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Forward

Welcome to the 9th International Conference on Educational Reform with the theme of Education for Sustainable Development (ICER2023).

ICER is a renowned international academic conference organized by the Faculty of Education at Mahasarakham University, in collaboration with various domestic and international educational institutions. As one of the leading institutions for education in the northeastern region of Thailand, the Faculty of Education (EDUMSU) upholds the philosophy of "Education is Growth."

Our journey began in 2007 when we co-hosted the inaugural conference, attracting over 300 scholars and students from Thailand and 29 other countries. Over the past eight ICERs, we have welcomed more than 2,400 participants, presented 372 articles, and engaged scholars from 30 countries worldwide, including Australia, China, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, South Korea, Thailand, the United States of America, and Vietnam.

Our aim is to expand knowledge, enhance practices, and forge valuable connections. This pivotal event is dedicated to intelligence, creativity, adaptability, and ready access to the vast pool of human knowledge. We extend our heartfelt gratitude to our partners and supporters, without whom this conference would not be possible.

It is our hope that this conference will contribute to the educational development of our partner countries and the global education landscape by fostering the exchange of ideas on current issues in educational reform. We envision this conference as a platform for broadening perspectives on teacher education at a global level.

Chowwalit Chookhampaeng

Assoc.Professor, Ed.D

Dean of Faculty of Education, Mahasarakham University

June, 16 2023

I had the honor of the part to organize the 9th International Conference on Educational Reform 2023 (ICER 2023) held at the Faculty of Education, Mahasarakham University. The conference focused on the theme of "Education for Sustainable Development," emphasizing the integration of sustainability principles into education.

ICER 2023 marked a significant milestone in the field of education, bringing together renowned professionals from various sectors, including the Secretariat of the Teachers Council of Thailand, the Office of the National Higher Education, Science, Research and Innovation Policy Council, Regional Center for STEM Education of the Southeast Asian Ministers of Education Organization (SEAMEO-STEM ED), and Regional Centre for Early Childhood Care Education and Parenting (SEAMEO-CECCEP), along with leading educational institutes from both domestic and international backgrounds.

The conference revolved around SDG 4, which emphasizes the need for sustainable education. It was inspiring to witness the collective effort of the network partners, who were dedicated to advancing research and service in this field. Through the Memorandum of Agreement on academic cooperation projects, the conference aimed to strengthen the Teachers Education Program (STEP) at the Faculty of Education, Mahasarakham University. This initiative holds great promise for the future of education, benefiting both students and academics. The conference had participants from more than 10 countries.

I am immensely grateful to the academic network that came together to create a vibrant learning society during the conference. The event fostered academic strength and warm friendships, providing an environment conducive to collaboration and knowledge exchange. It is through such collaborative efforts that we can pave the way for a more sustainable and inclusive education system. I am thankful for the opportunity to have organized this transformative event, and I commend all the participants for their commitment and passion. By collectively embracing the principles of sustainable development in education, we can shape a brighter future for generations to come.

Overall, ICER 2023 was a remarkable event that showcased the dedication and passion of educators, researchers, and professionals in promoting sustainable development through education. I am grateful for the opportunity to have been part of this transformative experience and look forward to the positive impact it will have on the future of education.

Education is Growth!

Jiraporn Chano

Assistant Professor, M.Ed , MBA, Ed.D
Vice Dean of Research and International Affairs
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Implementing STEAM Education in Vietnamese Preschools: An Analysis of The National Early Childhood Curriculum Framework

Viet-Nhi Tran[1], Tuan-Vinh Nguyen[1], Thi-Lam Bui[2]

ABSTRACT

The aim of this article is to analyze the National Early Childhood Education (ECE) curriculum and propose recommendations for implementing STEAM education in Vietnamese kindergartens. The study's primary research method is document analysis. According to studies worldwide, the STEAM approach has been researched and implemented in ECE as an educational innovation strategy for many countries. An analysis of the present Vietnamese National ECE revealed several parallels in its cross-cutting viewpoint with the STEAM education approach, indicating that it could be utilized in Vietnamese ECE to improve comprehensive education effectiveness in children. With the intention of presenting scenarios, several recommendations for implementing STEAM education in Vietnamese kindergartens were presented.

Keywords: STEAM education, Vietnamese preschools, National Early Childhood Curriculum Framework Implementation, Early childhood education.

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Introduction

Early childhood education (ECE) has a significant impact on a child's future development and success (NAEYC, 2015). The incorporation of Science, Technology, Engineering, Arts, and Mathematics (STEAM) education into ECE has gained popularity in recent years, with the goal of fostering creativity, critical thinking, and problem-solving skills in young children (American Institutes for Research, 2018; Murcia et al., 2022). The STEAM approach, which combines STEM education with the Arts, has been widely researched and implemented in ECE as an educational innovation strategy in many countries (DeJarnette, 2018). Approaching STEAM not only helps teachers combine multiple fields at the same time and promotes learning experiences for children to survey, question, research, explore and implement creative building skills but also provides more options for educators to present STEM concepts to children through arts (Colker & Simon, 2014). STEAM education integrates related disciplines into one lesson, depending on liaisons between the topics and real-life problems (Moore et al., 2014), encouraging preschool children's practice in an exciting way to improve their attitude toward STEAM and enhancing their creativity, innovation, engagement, problem-solving skills, teamwork, and communication ability (Van Meeteren, 2015; Mengmeng et al., 2019; Lee & Chang, 2019; Duhong, 2020; Murcia et al., 2022). These skills are essential for a child's success in the future. In Vietnam, the National ECE curriculum has been developed to provide comprehensive education for children from birth to six years old. The curriculum focuses on various domains, including language, cognition, and social-emotional development (MOET, 2021). However, despite the potential benefits of STEAM education in improving comprehensive education effectiveness in children (Aysun & Ozlen, 2017), the Vietnamese National ECE curriculum has not yet fully incorporated the STEAM approach (Tran et al., 2020).

This article intends to evaluate the ECE curriculum of Vietnam at the national level and gives recommendations for incorporating STEAM education in Vietnamese preschools. The study's primary research method is document analysis, which involves examining relevant documents to gain insight into the topic (Creswell, 2014). The following research questions aim to explore the implementation of STEAM education in early childhood education (ECE), the potential benefits and challenges of integrating STEAM into the ECE curriculum, the alignment of the current National ECE curriculum in Vietnam with STEAM education, and the recommendations for implementing STEAM education in Vietnamese kindergartens.

Question 1: What is STEAM, and how has STEAM education been implemented in ECE worldwide?

Question 2: What are the potential benefits and challenges of integrating STEAM into the ECE curriculum?

Question 3: How does the current National ECE curriculum in Vietnam align with STEAM education, and what recommendations can be made for implementing STEAM education in Vietnamese kindergartens?

Methods

The research design utilized in this study is a document analysis methodology (Creswell, 2014). This design involves the systematic examination of relevant documents in order to gain insight into a particular topic or issue. The research focuses on the Vietnamese National ECE curriculum and the implementation of STEAM education in Vietnamese kindergartens.

Data was collected by examining various relevant documents related to the Vietnamese National ECE curriculum and STEAM education. The sources of these documents included online databases (such as JSTOR, ProQuest, and Google Scholar), academic journals (such as the Journal of Early Childhood Education Research, the International Journal of STEM Education and HNUE Journal of Education), and official government websites (such as the Ministry of Education and Training's website). The documents were selected based on the following criteria: (1) Relevance to the study topic, (2) Availability of full text online, and (3) Date of publication within the last ten years (Creswell, 2014).

The collected documents were analyzed using a qualitative approach. The information was organized and coded based on the research objectives, and the themes and patterns that emerged from the data were identified. These themes and patterns were then used to draw conclusions and make recommendations (Strauss & Corbin, 1998).

Results

Question 1: What is STEAM, and how has STEAM education been implemented in ECE worldwide?

Definition and Elements of STEAM Education

The term "STEAM education" was first used in the early 2000s to describe an interdisciplinary approach to education that integrates the five core subjects of science, technology, engineering, arts, and mathematics (Department of Education and Training, 2017). The essence of STEAM education is to encourage children to develop a comprehensive understanding of complex problems and apply their knowledge of multiple subjects to solve them (Moore et al., 2014; Duhong, 2020; Murcia et al., 2022). In this context, the arts are viewed not only as a means of expression but also as a valuable tool for problem-solving, creativity, and innovation (National Science Teachers Association, 2017). STEAM education incorporates interdisciplinary and project-based learning methods, which aim to foster creativity, critical thinking, and problem-solving skills (Xunyi, 2021; Chen & Tippett, 2022; Murcia et al., 2022). STEAM education aims to equip children with a comprehensive education that prepares them for professions that necessitate a blend of technical and creative abilities (Timms et al., 2018).

STEAM education is a holistic approach that integrates multiple core subjects, including science, technology, engineering, arts, and mathematics (Department of Education and Training, 2017). The elements of science, technology, engineering, arts, and mathematics are all interconnected and provide children with the tools and skills essential for comprehending and resolving intricate problems (Department of Education and Training, 2017). Five elements of STEAM are described in detail as follows:

Science: In STEAM education, science is seen as a way to understand the natural world and the underlying principles that govern it (Department of Education and Training, 2017). This subject provides children with a strong foundation in the scientific method, which enables them to form hypotheses, test them, and draw conclusions based on their findings (Chen & Tippett, 2022; Dilek, 2020).

Technology: Technology plays a critical role in STEAM education by providing children with the tools to design, build, and test solutions to complex problems (Department of Education and Training, 2017). This subject helps children develop technical skills, such as coding, programming, and engineering, which are essential for careers in the technology sector (Wahyuningsih et al., 2020).

Engineering: Engineering is a key component of STEAM education, as it provides children with a structured approach to solving problems (Department of Education and Training, 2017). This subject teaches children to design, build, and test prototypes and provides them with hands-on experience in fabrication, assembly, and testing (Xunyi, 2021; Van Meeteren, 2015).

Arts: The arts play a central role in STEAM education, as they provide children with a way to express themselves creatively and to communicate their ideas in a meaningful and impactful way (National Science Teachers Association, 2017). This subject encompasses visual arts, music, dance, and drama and provides children with opportunities to develop their artistic skills as well as to collaborate with others (Lee & Hong, 2019; Spyropoulou et al., 2020; Moore & Holmes, 2021).

Mathematics: Mathematics is an essential component of STEAM education, as it provides children with a systematic approach to problem-solving and helps them develop critical thinking skills (Department of Education and Training, 2017). This subject teaches children to use mathematical concepts, such as geometry, algebra, and calculus, to analyze and solve problems in various fields, including science, engineering, and technology (He et al., 2021).

The implementation of STEAM in ECE over the world

The integration of STEAM (Science, Technology, Engineering, Arts, and Mathematics) education in ECE is gaining momentum globally. The following is an overview of the implementation of STEAM in ECE in various countries, including the USA, European countries, Asian countries, and Southeast Asian countries:

In the United States, the implementation of STEAM in ECE is driven by a growing interest in STEM education and the recognition of the importance of ECE in shaping children's future careers. As per the National Science Board (NSB, 2018), STEAM education can facilitate the development of critical thinking and problem-solving abilities in children and prepare them for the evolving requirements of the job market. There are various strategies and initiatives in the United States to promote STEAM in ECE. For example, the National Science Foundation (NSF) has launched the Advancing Informal STEM Learning (AISL) program, which supports the development of innovative, research-based learning experiences in informal STEM education settings, including ECE programs (NSF, n.d.). In addition, the National Association for the Education of Young Children (NAEYC) has developed the "STEM for all Ages" initiative, which provides resources and support for early childhood educators to integrate STEM learning into their curricula (NAEYC, 2018).

In Europe, various initiatives are underway to promote STEAM education in ECE. The European Schoolnet has launched the "Science on Stage" program (European Schoolnet, 2017), which provides resources and support to teachers to integrate science into their curricula and engage children in hands-on learning experiences. The program aims to help teachers make science more accessible and fun for children. In addition, the European Schoolnet has introduced the "Math for Fun" program (European Schoolnet, 2017), which provides resources and support for early childhood educators to integrate math into their curricula and engage children in hands-on learning experiences. This program is designed to help early childhood educators make math a more interactive and enjoyable experience for children.

In Asian countries, a number of initiatives are underway to advance STEAM education in ECE. For instance, the Ministry of Education (MOET) in South Korea has initiated the "STEAM Education Promotion Plan" (MOET, South Korea, 2017) that offers resources and support to early childhood educators to integrate STEAM learning into their curricula. This plan aims to help educators incorporate STEAM education in a meaningful and effective way. Similarly, the

Japanese government has launched the "Integrated Science and Technology Education" program (MOET, Japan, 2017), which provides resources and support to early childhood educators to incorporate science and technology into their curricula. This program aims to help educators integrate science and technology education into their teaching, making it more engaging and interactive for children.

In Southeast Asian countries, the implementation of STEAM in ECE is still in its early stages. However, there have been efforts to incorporate STEAM education into the curriculum, especially in countries like Singapore and Malaysia.

Singapore has been at the forefront of incorporating STEAM into ECE. Several initiatives have been implemented by the government to encourage STEAM education, including the "Infocomm Media Development Authority" (IMDA) program, which provides resources and support for early childhood educators to integrate technology into their teaching (MOET, 2016). The program also provides training and resources for teachers to incorporate STEAM subjects into their teaching, including engineering, science, technology, arts and mathematics (MOET, 2016).

In Malaysia, STEM-STEAM learning was introduced for the first time in prekindergarten classes in 2015 in order to inculcate a love for STEM learning at a young age in hopes it will continue throughout the rest of their education (Aminah, 2019). The Prime Minister has stressed the significance of fostering children's interest in STEM education to guarantee a brighter future for Malaysia. The possibility of introducing STEM education in early childhood was founded on the existence of science and mathematics components in the National PERMATA Curriculum, coupled with the alignment of Project-Based Inquiry Learning with the innate inquisitiveness of children, which drives them to inquire, explore, and design, investigate, create, and discuss their inventions or investigations. (Eng et al., 2016)

Despite the efforts being made, the implementation of STEAM in ECE in Southeast Asian countries is still in its initial phases, and there is a need for further research to evaluate the impact of these initiatives on student outcomes.

 # Question 2: What are the potential benefits and challenges of integrating STEAM into the ECE curriculum?

Potential Benefits of Implementing STEAM in ECE

Implementing STEAM in ECE has the potential to provide numerous benefits to young children, including improved problem-solving skills, creativity, and critical thinking (Van Meeteren, 2015; Zhang et al., 2019; Lee & Chang, 2019; Duhong, 2020; Murcia et al., 2022). STEAM programs also encourage children to take an active part in their learning and cultivate a lifelong love of learning (Mogotsi, 2019). Most research has also shown that STEAM programs can improve children's knowledge and understanding of science, technology, engineering, arts, and mathematics (Chen, 2017). STEAM programs have also been found to improve children's writing and communication skills (Vislavath, R., 2018; Nopiyanti et al., 2020; Siti et al., 2021; Marie & Andreas, 2021).

Additionally, STEAM programs can have positive effects on children's emotional and social development. For example, STEAM programs can help children develop social and emotional skills such as collaboration, communication, and empathy (Mogotsi, 2019). STEAM programs can also foster a sense of community among children as they work together on projects and engage in shared learning experiences (Chen & Tippett, 2022).

Challenges of Integrating STEAM into ECE Curriculum:

Despite the numerous benefits of STEAM education, there are also some challenges that need to be addressed in order to ensure its successful integration into the ECE curriculum. One of the major challenges is the need for teacher training, as STEAM education entails educators possessing a wide range of abilities, such as their knowledge in science, technology, engineering, arts, and mathematics, as well as pedagogical knowledge and the ability to integrate these subjects into their teaching practices (Chen, 2017; Bui et al., 2022).

Another challenge is the cost of implementing STEAM education, as it requires significant resources, including funding, materials, and equipment (Mogotsi, 2019). In addition, some schools may face challenges in terms of space and infrastructure, which can impact the implementation of STEAM activities and projects (Chen & Tippett, 2022).

 # Question 3: How does the current National ECE curriculum in Vietnam align with STEAM education, and what recommendations can be made for implementing STEAM education in Vietnamese kindergartens?

The current National ECE curriculum of Vietnam

ECE in Vietnam has a long history, dating back to the early 20th century (Vu, 2021). In the 1960s, the Vietnamese government established a comprehensive ECE program with the aim of providing quality education for all young children. Over the years, the program has undergone several changes and improvements, with the most recent update being the national ECE curriculum framework, which was introduced in 2009 and made amendments in 2017 and 2021. The framework is designed to provide a comprehensive education for young children, taking into account their multiple aspects of development and considering the importance of integrating different subjects and skills (Tran et al., 2020).

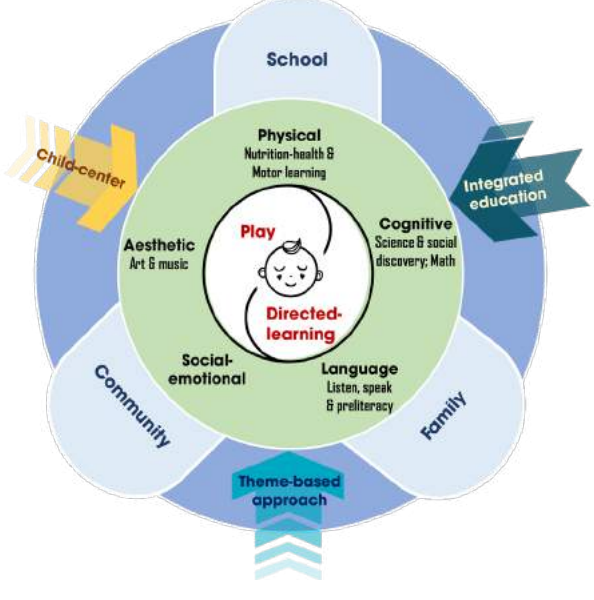

Figure 1. *Model of the current Vietnamese National ECE Curriculum Framework*

As illustrated in Figure 1, the national ECE curriculum framework in Vietnam aims to provide a comprehensive education for young children that covers a wide range of topics and skills, including physical development, cognitive development, language development, social-emotional development and aesthetic development (Vu, 2021; MOET, 2021). The curriculum is designed to be flexible and adaptable to the needs of each child and to promote their overall development. The curriculum also places emphasis on the importance of play and hands-on

learning experiences as a way to engage children and encourage their curiosity and creativity (Tran et al., 2020; Hoang, 2020; Tran & Nguyen, 2021). The national framework is designed with a cross-cutting perspective that considers the multiple aspects of a child's development (Nguyen, 2020; Tran et al., 2020; Tran & Nguyen, 2021). It recognises the importance of integrating different subjects and skills, such as language development and physical development, to provide a well-rounded education. This approach also considers the individual needs and abilities of each child, allowing for a customized educational experience that supports their growth and development (Tran et al., 2020; Hoang, 2020; Tran et al., 2021).

The framework also places a strong emphasis on the role of teachers in promoting a positive and supportive learning environment for young children (Tran et al., 2020; Hoang T.P., 2020). Teachers are encouraged to provide opportunities for children to engage in hands-on learning activities, engage in meaningful interactions with their peers and teachers, and develop their social and emotional skills (Tran, 2020; Vu, 2021; MOET, 2021). This can be accomplished through various instructional techniques, including project-based learning, cooperative learning, and play-based learning, which have been demonstrated to be effective in fostering child development and involvement. (Tran et al., 2020; Vu, 2021).

The presence of STEAM in the National ECE curriculum of Vietnam

STEAM education is in line with the current ECE program in Vietnam. The national ECE curriculum framework of Vietnam aims to promote the holistic development of children, including their physical, intellectual, emotional, and social development (Nguyen, 2020). The framework also emphasizes the importance of play-based learning and the integration of different subjects, such as language, mathematics, and science, to enhance children's understanding of the world around them (Tran, 2019; MOET, 2021). These objectives align with the principles of STEAM education, which also focuses on providing children with hands-on experiences that foster their development in a holistic manner (Robertson & McEwen, 2017; Tran et al., 2020; Hoang, 2020; Tran & Nguyen, 2021).

The national ECE curriculum framework in Vietnam includes a wide range of subjects that contribute to children's development, including language, mathematics, natural science, social science, and the arts (Tran et al., 2020; Hoang, 2020; Tran & Nguyen, 2021). The framework also recognises the importance of physical development and play in ECE (Pham, 2018). These subjects provide a broad base for the integration of STEAM education into the curriculum. Accordingly, educational content and activities are deployed in the direction of integration by themes to help children develop comprehensively and continuously, meeting the diversity of regions and children's abilities (Ministry of Education and Training, 2016). However, the presence of STEAM education as a distinct subject area is not explicitly mentioned in the national ECE curriculum framework (Tran et al., 2020).

Despite the absence of STEAM education as a distinct subject area in the national ECE curriculum framework, the objectives and contents of the framework provide a strong foundation for its integration. The focus on play-based learning, the integration of different subjects, and the recognition of the importance of physical development are all key components of STEAM education (Vu, 2021). Additionally, the emphasis on promoting children's holistic development aligns well with the principles of STEAM education, which also focuses on fostering children's development in a comprehensive manner (Tran et al., 2020; Hoang, 2020).

Studies have shown that the integration of STEAM education into ECE can enhance children's critical thinking skills, creativity, and problem-solving abilities (Van Meeteren, 2015; Mengmeng et al., 2019; Lee & Chang, 2019; Duhong, 2020; Murcia et al., 2022). Furthermore, STEAM education has been found to promote gender equality in education, as it encourages

girls to pursue careers in traditionally male-dominated fields (Nyman, 2018). These potential benefits of STEAM education highlight the importance of its integration into the national ECE curriculum in Vietnam.

Overall, the national ECE curriculum framework of Vietnam provides a strong foundation for the integration of STEAM education. The framework's focus on play-based learning, the integration of different subjects, and the emphasis on promoting children's holistic development align well with the principles of STEAM education. The absence of STEAM education as a distinct subject area in the national ECE curriculum framework may present a challenge, but the presence of these key components suggests that the integration of STEAM education into Vietnamese ECE is feasible. The potential benefits of STEAM education, including the enhancement of critical thinking skills, creativity, and problem-solving abilities, as well as the promotion of gender equality in education, further highlight the importance of its integration into the national ECE curriculum in Vietnam.

Recommendations for implementing STEAM education in Vietnamese ECE

Implementing STEAM education in Vietnamese ECE requires a combination of policy initiatives, teacher training and professional development, collaboration and integration, hands-on and experiential learning, access to technology, community partnerships, and effective assessment and evaluation. By incorporating these components, ECEs can provide children with engaging, meaningful, and relevant learning experiences that can help them develop a strong foundation in the STEAM subjects and prepare them for future success in these fields.

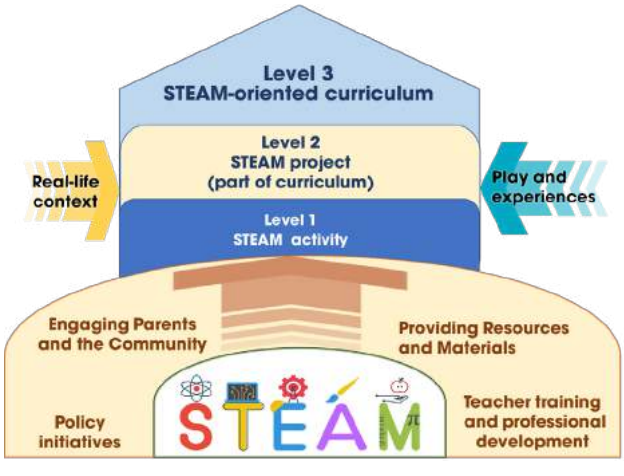

Figure 2. *Recommendations for implementing STEAM education in Vietnamese ECE*

Policy initiatives: Policy initiatives and the role of the Ministry of Education and Training (MOET) in Vietnam play a crucial role in the implementation of STEAM education in ECE. MOET can provide guidelines and standards for the integration of STEAM subjects into the curriculum, as well as support the professional development and training of ECE teachers.

One policy initiative that MOET can implement is the integration of STEAM subjects into the national curriculum. By including STEAM subjects in the curriculum, MOET can ensure that all children in Vietnam have access to quality STEAM education. MOET can also provide training and support for teachers to help them effectively integrate STEAM subjects into their teaching.

MOET can also promote community partnerships and encourage collaboration between ECEs and local businesses, organizations, and institutions. These partnerships can provide children with hands-on learning experiences and real-world applications of STEAM subjects, and they can also help ECEs access the resources and technology needed to implement effective STEAM

education programs. In addition, MOET can support the development of assessment and evaluation strategies for STEAM education in ECEs. This can help ensure that student's learning and progress are accurately measured and that educators have the necessary information to make informed choices on enhancing their STEAM education programs.

Teacher training and professional development: The role of teachers in the successful implementation of STEAM education is pivotal. To effectively integrate STEAM subjects into their lessons, teachers require a deep understanding of each subject and how they interconnect (Tran et al., 2021). This underscores the need for teacher training and capacity building in STEAM education, as well as greater attention from educational institutions in equipping future preschool teachers with the relevant knowledge and skills for STEAM education while still in university. In Vietnam, STEAM education in preschool is still in its infancy, which highlights the importance of preparing a generation of teachers who can comprehensively meet the demands of STEAM education in the future. Teachers should receive training in integrating the different STEAM disciplines, designing STEAM activities, and facilitating learning experiences that foster critical thinking, problem-solving, and creativity in young children.

Integrating STEAM into the ECE Curriculum: The integration of STEAM education into the ECE curriculum can be implemented at various levels, ranging from individual to synchronized, based on the school's physical conditions and human resources. (Hoang, T. P., 2020)

Level 1: Incorporating the concept of integrated STEAM education into preschool activities allows for the development of connections between subjects without coordination in a specific project. This step enables preschools to gain experience in connecting educational fields and gradually develop STEAM education programs that meet the requirements of the ECE program.

Level 2: Preschools can develop STEAM education projects that support the ECE program through project-based learning. This approach allows children to engage in micro or large projects, which helps them develop skills and positive attitudes.

Level 3: Preschools can develop their curriculum towards STEAM education to meet ECE curriculum objectives, expected results, and educational requirements. The ECE curriculum framework in Vietnam provides a legal basis and foundation for integrating educational fields and developing STEAM education programs based on educational themes. Kindergarterns with sufficient human resources can integrate educational fields through small, medium, or large projects, depending on their actual conditions.

Engaging Parents and the Community: Parents and the community play a crucial role in the success of STEAM education in early childhood education. Engaging parents and the community can create a sense of ownership and investment in the program's success. This can be achieved by organizing STEAM events, inviting parents to participate in STEAM activities, and creating opportunities for the community to support the program.

Providing Resources and Materials: Provision of Resources and Materials: STEAM education necessitates a broad range of resources and materials, including manipulatives, technology, and art supplies. It is vital to grant teachers access to these resources and materials to facilitate the implementation of STEAM activities. This can be accomplished by securing funding and partnerships with organizations that support STEAM education.

Furthermore, STEAM education is enriched by the use of loose parts. Loose parts are open-ended materials that can be employed in various ways, fostering creativity, problem-solving, and collaboration among children. These materials can consist of natural items such as

sticks, stones, and leaves, as well as recycled materials like cardboard boxes, plastic containers, and bottle caps. Teachers can gather and arrange these loose parts to make them accessible for children to employ in their STEAM activities. Providing loose parts encourages children to explore and experiment with diverse materials, honing their critical thinking and innovation skills. It also promotes sustainability by fostering the use of recycled materials and encouraging an appreciation for nature.

5. Conclusion

In conclusion, this research aimed to answer three questions related to STEAM education in Early Childhood Education (ECE): What is STEAM, and how has STEAM education been implemented in ECE worldwide? What are the potential benefits and challenges of integrating STEAM into the ECE curriculum? And how does the current National ECE curriculum in Vietnam align with STEAM education, and what recommendations can be made for implementing STEAM education in Vietnamese kindergartens?

The findings of this research show that STEAM education provides children with a well-rounded education that prepares them for future careers and lifelong learning. The integration of STEAM into ECE has been widely adopted worldwide and offers many potential benefits, such as the development of critical thinking and problem-solving skills, creativity, and an understanding of real-world applications. However, the implementation of STEAM education in ECE also poses challenges, including the need for significant resources and teacher training and the need to balance the focus on STEM and the arts. The current National ECE curriculum in Vietnam aligns well with STEAM education, but further steps can be taken to ensure that all Vietnamese kindergartens are equipped with the resources and support necessary to implement STEAM education effectively.

Implementing STEAM education in Vietnamese early childhood education (ECE) requires comprehensive policy initiatives, teacher training, integration into the curriculum, parent and community engagement, and provision of necessary resources. The Ministry of Education and Training (MOET) should provide guidelines and support for integrating STEAM subjects into the curriculum, while also fostering partnerships between ECEs and local entities. Teacher training is vital for effective integration of STEAM subjects, and ECEs can gradually incorporate STEAM education into their curriculum at various levels. Engaging parents and the community creates a sense of ownership, and providing resources such as manipulatives and loose parts facilitates hands-on learning. By following these recommendations, Vietnamese ECEs can provide engaging STEAM education that prepares children for future success and enhances their overall development.

The recommendations provided in this article are based on current research and best practices in STEAM education. However, the implementation of these recommendations may face limitations and challenges, such as limited financial and resource allocation for STEAM education, inadequate teacher training and support, and cultural attitudes towards STEAM subjects. It is important to consider these limitations and work towards finding solutions to address them in order to ensure the effective implementation of STEAM education in ECE in Vietnam. Further research is also needed to determine the impact of STEAM education on child development and to evaluate the effectiveness of different teaching methods and resources

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CERTIFICATE OF PRESENTATION

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FACULTY OF EDUCATION, MAHASARAKHAM UNIVERSITY, THAILAND
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