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Freedom Learning on Early Childhood Education: Implementation of STEAM Method with Loose Parts Media

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Abstract

Purpose – This study aims to describe and analyze the teacher's experience in implementing independent learning using the STEAM (Science, Technology, Engineering, Art and Mathematic) method made from loose parts, namely by creating a fun education so that students can be actively involved in increasing children's creativity, so children's development aspects can develop well.
Design/methods/approach – This study uses a qualitative descriptive method. The data analysis technique uses data collection, display, reducing data, and drawing conclusions. We are collecting data using observation, interviews, and documentation. The research subjects were teachers and children of group B of Nurul Iman Kindergarten.
Findings – The study findings are in the form of loose parts media used by TK Nurul Iman's teacher in learning with the STEAM method, namely the selection of loose parts material using natural materials such as playing with sand, arranging leaves into necklaces, writing with water on the wall, arranging letters using pieces leaves above the ground. By using loose parts media, aspects of children's development will be achieved, including the artistic aspect: children can make pictures on the sand. Social-Emotional: children have behavior that reflects the attitude of self-confidence, caring, and empathy. Religious and moral values: children can name objects created by God. Language: the child can arrange the pieces of the leaf into a word. Cognitive: children can conceptualize numbers with sand and leaves. Physical motor: children can write using a stick and water on the school wall.
Research implications/limitations – The study focuses on implementing independent learning using loose parts media with the STEAM method in students' learning process with natural materials, which have implications for children's development and independent learning.
Practical implications – The study can be an additional reference for teachers in developing loose parts of teaching media to implement independent learning.
Originality/value – This study provides an in-depth understanding of liberating early childhood by using STEAM loose part media.

Keywords: Freedom learning; STEAM; Losse Parts

Paper type: Research paper

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Introduction

The education is an effort to prepare students by providing guidance, teaching, and functional exercises for the future. The education aims to form the nation's children with character, intelligence, and virtue. In a sense, everyone has the right to get proper education, from primary education to higher education. Furthermore, education will also make changes for future generations for the better and give birth to a generation of people who can innovate, be creative, and indeed become agents of change for this country (Ainia, 2020).

Early childhood is a golden age. Education for early childhood is carried out until children are six years old with age-appropriate learning activities, namely Kindergarten, RA, and similar or non-formal Early Childhood Education (ECE) (Marlina et al., 2020). At that age, a child's brain develops rapidly throughout life. At this time, the human brain is experiencing the most rapid development throughout its life. Therefore, providing education tailored to his age will significantly influence individuals, indirectly the initial foundation in life starting from early childhood education (Hermanu, 2020). If the foundation is solid, the individual will have a better future.

The government is intensively implementing independent learning in every line of education, including education aimed at children early. The independent learning program is being intensively launched by the government to be implemented at every level of education. This idea allows educators and students to determine learning activities to make learning activities fun (Ainia, 2020). The independent learning program has the essence of free thinking that educators must do before implementing the material to students. The existence of learning is a translation of the competencies possessed by teachers and the curriculum. So, if you want meaningful learning to occur, you must pay attention to these things, namely competence and educational curriculum (Hattarina & Marga, 2022).

Applying learning activities with the concept of independent learning in ECE confirms that learning that has meaning occurs at the ECE level. This learning will be realized because the world of children is the world of play, when they learn according to their wishes, in the sense of being free to explore their abilities and knowledge through playing (T. W. Prameswari, 2020). The concept of playing has the meaning of activities carried out in a fun way and without having to think about the result. So, this is where the fundamental freedom of learning is. The children are actively free to determine the activities that have been determined by the facilitator, in this case, the educator. Implementing independent learning in the world of education requires methods used by educators when providing learning to students when learning takes place. In a sense, the method used for learning activities can improve the effectiveness and efficiency of learning. For this reason, education methods, especially children's education, are needed (Sumarseh, 2022). The STEAM (Science, Technology, Engineering, Art and Mathematic) is one of many methods that can be used to implement independent learning for children. In learning activities, educators need to link subject matter with activities that children do every day to give children real experiences. Therefore children can make their analyses and integrate new knowledge they get during the learning activities. which will naturally be processed in the child's brain so that the child's cognitive, affective, and psychomotor develop well.

The observation of learning activities in Nurul Iman Kindergarten has more or less implemented independent learning. It is one of the steps to save the younger generation. Because nowadays, there is much calistung education given to early childhood. Providing calistung learning will damage children's mentality in the future. According to the minister of education, independent learning is compatible with kindergarten learning (T. W. P. Prameswari, 2020). That is by fulfilling the rights and desires of children through play. It will create meaningful learning for children. It is not only concerned with calistung but must be adjusted to the child's educational needs. Therefore, completing teaching materials so that they are more varied for children can be done through the closest environment, such as loose parts of natural materials. Besides being able to play freely in the natural environment, they can also learn STEAM.

According to Casey & Robertson, a children's world is a world of play. Children have needs that must be met, namely, playing. They need the freedom to channel their abilities. Through play, children develop creativity, imagination, self-will, self-confidence, physical motor, social-emotional, and cognitive development (Casey, T., & Robertson, 2016). Therefore, the application of learning media made from loose parts to build independent early childhood learning is very suitable to be implemented in Nurul Iman Kindergarten. It is hoped that the STEAM method used will make children learn various sciences such as science, linguistics, arts, and mathematics (Munawar et al., 2019). Children will be interested in learning by using the STEAM method in learning activities. Through this STEAM activity, educators will invite students to explore the surrounding environment in order to find new knowledge for children and try to make children able to solve their problems by finding solutions to the problems they face. Therefore, making children able to think critically will develop (Prameswari, Titana Widya, 2020).

The objects or items that are easily found in the everyday environment can be named loose parts. This media can help develop every aspect of a child's development because by playing loose parts, children can imagine making objects according to their abilities, for example, assembling objects. Children will have the opportunity to be able to interact directly with the environment where they child are when using loose parts. This media can also make children think critically, find solutions, explore, and imagine when children can use the media well (Prameswari, Titana Widya, 2020). Freedom to learn makes teachers even more creative in determining strategies in designing learning methods according to the surrounding environment (Falera, A., Masitoh, S., & Setyowati, 2018). Learning freedom also aims to make children think critically (T. W. Prameswari, 2020). In addition, independent learning can also increase students' independence because it is also the primary goal of education, namely increasing a sense of independence in children during the process of learning activities, and this process takes quite a long time. However, this time can actually be more optimal for children than just giving children material through lecture activities (Nursarofah, 2022).

Using STEAM made from loose parts for the learning process aimed at children at an early age is a step that can make children interact directly with their environment. In addition, children are required to be independent, able to solve their problems and think critically and creatively in independent learning activities using the STEAM method made from loose parts. Media with ingredients and loose parts is easy to find, flexible, and cheap because the materials used are from used materials and are not used, so they can be used to make goods that have value for children's learning. In this case, the school usually facilitates and organizes places for materials and loose parts, which will be used as children's learning media (Simoncini & Michelle, 2021). This advantage is then used for children to make these used goods into useful learning media.

Methods

This study uses a qualitative descriptive method (Emzir, 2014). The research subject can be found using a qualitative descriptive method. Usually, the data is in the form of words from the person being studied (Biklen, 2003). Research with descriptive qualitative methods will present and discuss general and specific research results based on research findings (Mukhtar, 2013). This research was conducted at Nurul Iman Mangunjaya Kindergarten, with the research subject of two teachers. Data is collected through interviews, observations of STEAM activities made from loose parts, and documented learning activities (Emzir, 2014). After the data is collected, data reduction, analysis, and verification activities are carried out (Matthew B. Miles, A. Michael Huberman, 2014).

Result and Analysis

The world related to the child is a world of play. Children's lives are filled with joy by playing all day and every moment. For children, playing is something fun, whether playing alone, with parents, or with friends. Playing is more fun with objects in front of the child, such as leaves, flowers, sand, water, etc. The STEAM method will enable children to form their knowledge about

the world by observing, asking questions, gathering information, associating, and communicating. STEAM Activities will make many answers from the activities done, so more concerned with the process than the final result. Educators in independent learning have a role to be facilitators so that children can think further and be able to solve problems. The STEAM method can be used using media made from loose parts.

The results of this study can be explained by researchers starting from the implementation of learning activities by playing, which educators have provided by arranging the environment as best as possible and providing media made from loose parts of various kinds, to attract children, children love to play and learn as desired so that learning independence for children will be realized. There are several media components made from loose parts that can be used in learning, including natural materials such as sand, leaves, soil, water, and so on, made of plastic, metal, wood, bamboo, yarn, cloth, glass, ceramics, and packaging. Meanwhile, in Nurul Iman Kindergarten, the loose part materials used are natural, such as sand, leaves, and water. As for In learning planning activities, educators will first determine the learning objectives, namely the goals to be achieved after the learning activities are completed. Learning activities in kindergarten to improve aspects of child development through natural media include 1) Art: children can make pictures on sand. 2) emotional and social aspects: children have self-confidence, care, and empathy. 3) aspects of religious and moral values: children can name objects created by God. Then language: child can arrange the pieces of leaves into a word. 5) Cognitive: children can conceptualize numbers with sand and leaves. 6) Physical motor: children can write using sticks and water on the school wall.

Data was obtained when the learning media was applied with the STEAM method made from loose parts. That is, researchers found the reality in the field that when children were playing science about water, the children felt happy. Various activities were playing with water that children can do, namely, knowing wet and dry, then disappearing writing using water on the school wall. Then the concept of sinking heavy objects in a bucket filled with water and floating light objects if they are in the water. With these simple activities, children get to know the characteristics of water.

Figure 1. Science Concept on Early Childhood Education

The children were allowed to write on the walls using sticks and water in this activity. The imagination and creative thinking of children here appear to paint something on the wall. However, they also noticed the disappearance of the water writing on the wall when the water dries up. Water's wet and dry nature makes them learn that if water is applied to a dry area such as a wall, the water will appear as written. However, over time the water will dry up or disappear because it has evaporated in the sun shining on the wall, thus making the writing on the wall disappear. Next, the second learning activity is playing with sand. The children looked enthusiastic when playing in the sand. They use a tool to print sand with various shapes, then stir it using it. Technology concept What children do in sand play activities is to find a suitable tool to print and mix the sand.

Figure 2. Chidren's play sand

The figure 2 shows that the children are busy forming sand using a bottle cap tool, then stirring and putting the sand into the lid using a spoon. Activities playing with sand will be able to develop aspects of the motto finely chopped on children, namely forming, stirring, and putting sand. The third learning activity is weaving the leaves with a rope. The children here pick their leaves. Then a string is inserted into the leaves one by one to form leaf necklaces or headbands from the leaves depending on the children's preferences. The children look happy and free to explore the natural environment around them. They show each other a leaf necklace. Concept engineering Here, it can be seen from the children finding materials or tools that can help to string the leaves into a necklace. Here is the cognitive development of learning long, short, and medium from the resulting necklace. Then in terms of children's fine motor skills, children can crochet, embroider leaves with thread, and tear leaves into the same small size.

Figure 3. Children Picking and Shredding Leaves with a Rope

The figure 3 shows the children making necklaces or headbands from leaves. Then to make a rope, there must be a rope. They found the rope and began to string the necklaces individually. Children's critical thinking and concentration emerge. They must concentrate so that the leaves can be strung together using ropes. Then, approximately how many leaves they will arrange. The concept Art What is contained in playing with leaves is the activity of decorating the ground with leaves. The fourth learning activity carried out was using leaf materials. They decorate the ground using leaves that have been cut into small pieces. Children love to decorate with letters, numbers, and even flowers. They are accessible in determining what theme will be used to decorate the ground. For example, they are busy decorating the numbers on the ground using leaves, then those who like animals can take pictures of animals such as birds.

The developmental aspect resulting from the activity of decorating the ground with leaves is the children's fine motor skills, where the children tear the leaves into small sizes so that they can be arranged on the ground according to their imagination and preferences. The creativity of children here also appears. They imagine how to make birds or butterflies by stringing leaves. The math concepts in STEAM were demonstrated to children. It tells how many leaves are needed

to make a necklace. So children can predict that the resulting necklace or headband will look good, so the number must be adjusted accordingly.

Figure 4. Children decorating the ground with leaves

Figure 5. Children are Stringing and Counting the Number of Leaves

From the description and documentation of the data above, the abilities resulting from the activities carried out by children using STEAM media made from *loose parts* are creativity, critical thinking skills, ability to communicate well with friends and collaborators. All those abilities have increased because children feel stimulated to create works according to their ideas. So, children's imagination, creativity, communication, and knowledge skills will develop well

Discussion

From the research results above that have been described, children's development has increased starting from each stage of activity using the STEAM method made from loose parts. Children also feel free to learn because they are close to the environment and free to explore whatever is around them, especially materials. The natural materials around them match the theme, namely the objects they like.

Freedom to learn is a policy that Mr. Nadiem Makarim has resigned as the Minister of Education. Freedom here means freedom. While learning is an activity that has been carried out by someone who can bring changes in behavior for the better after participating in learning (Nursarofah, 2022), learning is also a complex process by providing feedback, namely stimulus and response (Byars-Winston, Am, & Fouad, 2008). A pleasant learning situation can create a sense of pleasure in children. When children are happy, it is an essential foundation to make children have a love for learning. Children who feel happy when they are learning will positively impact their developmental aspects. Children will be able to learn for a long time when the pleasure is in them. Therefore, when children are given complex and quite challenging material that requires bright ideas to increase their creativity, it will be better if given when the child's feelings are happy. So, the child will be able to remember much of the material he has learned (Hattarina & Marga, 2022).

In addition, teachers are also given the freedom to determine the appropriate curriculum for children. The independent learning program makes educators function as facilitators to create pleasant learning conditions. Children will not feel pressured when learning. The key to independent learning that the teacher must prepare is the existence of learning strategies that can make children independent when learning, using appropriate learning methods and media, where the key must refer to the principle of independent learning, namely student-centered, literacy, ideals, methods, and scope. Study. The freedom of teaching gained by the teacher includes the freedom to innovate, where the teacher can use active, effective, and efficient learning methods. Then, teachers can learn independently, namely by developing creativity when designing learning. They must be skilled and independent. Furthermore, the teacher must be creative and create new ideas, something unique, fun, flexible, easy to get along with, and with one likes to experiment with (Arnawati, 2018).

The education system will be able to make children free to develop their potential and skills. They are free to learn, create comfortable classes, and think and imagine well (Sibagariang et al., 2021). Educators must have the ability to make students come up with creative ideas. Then educators must collaborate with children to develop students' intelligence, such as empathy, ability to communicate well, understanding, and good skills (Wagner, C. S., Wagner, C. S., 2018). Therefore, the implementation of independent learning, the latest curriculum, can be interpreted as an education system that frees educators and students to study the material and filter it correctly according to the wishes of students in order to achieve the desired goals. Likewise, in the world of children, freedom to learn in early childhood will make children free to explore their surroundings in different ways, which can fulfill children's playing rights (Marlina et al., 2020).

The learning activities are generally carried out in several stages, including preliminary, core, and closing activities. Using the STEAM method in learning will make children build knowledge about the world around them. Children can observe, investigate and ask what they do not understand. STEAM learning is learning that connects knowledge with skills in science, technology, engineering, art, and mathematics. With the STEAM method, it is hoped that students will get used to solving problems creatively (Munawar et al., 2019). The purpose of the STEAM method itself is so that students' knowledge can increase so that they can solve every problem they face while being able to make the best decisions. Learning with the STEAM method is very important to be applied in every line of education because it has many benefits, such as future generations facing the challenges of an increasingly developing era, being able to help students to innovate, being interested in the STEAM field of profession, making meaningful learning activities according to their lives, participants Students are actively able to build themselves, and improve their literacy skills. Learning with the STEAM method is very suitable to be introduced to students in early childhood. Using STEAM in learning will indirectly help children become skilled. For example, children can work with friends and be more creative, diligent, and intelligent. The presence of STEAM cannot be separated from our lives. That is why STEAM is essential to be used as a learning method.

The impact resulting from the STEAM method can increase children's knowledge, interest, and understanding of technology and can help children learn how to solve problems (Thuneberg et al., 2018). STEAM stands for Science, Technology, Engineering, Arts, and Mathematics. In STEAM, children can play activities naturally and are often done so that it will bring up the child's curiosity about something. Children can experiment and explore the surrounding environment. This program is essential in the 21st century because it can develop children's skills. Because today's environment requires speed in everything, STEAM will be able to help prepare children to have a successful future.

Learning activities with STEAM have indirectly been integrated with learning in kindergarten. An essential element in STEAM is loose parts, where the materials used for children's learning activities are easy to find and cheap because they can come from used goods that can still be used, as well as natural materials such as leaves, flowers, twigs, seeds, stones and other natural objects (Wahyuningsih et al., 2019). The Loose parts can be found quickly and at no cost. Nature around us has provided many loose parts which can be used for learning media to support children's development. Besides that, children can also connect themselves with their environment. They can play loose parts in various ways. For example, from natural leaves, children can play by stringing together a rope into a necklace, then tearing it into small pieces to be assembled into a letter or number. Children are free to make anything using loose parts according to their creative ideas. So that children will develop creativity, language, imagination, and knowledge, learning will also be fun (Sumarseh, 2022).

Children feel happy, they have an extraordinary experience, their curiosity is high, and the knowledge to observe, explore and discover things around them through fun play activities. The purpose of STEAM learning in this activity is to build creativity, think critically, and solve problems (Munawar et al., 2019). When making something, the kids will do it until it has been done. Children will be in direct contact with concrete objects when they play with concrete objects around them. Children can observe, touch, and explore objects that are being used to play so that

children can build new knowledge about these objects. That is the learning process that children get. Children prefer learning that results in projects or product creations when they play. Coupled with learning activities, loose parts such as balls, toys, and role-playing outside the classroom will support children's development (Olsen & Smith, 2017). Playing outside will make children feel free to explore the environment in which they play.

The role of a teacher who can stimulate children in every learning activity is significant. For this reason, teachers must be active and creative so that children will be creative. It Provides a variety of games with materials and loose parts. It can be done by utilizing waste or materials that can be recycled so that they can be reused as learning media for children. These items become even more helpful than just trash that has no benefit at all. The learning process through play activities facilitated by the teacher in learning something will make children's development develop optimally and thoroughly. Therefore, the implementation of independent learning uses the STEAM method made from loose parts very precisely implemented because loose parts pedagogically it is very appropriate to support children's competence in the school environment (Mackley et al., 2022). In addition, playing in the wild will involve children's Five Senses to explore their environment uniquely. Creativity is good, and children's development is more clearly visible when done outdoors independently (Boulton & Thomas, 2022). So that the children in Nurul Iman Mangunjaya Kindergarten have increased in terms of the developmental aspects of each child.

Conclusion

The children's abilities have increased, including creativity, collaboration, and critical thinking, and they can communicate well with their friends. Freedom to learn using the STEAM method made from loose parts is highly recommended to assist teachers in achieving child development achieved well. Because this method is very suitable to be used in every stage of the child, the child does not feel burdened by doing it but instead feels happy and free.

Declarations

Author contribution statement

Rianti conceived the presented idea. Ika Nurjanah and Dewi Latifah developed the theory of early childhood education and STEAM (Science, Technology, Engineering, Art, Mathematic) in early childhood education. Nisa Alifah and Aas Asyiah verified the analytical methods. All authors discussed the result and contributed to the final manuscript.

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Data availability statement

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Declaration of interests statement

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Additional information

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