The 6th International Conference on Islamic and Civilization (ICONIC)
October 28, 2021, Purwakarta, Indonesia
Available online at http://www.e-jurnal.staimuttaqien.ac.id/

Implementation of The Steam Approach in Supporting Free Learning

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ISBN: 978-623-97987-1-0

Received: 25 October 2021	**Accepted:** 27 October 2021	**Published:** 22 November 2021

Abstract :

Implementation of the *STEAM* Approach in Supporting Independent Learning (Case Study at Bunga Tanjung Kindergarten, Pondoksalam District, Purwakarta Regency). Freedom to learn is a policy that was issued in 2020. The essence of free learning is so that teachers and children can face 21st-century education and the 4.0 industrial revolution. However, long before the policy of independent learning was issued, the independence of learning for early childhood education programs level had been realized in the concept of learning through play because learning through play was the same as learning freedom. One approach that can be used to support independent learning is to use the *STEAM* approach. Because *STEAM* is an approach that can deal with 21st-century education and the 4.0 industrial revolution, this study aims to describe: (1) the implementation of the *STEAM* approach in supporting independent learning, (2) the supporting and inhibiting factors, advantages and disadvantages, and the effectiveness of the implementation of the *STEAM* approach in supporting independent learning. This study uses a qualitative approach, and data collection is done using observation, interviews, and documentation. The data analysis used is the Miles and Huberman model, where the process starts from reducing the data, then presenting the data and verifying it. The data validity technique used is the source triangulation method. The results show that the implementation of the *STEAM* approach in supporting independent learning has been carried out starting from the curriculum, which includes plans, methods, models, strategies, evaluations, and infrastructure, as well as the steps in the RPPH so that everything shows that *STEAM* can support free to learn.

Keywords : *STEAM Approach, Freedom to Learn, 21st Century Skills.*

INTRODUCTION

Along with the development of the era where today technology has a positive impact in the world of education. The existence of these advances is unavoidable, and this is because technological advances go hand in hand with advances in knowledge itself. For the current generations, without them knowing, they have been introduced by their parents and their environment to the technology that is currently developing, so that the majority of children are used to its presence.

The development of the quality of PAUD in Indonesia can be done by implementing education reforms. The shift from traditional learning to learning that further enhances the potential and abilities of PAUD children. The factor causing the decline in the potential and ability of PAUD children is the lack of variety of learning approaches used by teachers, so they tend to be monotonous

and boring. One of the evaluations of efforts to improve the quality of the potential and abilities of PAUD children does not escape the learning components, namely objectives, approaches, methods, media, and evaluation.

To create a generation that can develop in technology in the future. The government has made policies in learning, such as the policy for independent learning. Education that is independent of learning can be sought to deal with developments in the 21st century, students and teachers will collaborate in achieving maximum learning and teachers are given the freedom to make learning in such a way as to provide fun material.

Of course, in improving the quality of education, many things can be used as solutions or alternatives. One of them is by choosing a learning approach. The principles in the learning approach must be child-centred, active participation, holistic, integrative and integrative, flexible, individual differences. Emphasis on choosing a learning approach refers to the condition and character of the child. The most dominant concept in children's learning is "learning through play and playing through learning".

One of the learning approaches that stole the attention of education experts is STEAM. As Yulianti Siantajani has stated that the components in the STEAM approach have their respective meanings, including science is knowledge or learning about nature based on facts learned through experiments and observations, technology is the use of science in industry, engineering, etc. to find something useful in order to solve problems, engineering is an effort to design and create new product systems using scientific methodologies, arts is art, and mathematics is the science of numbers and number operations, combination relationships, generalizations and their structures, sizes, transformations[1]

Minister Nadiem Makarim in the policy of independent learning gives an implicit meaning in his message that students are given the freedom to determine their future according to their competencies, not based on the pressure that causes students to stress and lose their confidence as is the case in many cases due to the implementation of the national exam. [2]

Muzakki stated that humans as creatures created by Allah SWT are essentially given freedom and independence by Allah to carry out any activity desired by their servants, but every choice of Allah's freedom has consequences, if it is good, it will get good, and if it is wrong it will get nasty later. In return for what has been done. [3]Based on the results of the background of the problem, it can be concluded that the identification of the problem is an effort to realize the generation that develops in technology in the future, trying to change and use a new learning approach that can create a generation that develops in technology in the future, the importance of implementing the STEAM approach in supporting independence. Learning, the implementation of the STEAM approach in supporting independent learning and factors are supporting and inhibiting the implementation of the STEAM approach in supporting independent learning.

Based on the results of problem identification, the focus of the problem is planning, implementation and evaluation, supporting and inhibiting factors, advantages and disadvantages, and the effectiveness of implementing the STEAM approach in supporting independent learning.

Based on the results of the focus of the problem above, the formulation of the problem is how to plan, implement and evaluate, the supporting and inhibiting

factors, the advantages and disadvantages, and the effectiveness of the implementation of the STEAM approach in supporting independent learning.

The purpose of this study is to describe the planning, implementation and evaluation, supporting and inhibiting factors, the advantages and disadvantages of implementing the STEAM approach in supporting independent learning.

The usefulness of this research is expected to be helpful, both theoretically and practically. The benefits of developing science are increasing the author's knowledge about the implementation of the STEAM approach and learning independence, and enriching knowledge about the implementation of the STEAM approach. The practical use is to contribute knowledge to educators and all parties involved in an early childhood education as a reference in the future STEAM approach to make it even better and as reference material for other researchers to conduct further research on the implementation of the STEAM approach in supporting independent learning. In PAUD.

RESEARCH METHOD

This study uses a qualitative approach, and data collection is done using observation, interviews, and documentation. The data analysis used is the Miles and Huberman model, where the process starts from reducing the data, then presenting the data and verifying it. The data validity technique used is the source triangulation method.

FINDINGS AND DISCUSSION

1. Planning for the Implementation of the STEAM Approach in Supporting Independent Learning

Planning for implementing the STEAM approach in supporting independent learning is to prepare the KTSP and RPPH, whose contents must contain the STEAM approach to support independent learning. This is in line with Law Number 137 of 2014 concerning National Standards for Early Childhood Article 12 that:[1] (1) The learning planning as referred to in Article 11 letter a is carried out with an approach and learning model that is following the needs, characteristics of children, and local culture. (2) Learning planning includes a. semester program (Prosem); b. weekly lesson plan (RPPM); and c. daily learning implementation plan (RPPH). (3) Learning planning is prepared by educators in PAUD units or programs.

2. The Implementation of the STEAM Approach in Supporting Free Learning

The implementation of the STEAM approach in supporting independent learning in Bunga Tanjung Kindergarten is carried out through the implementation steps of the STEAM approach in supporting independent learning, which has been compiled in the RPPH for the core activities that have been given the characteristics of sections including science, technology, engineering, art and mathematics. The RPPH has also written about the points included in the competence of independent learning. This is in line with the opinion of experts regarding the steps that must be taken in implementing the STEAM approach. According to Father Rachman in the book How to STEAM your Classroom, the steps in the STEAM approach implemented in the learning process are:[1]

1. *Focus*

In this step, we choose an important (essential) question to answer or a problem to find a solution for. It is vital to have a clear focus on how this question or issue relates to the chosen STEM and Art content areas.

2. *Details*

During the detail phase, we look for the dominant element that is related to the relationship problem with other fields or why the problem occurs, and then we start to dig up much information about the background of the problem, that is when the process skills that students have to answer the question are needed.

3. *Discovery*

Discovery is about guided research and is globally applied to teaching. In this step, students carry out existing solutions and what is still not implemented/not working based on existing solutions.

As teachers, we must use this stage to analyze gaps that students may have in a skill or process and specifically teach that skill or process.

a. Application

At this stage, learning will be more enjoyable. Once students are involved in formulating and answering a problem or question and analyzing the current solution and what needs to be done to improve it, they can start creating their solution.

b. Presentation

After students make solutions, including alternatives, the next step is to share them. Work must be presented/published for feedback and to express students' perspectives on the question or problem at hand. This is also a significant opportunity to facilitate feedback and help students learn to give and receive input.

3. Evaluation Implementation of the STEAM Approach in Supporting Free Learning

The evaluation of the implementation of the STEAM approach has been carried out after each lesson using discussions between the teacher and the principal so that the findings from the evaluation can find a solution. To facilitate the evaluation, it is necessary to look at the indicators contained in the context, inputs, processes and outputs used in the evaluation steps of the implementation of the STEAM approach.[1]

4. Supporters and Obstacles to the Implementation of the STEAM Approach in Supporting Free Learning

There are two supporters of the implementation of the STEAM approach, including human resources and infrastructure. This is in line with Donatirin's opinion that the factors that can support the implementation of the STEAM approach in supporting independent learning consist of three aspects, including:

1. HR/educators and education personnel who have attended training on early childhood education, understand the 2013 PAUD curriculum and understand the implementation of STEAM approach learning in PAUD units. [1]Students with active status as PAUD unit students, preferably children aged 5-6 years, physically and mentally healthy and able to

[1] Peraturan Pemerintah Nomor 137 tahun 2014 tentang Standar Nasional Anak Usia Dini pasal 16.

participate in the implementation of STEAM approach learning actively carried out in institutions. [2]

2. Facilities and infrastructure, including learning activity rooms, in-door and out-door Educational Game (APE) tools, loose parts media, learning materials in the form of reading books, other supporting facilities in the form of whiteboards, etc.[3]

The obstacles that arise in the implementation of the STEAM approach in supporting independent learning include:

1. The process of making lesson plans takes quite a long time.
2. Human Resources (HR), which is still low, is one of the initial obstacles to implementing STEAM learning.
3. Lack of socialization and training on the implementation of STEAM learning.

5. Strengths and Disadvantages of Implementing the STEAM Approach in Supporting Free Learning

Implementing the STEAM approach in supporting independent learning can provide advantages or benefits for schools, teachers and students. This is in line with Father Rachim's thoughts in the book How to STEAM your Classroom, the advantage of the STEAM Approach is to prepare students so that they can enter the world they will experience when they leave school. [1]The shortcoming faced by teachers and principals when implementing the STEAM approach in supporting independent learning is the time conditions during the pandemic which resulted in limited mobility activities. This is in line with the provisions issued by the government regarding the Joint Decree in limiting learning activities during the COVID-19 pandemic.

6. The Effectiveness of the Implementation of the STEAM Approach in Supporting Free Learning

The effectiveness of implementing the STEAM approach in supporting independent learning is seen from the suitability of learning for the PAUD level. The implementation of the STEAM approach is appropriate according to the level of education, this level of conformity can be seen from the essential competencies that can be used. According to Siantajani's opinion in the book Concepts and Practices of STEAM in PAUD which says that there are 13 essential competencies related to the STEAM approach, which will then become appropriate materials for early childhood, namely KD 2.2; 2.3; 2.4; 3.5-4.5; 3.6-4.6: 3.7-4.7; 3.8-4.8; 3.9-4.9.[2]

CONCLUSION

Based on the research and discussion results, it can be concluded that the STEAM approach has been implemented to support independent learning at the Bunga Tanjung Kindergarten. Implementing the STEAM approach in supporting independent learning in TK Bunga Tanjung is carried out through planning,

[2] Yulianti Siantajani. Konsep dan Praktek STEAM. (Jawa Tengah: PT Sarang Seratus Aksara, 2020), 23.

implementation, evaluation, supporting and inhibiting factors, advantages and disadvantages, effectiveness.

Planning for the STEAM approach to support independent learning in Bunga Tanjung Kindergarten has been carried out by preparing various things, including: first, selecting educators and teaching staff who have the following criteria: 1) educator criteria: have attended training on early childhood education, understand the curriculum 2013 PAUD, and understand the implementation of STEAM approach learning in PAUD units. 2) the criteria for educators: have knowledge and skills in the field of PAUD and have knowledge and skills about learning the STEAM approach in the PAUD unit; second, compiling a learning plan consisting of Basic Competence (KD), methods, media, strategies, evaluation, and preparing PROMES, RPPM and RPPH. The STEAM approach in supporting independent learning at the Bunga Tanjung Kindergarten is carried out as follows: first, setting the playing environment using loose parts. Second, use invitation sentences and provocation sentences. Third, using the steps of the STEAM approach to support independent learning, such as focus, detail, discovery, application, presentation, and link. School principals evaluate the STEAM approach in supporting independent learning to teachers, teachers to students, including evaluation indicators, including the identity of activity institutions, students, curriculum, teachers, learning facilities and infrastructure, planning, implementation, assessment, and media.

Supporters of the implementation of the STEAM approach in supporting independent learning include: first, human resources who are active as PAUD educators, have a minimum education of high school, have attended training on early childhood education, understand the 2013 PAUD curriculum, understand the implementation of STEAM approach learning in PAUD units. Second, students with active status as PAUD unit students, preferably children aged 5-6 years, physically and mentally healthy, can actively participate in implementing STEAM approach learning carried out in institutions. Third, facilities and infrastructure include the study room, educational game tools, loose parts media, learning materials in the form of reading books, additional supporting facilities and administrative books available.

The advantages of implementing the STEAM approach in supporting independent learning are that the STEAM approach shows positive results in students' scientific knowledge and teaches students to think to solve problems actively, creatively, and innovatively. Students can create their ideas into the latest technology, and students can apply the learning outcomes obtained into everyday life, can bridge abstract concepts mathematically into science, technology, inquiry and art, can integrate art into STEAM will foster student creativity in creating fun learning tools, and build students' cognitive abilities through meaningful learning. The drawback of implementing the STEAM approach in supporting independent learning is that it can make students less likely to appreciate other subjects such as music, literature, language, writing and others. This applies if the teacher does not enter the Art element.

The effectiveness of the implementation of the STEAM approach in supporting independent learning is seen from indicators that can show that learning can be effective if there is an attitude and willingness in the child to learn, the readiness of the child and teacher in learning activities, and the quality of the material presented. If these five indicators do not exist, the children's

teaching and learning activities will not run well. Children need practical learning activities to help develop children's thinking power without compromising their level of understanding of children according to their developmental age. The effectiveness of learning is a measure of the success of the interaction process in educational situations to achieve learning objectives. They were judging from the activities during learning, responses and mastery of concepts.

REFERENCES

Arikunto, Suharsimi. 2002. *Metodologi Penelitian*. Jakarta: PT. Rineka Cipta.

Azis, Donny K. 2018. *Pendidikan Kreatif Pada Anak Usia Dini*. Yogyakarta: Lontar Mediatama.

Depatemen Agama RI. *Al-Qur'an dan Terjemahanya*

Donatirin, Siti. 2020. dkk. *Model Evaluasi Pelaksanaan Program Pembelajaran pendekatan STEAM Di Satuan Paud (Dengan Model Cipp Melalui Aplikasi Online).* Kemendikbud, Dirjen PAUD, Dikdas Dan Dikmen, Bp - Paud Dan Dikmas: Daerah Istimewa Yogyakarta.

Farwati, Ratna. dkk. 2021. *STEM Education Dukung Merdeka Belajar*. Riau: DOTPLUS Publishir.

Hamalik, Oemar. 2011. *Psikologi Belajar dan Mengajar*, Bandung: Sinar Baru Algensindo.

Islam, Muhammad Syaikhul. 2020. *Mengimplementasi Kebijakan Merdeka Belajar*. Jakarta: Arba'a Magazine.

Limbong, Irmayani. dkk. 2021. *Perencanaan Pembelajaran Paud Berbasis Steam (Science, Technology, Eingeneering, Art, Mathematic).* Jurnal.

Muzakki, Akh. dkk. 2020. *Menyorot Kebijakan Merdeka Belajar*. Yogyakarta: Pustaka Pelajar.

Mediaguru, 100 Gurusianer. 2020. *Sudahkah Kita Merdeka Belajar?,* Pustaka Media guru.

Mulyasa. 2012. *Manajemen PAUD*. Bandung: Remaja Rosdakarya.

Miarso, Yusufhadi. 2004. *Menyemai Benih Teknologi Pendidikan*. Kencana.

Moleong, Lexy J. 2010. *Metodologi Penelitian Kualitatif*. Bandung: Remaja Rosdakarya Offset.

Nada, Fina F. 2021. Skripsi: *"Implementasi Pendekatan Steam Pada Pembelajaran Ipa Untuk Meningkatkan Kreativitas Siswa Praktom 4 Adniin Phatna Witya Demonstration School Yala Thailand 2019-2020".* Tulungagung: IAIN.

PAUD, Pokja, 2019. "*Model Pembelajaran STEAM dengan pendekatan saintifik*, Makasar.

Rachman, Fatur. 2019. *How to STEAM your Classroom*. DPP AGTIPINDO.

Sugiyono. 2010. *Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif, dan R&D*. Bandung: Alfabeta.

Sugiyono, 2012. *Metode Penelitian Kuantitatif Kualitatif dan R&B*, Bandung: Alfabeta.

Saleha. 2019. *STEM Menjawab Tantangan Abad 21*. Jawa Timur: CV. Beta Aksara.

Supardi. 2013. *Sekolah Efektif, Konsep Dasar dan Praktiknya*. Jakarta: Rajawali Pers.

Siantajani, Yulianti. 2020. *Konsep dan Praktek STEAM*. Jawa Tengah: PT Sarang Seratus Aksara.

https://pusdiklat.perpusnas.go.id/regulasi.

https://gtk.kemdikbud.go.id/read-news/mengenal-prinsip-dasar-merdeka-belajar.

ISBN : 978-623-97987-1-0 : page 121-128
Available online at http://www.e-jurnal.staimuttaqien.ac.id/

https://binus.ac.id/knowledge/2019/03/steam.
https://images.app.goo.gl/ipHQs2JSz93TaZHd9.
https://nasional.tempo.co/read/1283493/nadiem-makarim-merdeka-belajar-adalah-kemerdekaan-berpikir.
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https://proceeding.unpkediri.ac.id/index.php/ppn.
https://poskita.co/2020/11/21/bermain-asyik-menggunakan-media-loose-part-di-taman-kanak-kanak.
https://ibnudin.net/pendekatan-strategi-pembelajaran.
http://repository.upi.edu/55121/7/S_PAUD_1602414_Title.pdf.
http://ejournal.mandalanursa.org/index.php/JIME/index.
https://ibnudin.net/pendekatan-strategi-pembelajaran.
https://www.tripven.com/pendekatan-pembelajaran.
https://poskita.co/2020/11/21/bermain-asyik-menggunakan-media-loose-part-di-taman-kanak-kanak.
https://blog.kejarcita.id/7-alasan-mengapa-metode-pembelajaran-steam-penting-untuk-pembelajaran-anak.
https://www.tripven.com/pembelajaran-stem.

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