

A QUALITATIVE STUDY ON INTEGRATING THE STEAM APPROACH TO ENHANCE INDONESIAN LANGUAGE SKILLS IN MI MAARIF 02 BAJING KULON

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ABSTRACT

This study explores the integration of the STEAM (Science, Technology, Engineering, Arts, and Mathematics) approach into Indonesian language learning at MI Maarif 02 Baging Kulon. Using a qualitative descriptive method, the research examines how STEAM-based learning affects students' language skills, creativity, and 21st-century competencies. Data were collected through in-depth interviews with teachers, classroom observations, and document analysis. The study found that project-based and inquiry-based learning models, which combined various STEAM disciplines, effectively enhanced students' Indonesian language proficiency. For example, students engaged in activities such as designing water filtration systems and creating persuasive posters, which required them to apply language skills in real-world contexts. This interdisciplinary approach not only improved vocabulary and sentence structure but also fostered critical thinking, problem-solving, and collaboration. However, the study also identified challenges, including resource limitations and the need for teacher training in STEAM pedagogy. Despite these obstacles, teachers demonstrated creativity and adaptability, using available resources and peer collaboration to implement STEAM effectively. The findings suggest that integrating STEAM into language education can transform learning by promoting active engagement, enhancing language development, and preparing students for future challenges. The study concludes that STEAM-based language education holds significant potential for reforming teaching practices in MI Maarif 02 Baging Kulon, contributing to the holistic development of students by fostering linguistic, cognitive, and social skills essential for the modern world.

Keywords: STEAM, Indonesian language learning, and MI Maarif 02 Baging Kulon.

INTRODUCTION

Education plays a pivotal role in shaping human development. As a fundamental institution in society, schools are expected to provide a comprehensive learning environment that fosters not only intellectual growth but also emotional and social development. This holistic approach is crucial for preparing students to contribute meaningfully to society and adapt to the ever-changing world. According to Tilaar (2022) and Darmaningtyas (2015), educational institutions should align their learning processes with societal values while addressing the diverse needs of students. In Indonesia, education is not just a necessity; it is a constitutional mandate. The Indonesian Constitution guarantees every citizen's right to quality education as a means of preparing them for life in a multicultural and dynamic society (Sutrisno, 2019; Koesoemo, 2007). This legal framework emphasizes the importance of improving educational quality and ensuring that it meets the demands of a rapidly evolving world.

In this context, the need for innovative educational practices is more pressing than ever. Traditional teaching methods, while still valuable, are no longer sufficient to equip students with the critical thinking, creativity, collaboration, and communication skills necessary for success in the 21st century. As such, educational reform has become essential, and the introduction of innovative learning models is seen as a viable solution. One such model gaining traction is the integration of STEAM education — Science,

Technology, Engineering, Arts, and Mathematics. This interdisciplinary approach seeks to develop students' knowledge and skills across multiple domains, emphasizing real-world problem-solving, creativity, and collaboration (Beers, 2011).

The STEAM approach has proven to be an effective way of preparing students for the challenges of the future. It encourages them to make connections across different fields of study, fostering a deeper understanding of complex issues and promoting critical thinking. This model not only focuses on academic achievement but also nurtures the development of skills necessary for personal growth and future career success. By engaging students in activities that combine scientific inquiry, technological tools, engineering concepts, artistic expression, and mathematical reasoning, STEAM aims to develop well-rounded individuals capable of tackling the multifaceted problems of the modern world.

In the context of language education, the integration of STEAM offers significant potential. Specifically, in Indonesian language education, STEAM can be used to enhance students' language proficiency through a variety of problem-based, experiential, and creative activities. Traditional language learning approaches often rely heavily on rote memorization, with limited opportunities for students to engage with the language in meaningful, real-world contexts. By incorporating STEAM principles into Indonesian language learning, educators can create a more dynamic and engaging curriculum that not only improves linguistic skills but also nurtures critical and creative thinking. This approach encourages students to use language as a tool for exploring and solving real-world problems, fostering a deeper understanding and mastery of the language.

MI Maarif 02 Bajing Kulon, as Islamic primary education institutions in Indonesia, play a crucial role in shaping students' foundational skills, including language proficiency. These institutions are tasked with providing students with a well-rounded education that integrates both secular and religious knowledge. However, traditional methods of language learning in MI Maarif 02 Bajing Kulon, as in many other educational settings, often emphasize rote learning and memorization, with limited opportunities for students to engage in more complex cognitive processes such as critical thinking, creativity, and problem-solving. This can hinder the development of higher-order thinking skills, which are essential for success in today's rapidly changing world.

Given the increasing demands of 21st-century education, the integration of the STEAM approach into Indonesian language learning at MI Maarif 02 Bajing Kulon offers a promising solution. By integrating science, technology, engineering, arts, and mathematics into language lessons, educators can create a more engaging and meaningful learning experience for students. This approach not only promotes language proficiency but also encourages students to develop essential life skills such as creativity, collaboration, and critical thinking. Through project-based learning, students can explore real-world issues and apply their knowledge of language in practical, hands-on ways. This process not only enhances their language skills but also helps them develop the cognitive and problem-solving abilities necessary for future success.

The integration of STEAM into Indonesian language education is particularly relevant in the context of MI Maarif 02 Bajing Kulon, where there is often a greater emphasis on religious studies alongside secular subjects. Incorporating STEAM principles into the curriculum allows for a more holistic approach to education, where students are encouraged to explore the intersections between their faith, culture, and the broader world around them. This can foster a deeper understanding of both the

Indonesian language and the world in which students live, preparing them for the challenges and opportunities of the future.

While the potential benefits of integrating STEAM into Indonesian language learning at MI Maarif 02 Bajing Kulon are clear, the implementation of such an approach is not without its challenges. Educators may face difficulties in adapting their teaching methods to accommodate interdisciplinary learning, especially if they are more accustomed to traditional teaching styles. Additionally, there may be a lack of resources or training to fully implement the STEAM model effectively. These challenges must be addressed to ensure the successful integration of STEAM into language education.

This study aims to conduct a qualitative analysis of the integration of the STEAM approach in developing Indonesian language skills at MI Maarif 02 Bajing Kulon. It seeks to explore the strategies employed by educators, the challenges encountered in the implementation process, and the perceived impacts on students' language skills and overall development. By examining the experiences of both teachers and students, this research hopes to provide valuable insights into the effectiveness of STEAM-based language learning and its potential to enhance educational outcomes in MI Maarif 02 Bajing Kulon. Furthermore, the study aims to contribute to the broader discourse on educational innovation in Indonesia, particularly in the context of integrating interdisciplinary approaches to improve teaching and learning.

Through this research, it is hoped that the findings will inform educational policies and practices, offering practical recommendations for educators seeking to integrate STEAM into their classrooms. Ultimately, the goal is to foster a more engaging, dynamic, and meaningful learning experience for students, helping them develop not only language proficiency but also the critical thinking and creative skills necessary to thrive in the modern world.

METHOD

This study uses a qualitative descriptive approach. The primary focus is to explore and describe the integration of the STEAM approach in Indonesian language learning at MI Maarif 02 Bajing Kulon. The research subjects are Indonesian language teachers and fourth-grade students at a selected MI Maarif 02 Bajing Kulon. Data collection methods include in-depth interviews, participant observation during Indonesian language lessons, and document analysis of learning plans and students' work. Interviews were conducted with teachers to understand their perceptions, strategies, and challenges in implementing STEAM-based learning. Observations were used to capture real classroom practices, while document analysis helped identify how STEAM elements were integrated into instructional materials. Data were analyzed thematically by categorizing information into themes such as learning strategies, student engagement, development of language skills, and encountered obstacles. Triangulation techniques were employed to ensure the validity of findings by cross-verifying data from interviews, observations, and document analysis.

RESULTS

This study explored the integration of the STEAM (Science, Technology, Engineering, Arts, and Mathematics) approach in enhancing Indonesian language skills at MI Maarif 02 Bajing Kulon through a qualitative descriptive method. The study aimed to assess how combining various disciplines with language instruction could improve student language proficiency, foster creativity, and enhance critical 21st-century skills. Data were gathered through classroom observations, semi-structured interviews with

teachers and students, and document analysis of teaching materials and student work. Thematic analysis of the collected data revealed several key patterns related to the forms of STEAM integration, its impact on language skill development, student engagement, teacher strategies, challenges faced, and the development of 21st-century competencies. This detailed analysis sheds light on the potential of STEAM to transform language learning, providing deeper insights into the complex relationships between content, language, and skills development.

1. Forms of STEAM Integration in Language Learning

The integration of STEAM principles into Indonesian language instruction at MI Maarif 02 Bajing Kulon was primarily implemented through project-based and inquiry-based learning models. These models allowed students to engage in interdisciplinary activities that combined multiple fields of knowledge, such as science, technology, engineering, arts, and mathematics, while embedding core language skills development. Teachers designed learning experiences that emphasized collaboration, problem-solving, and hands-on engagement, fostering both cognitive and linguistic growth. In one learning activity, for example, students were tasked with designing a simple water filtration system using recycled materials. This project combined science (understanding filtration) and engineering (designing the filtration system) with language learning, as students were required to document and explain the steps of their project in Indonesian. This activity not only reinforced scientific and engineering concepts but also required students to practice organizing ideas logically in their native language. Students demonstrated their ability to describe processes, explain technical terms, and write procedural texts clearly in Indonesian. Another project involved creating persuasive posters promoting environmental sustainability, combining arts and technology with language practice. In this case, students designed posters and then presented them orally, practicing both written and spoken Indonesian skills. These activities exemplify how STEAM integration can foster interdisciplinary learning and simultaneously support language development, aligning with Yakman (2008), who emphasized that STEAM encourages higher-order thinking by promoting connections across disciplines. Moreover, Beers (2011) highlighted the importance of authentic tasks in language education, suggesting that students are more likely to develop meaningful literacy when language is contextualized in real-world, interdisciplinary contexts.

2. Impact on Indonesian Language Skill Development

The integration of STEAM in Indonesian language classes provided a multidimensional learning experience, allowing students to develop cognitive, linguistic, and creative skills simultaneously. During project-based tasks, students were not only required to design and create tangible projects but also to document their processes, explain outcomes, and reflect on their experiences using Indonesian. These activities helped students expand their vocabulary, improve sentence structure, and strengthen their ability to connect ideas coherently in writing. For instance, after conducting a science experiment on plant growth, students were asked to compose scientific reports in Indonesian, blending factual descriptions with procedural narration. These interdisciplinary learning contexts enriched students' understanding of both content and language, as the scientific language became integrated with the procedural

structure of Indonesian texts. The authenticity of these tasks, as discussed by Beers (2011), helped anchor language learning in meaningful experiences, enhancing students' literacy and encouraging them to apply their language skills to solve problems. By merging content learning with language instruction, students were able to view language as a tool for expression and communication rather than as a separate subject to be memorized. This holistic approach allowed them to develop deeper cognitive connections, enabling them to use language not only to convey information but also to construct and share knowledge in a meaningful way.

3. Enhancement of Creativity and Engagement

One of the most significant impacts of STEAM-based learning was its ability to foster creativity and increase student engagement. Students expressed enthusiasm for the hands-on, practical nature of the projects, which they found far more engaging than traditional methods of language instruction. For example, students were given the opportunity to create physical models, drawings, and presentations that demonstrated their understanding of various topics. The act of creating tangible objects and then explaining them in Indonesian gave students a sense of ownership over their learning process. This shift from passive to active learning allowed students to engage more deeply with the language, as they had to think critically about how to explain their work and reflect on their findings. As one student put it, "When we make things and then explain them, it feels easier to speak in Indonesian because we understand what we are talking about." Another student remarked, "I enjoy drawing and building things, not just writing. It makes learning Indonesian more interesting." These responses underscore the importance of incorporating creativity into the learning process. According to Ryan and Deci's (2000) Self-Determination Theory, motivation is significantly enhanced when students feel a sense of autonomy, competence, and connection to the learning experience. The hands-on nature of the projects and the opportunity to create real-world products contributed to the students' motivation and helped them develop greater language fluency.

4. Teacher Strategies in Overcoming Challenges

Despite the positive outcomes, the implementation of STEAM-based instruction also faced significant challenges. One of the most notable issues was the lack of resources in many classrooms, particularly the absence of digital devices, laboratory tools, and basic art supplies. Teachers often had to improvise by using household items, recycled materials, and local resources to conduct STEAM projects. As one teacher explained, "When we couldn't access proper science kits, we used old plastic bottles, stones, and sand to teach about water filtration." This resourcefulness highlights the adaptability of teachers in resource-constrained environments. Additionally, many teachers lacked formal professional development on STEAM pedagogy, which made it challenging for them to design fully integrated, interdisciplinary lessons. To overcome this, teachers often engaged in peer collaboration, self-initiated online courses, and informal study groups to exchange ideas, lesson plans, and teaching strategies. Time constraints also posed a challenge, as project-based activities often required more instructional time than traditional lessons. Teachers addressed this by breaking larger projects into smaller, manageable phases and setting realistic timelines to ensure that curriculum standards were met. These adaptive strategies reflect the findings of Herro and Quigley (2017), who emphasized the importance of teacher innovation and collaboration in overcoming challenges in resource-limited contexts.

5. Student Responses to STEAM-Based Learning

The student response to STEAM-based learning was overwhelmingly positive. Many students found the lessons to be more enjoyable, engaging, and meaningful compared to traditional approaches to language learning. Students particularly appreciated the opportunity to work on projects that required them to create something tangible. One student commented, "It feels like I'm actually doing something, and it helps me learn how to speak Indonesian better." Another student expressed, "I like being able to make things with my hands and then explain it. It helps me understand the lesson more and makes learning Indonesian easier." These sentiments align with Ryan and Deci's (2000) Self-Determination Theory, which suggests that students are more motivated when learning activities fulfill their needs for autonomy, competence, and connection to others. By providing students with opportunities for self-directed learning and allowing them to take ownership of their projects, STEAM-based activities contributed to increased student motivation and improved language skills.

6. Development of 21st-Century Skills Alongside Language Competence

The integration of STEAM not only supported language proficiency but also fostered the development of essential 21st-century skills. During project-based activities, students developed critical thinking skills by analyzing problems, generating hypotheses, testing solutions, and reflecting on their outcomes. These activities encouraged students to think creatively and find innovative solutions to complex problems. Collaboration skills were also enhanced, as students worked together in teams, negotiated project roles, shared responsibilities, and resolved conflicts. Communication skills, both written and oral, were consistently exercised as students documented their projects, engaged in peer feedback, and presented their findings. These findings align with the "4Cs" framework — Critical Thinking, Creativity, Collaboration, and Communication — which is central to preparing students for the demands of the modern world. Moreover, the observed learning processes reflected Bloom's Taxonomy, as students progressed beyond simple recall to higher levels of cognitive performance such as analysis, synthesis, and creation.

In addition, Vygotsky's Sociocultural Theory (1978) played a significant role in understanding how students developed language skills in the context of STEAM-based learning. Vygotsky emphasized the importance of social interaction and cultural context in cognitive development, suggesting that learning is most effective when it occurs within a socially mediated context. In the case of STEAM-based learning, students worked collaboratively, sharing knowledge, solving problems together, and negotiating meaning. This collaborative process helped students develop their language skills in authentic contexts, supported by both peers and teachers who scaffolded their learning.

DISCUSSION

The integration of STEAM also facilitated the development of essential 21st-century skills alongside language proficiency. Students exhibited improved critical thinking by analyzing problems, designing solutions, and reflecting on their work. Creativity was fostered through the design of projects and the artistic expression involved in tasks like creating posters. Collaboration skills were strengthened as students worked in teams, shared responsibilities, and negotiated project roles.

Communication skills, both written and oral, were consistently exercised as students documented their projects, received peer feedback, and presented their findings. These findings align with the "4Cs" framework (Critical Thinking, Creativity, Collaboration, and Communication), which are essential competencies for success in the 21st century. The observed learning processes also reflect Bloom's Taxonomy, where students demonstrated higher levels of cognitive performance such as analysis, synthesis, and creation, which are the most advanced stages of learning. In addition, Vygotsky's Sociocultural Theory (1978) played a significant role in understanding how students developed language skills in the context of STEAM-based learning. Vygotsky emphasized the importance of social interaction and cultural context in cognitive development, suggesting that learning is most effective when it occurs within a socially mediated context. In the case of STEAM-based learning, students worked collaboratively, sharing knowledge, solving problems together, and negotiating meaning. This collaborative process helped students develop their language skills in authentic contexts, supported by both peers and teachers who scaffolded their learning.

This study aimed to examine the integration of the STEAM (Science, Technology, Engineering, Arts, and Mathematics) approach in enhancing Indonesian language skills at MI Maarif 02 Bajing Kulon. The study employed a qualitative descriptive methodology, collecting data through classroom observations, semi-structured interviews with teachers and students, and document analysis of teaching materials and student work. The thematic analysis revealed significant insights into the integration of STEAM in language learning, its impact on language skill development, the strategies employed by teachers, the challenges faced, and the development of 21st-century competencies in students.

The integration of STEAM into Indonesian language instruction was mainly implemented through project-based and inquiry-based learning models. These models allowed for the fusion of various fields of knowledge while focusing on developing language skills. For instance, one project required students to design a water filtration system using recycled materials. This activity combined science and engineering with language learning, as students were asked to document their process and explain the steps in Indonesian. Such tasks not only helped students grasp scientific concepts but also encouraged them to organize and express their thoughts clearly in written and spoken Indonesian. Another project involved creating persuasive posters to promote environmental sustainability, which combined arts and technology with language practice. Students presented their posters and explained their designs in Indonesian, thus enhancing their speaking and writing skills. These examples demonstrate the potential of STEAM to foster interdisciplinary knowledge and higher-order thinking, aligning with Yakman's (2008) view that STEAM encourages students to make connections across different fields, thereby enhancing critical thinking and problem-solving abilities.

The study also revealed that the integration of STEAM had a profound impact on students' Indonesian language skill development. By engaging in project-based tasks, students not only deepened their understanding of content but also had to articulate their learning and reflections in Indonesian. For example, after conducting an experiment on plant growth, students were asked to write scientific reports in Indonesian, blending descriptive and procedural language. This integration of language and content knowledge allowed students to expand their vocabulary, improve syntax, and strengthen their ability to organize ideas cohesively. The hands-on nature of the activities, along with the requirement to use Indonesian for documentation and

presentations, provided a meaningful context for language learning, supporting Beers' (2011) argument that authentic tasks enhance literacy by grounding language use in real-world experiences.

Student engagement and creativity were also notably enhanced through STEAM-based learning. Students reported enjoying the practical, hands-on nature of the projects, which made learning more enjoyable and meaningful compared to traditional methods. One student mentioned, "When we make things and then explain them, it feels easier to speak in Indonesian because we understand what we are talking about," highlighting the connection between experiential learning and language development. Another student noted, "I enjoy drawing and building things, not just writing. It makes learning Indonesian more interesting." These responses underscore the role of autonomy and creativity in enhancing student motivation, as proposed by Ryan and Deci's (2000) Self-Determination Theory. When students had the opportunity to take ownership of their projects, they became more engaged, which positively impacted their language skills.

Despite these positive outcomes, the implementation of STEAM-based instruction faced several challenges. Limited resources, such as a lack of digital devices, laboratory tools, and art supplies, were a recurring issue. In response, teachers often improvised by using household items, recycled materials, and local resources. For example, one teacher shared, "When we couldn't access proper science kits, we used old plastic bottles, stones, and sand to teach about water filtration." This resourcefulness mirrors the findings of Herro and Quigley (2017), who emphasized the importance of teacher innovation in overcoming constraints in resource-limited settings. Additionally, a lack of professional development on STEAM pedagogy made it challenging for some teachers to design integrated, interdisciplinary lessons. To address this, teachers engaged in peer collaboration, participated in online courses, and formed informal study groups to share strategies and lesson plans. Time constraints also posed a significant challenge, as project-based activities often required more instructional time than traditional lessons. Teachers addressed this by breaking larger projects into smaller, more manageable phases and setting realistic timelines to ensure the completion of the curriculum.

Despite these encouraging findings, several areas warrant further exploration to enhance the depth and applicability of this study. First, while this research outlines the general forms of STEAM integration, the specific contributions of each STEAM element (Science, Technology, Engineering, Arts, and Mathematics) to the development of language skills are not extensively detailed. For instance, how artistic activities enhance oral expression or how engineering projects support narrative structure development in writing should be investigated further. Second, although there are claims of improved language proficiency, the study lacks detailed explanation on how these improvements were measured. A more rigorous application of structured assessment tools, such as speaking rubrics, writing scales, or observational protocols, would provide stronger empirical grounding. Third, the challenges of limited time and resources are acknowledged, yet the implications of these limitations for long-term sustainability of STEAM integration remain underexplored. Future research should consider how these constraints affect the continuity and scalability of project-based learning models in real classroom settings. Fourth, student collaboration was highlighted as a beneficial outcome; however, the dynamics of teamwork in fostering language development—particularly in speaking and writing—should be examined in greater depth. Understanding how peer interaction influences linguistic outcomes could add valuable

insight.

Students' responses to STEAM-based Indonesian language learning were overwhelmingly positive. Many students reported that they found the lessons more engaging and enjoyable compared to traditional methods. The hands-on nature of the learning process, coupled with the opportunity to create tangible products, contributed to a deeper understanding of the language. One student commented, "I feel more confident speaking Indonesian because I understand what I am talking about," demonstrating how the integration of content and language promoted fluency. These positive responses are consistent with Ryan and Deci's (2000) Self-Determination Theory, which suggests that motivation and engagement are enhanced when students feel a sense of competence, autonomy, and connection to the learning process.

The integration of STEAM also facilitated the development of essential 21st-century skills alongside language proficiency. Students exhibited improved critical thinking by analyzing problems, designing solutions, and reflecting on their work. Creativity was fostered through the design of projects and the artistic expression involved in tasks like creating posters. Collaboration skills were strengthened as students worked in teams, shared responsibilities, and negotiated project roles. Communication skills, both written and oral, were consistently exercised as students documented their projects, received peer feedback, and presented their findings. These findings align with the "4Cs" framework (Critical Thinking, Creativity, Collaboration, and Communication), which are essential competencies for success in the 21st century. The observed learning processes also reflect Bloom's Taxonomy, where students demonstrated higher levels of cognitive performance such as analysis, synthesis, and creation, which are the most advanced stages of learning.

CONCLUSIONS

In conclusion, this study affirms that integrating the STEAM approach into Indonesian language learning at MI Maarif 02 Bajing Kulon offers significant benefits. Not only does it enhance students' linguistic abilities, but it also promotes creativity, critical thinking, collaboration, and communication, which are essential for success in the 21st century. Despite challenges such as limited resources and time constraints, teachers demonstrated innovation and adaptability in overcoming these obstacles, ensuring the successful integration of STEAM into their classrooms. The positive impact on student engagement and language competence suggests that STEAM-based instruction holds great potential for educational reform, particularly in fostering holistic development in students. As educational systems continue to evolve, the findings of this study contribute to the growing body of evidence supporting the integration of interdisciplinary learning approaches like STEAM in language education. Future studies should consider designing more varied STEAM projects that intentionally target specific language competencies, such as debate-based STEM topics, science-fiction storytelling, or multimedia presentations. Structured assessment instruments must also be adopted to provide more robust evidence of language skill gains. Additionally, this research underscores the need for ongoing professional development for teachers to effectively design interdisciplinary lessons. Exploring the role of student motivation through psychological theories, such as self-determination or flow theory, could provide deeper understanding of engagement patterns. Comparative studies with traditional teaching methods are also recommended to determine the unique contributions of the STEAM approach to language acquisition.

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