experimentation at the core of the STEAM model, students experience more in-depth and contextualized learning, which encourages critical thinking, creativity and problem-solving skills. By directly engaging in science, technology, engineering, art and math activities, students not only understand the theory, but can also apply the concepts in real situations, which in turn strengthens and deepens their understanding. This process allows students to bridge the gap between academic knowledge and practical application, and facilitates the development of practical skills that are highly relevant to the challenges of the modern world.

In addition to the impact on academic skills, the STEAM model also contributes significantly to students' character development. In carrying out STEAM projects, students often work in groups, which requires collaboration, communication and leadership skills (Hsiao & Su, 2021). This activity not only teaches them how to work effectively with others but also teaches values such as responsibility, patience and empathy-values that are in line with the principles of cooperation and mutual respect in Islamic education. By participating in projects that require teamwork and joint problem-solving, students learn to appreciate others' perspectives, manage conflict constructively, and accomplish complex tasks in a cooperative manner.

Challenges of STEAM Model Implementation in Madrasah Ibtidaiyah:

The implementation of the STEAM model in Madrasah Ibtidaiyah (MI) faces a number of complex challenges and requires special attention to ensure successful implementation. One of the main challenges is the adjustment to a curriculum that is often more focused on teaching religion and traditional values (Leavy et al., 2023). The integration of the STEAM model requires significant changes in the planning and delivery of teaching materials, which involves not only content adjustments but also changes in pedagogical approaches (Lavicza et al., 2022). This may generate resistance from educators who are accustomed to traditional teaching methods, especially if they feel that the STEAM model may divert focus from the main purpose of religious education.

In addition, limited resources are a major challenge in implementing STEAM models in MI. STEAM-appropriate teaching materials, such as science experiment tools and materials, technology devices, and art and engineering materials, are often unavailable or inadequate in the MI environment (Belbase et al., 2022). Lack of supporting technology and facilities is also a barrier, especially in schools with limited budgets. This research highlights the need for strong support to address these shortcomings, including the provision of adequate resources and updating of facilities to suit STEAM needs (Belbase et al., 2022).

Adequate training for teachers is also a key factor in overcoming implementation challenges. Teachers need to be trained not only to understand STEAM concepts but also to develop skills in designing and implementing effective project-based learning (Mutohhari et al., 2021). This training should include innovative teaching techniques, the use of technology in learning, as well as strategies for integrating religious values with STEAM principles. Without sufficient training, teachers may face difficulties in adapting STEAM methods and integrating them with the existing curriculum (Mubarok et al., 2020). In the face of these challenges, it is important for schools and policymakers to work together to design strategies that support the effective implementation of STEAM (Mejias et al., 2021). This includes developing policies that facilitate STEAM integration, providing adequate budgets for resources and training, and creating support networks for educators. With a comprehensive and coordinated approach, these challenges can be

overcome and the STEAM model can be effectively applied to improve the quality of education in Madrasah Ibtidaiyah.

Discussion

The implementation of the STEAM (Science, Technology, Engineering, Arts, and Mathematics) model in Madrasah Ibtidaiyah (MI) offers a significant opportunity to change educational approaches by integrating disciplines that are usually separated. The model brings a project- and experiment-based approach that can enhance student engagement as well as critical thinking, creativity and problem-solving skills. Preliminary results show that students engaged in STEAM learning are more active and skilled in applying academic concepts in a real-world context, which strengthens their understanding. However, the implementation of STEAM model in MI is not without challenges. Adjusting the dominant curriculum with religious teaching requires careful adaptation so that STEAM principles can be integrated without neglecting traditional values. Resistance from educators who are used to conventional methods and limited resources, such as technology and teaching materials, also hinder effective implementation. Adequate teacher training and infrastructure support are crucial to overcome these barriers.

Despite these challenges, the potential benefits of the STEAM model-including improved collaboration and problem-solving skills, and the reinforcement of character values-open up opportunities for a more thorough curriculum renewal. With careful planning and sufficient support, the STEAM model can be adapted to enrich learning experiences in MI, preparing students with relevant skills and values for future global challenges. Successful implementation could serve as a model for educational innovation in other religious education institutions, strengthening the balance between academic education and character building.

CONCLUSION

The implementation of the STEAM (Science, Technology, Engineering, Arts, and Mathematics) model in Madrasah Ibtidaiyah (MI) has great potential to enrich the educational experience by integrating five disciplines in a connected and contextualized approach. Despite significant challenges such as curriculum adjustment, resistance from educators, and limited resources, the STEAM model can improve students' critical thinking, creativity, and collaboration skills while maintaining religious and character values. With adequate support in the form of teacher training, provision of resources, and careful curriculum planning, the STEAM model can be effectively adapted to meet the educational needs in MI, preparing students with relevant skills and values to face the challenges of the 21st century.

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