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The Use of Geometric Wood Waste to Grow Early Childhood Artistic Expression and Imagination

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Abstract: This study is development research investigating how geometric products can be made from wood waste materials and used to foster artistic expression and imagination in early childhood. Art is an important development in the early childhood. This study uses the Analysis, Design, Development, Implementation and Evaluation (ADDIE) model development approach. The subjects of this study were kindergarten children in a special region of Yogyakarta. The goal of this study is to produce geometric products from wood waste. These products are in the form of means of transportation such as pedicabs, planes, bicycles, motorcycles, boats, and locomotives. The art of transportation. The use of wood waste is for artistic expression and imagination when children use colors according to what they want. These colors represent a form of children's exploration of pouring art as a means of transportation.

Keywords: Geometry, Art, Early Childhood.

利用几何木屑培养幼儿艺术表达能力和想象力

摘要: 本研究是一项开发研究，旨在研究如何利用木材废料制作几何产品并用于培养儿



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童早期的艺术表达和想象力。艺术是幼儿的重要发展之一。本研究采用 ADDIE（分析、设计、开发、实施和评估）模型开发方法。本研究的对象是日惹特别地区的幼儿园儿童。本研究的目标是利用木材废料生产几何产品。这些产品是交通工具的形式，例如人力车、飞机、自行车、摩托车、船和机车。交通艺术。当孩子们根据自己的意愿使用颜色时，这些木材废料的用途是进行艺术表达和想象。这些颜色代表了孩子们对倾注艺术作为交通工具的一种探索形式。

关键词：几何，艺，幼。

1. Introduction

Early childhood development includes various developmental stages such as motor, cognitive, language, emotional, and artistic. Early childhood development cannot be separated from relationships with other aspects. Cognitive development with the development of art that can go hand-in-hand. However, art is always considered a form of learning that differs from mathematics and science [1]. Art can help children develop an appreciation for esthetics, which is an important part of life.

For children, art is the beginning of their culture. In their daily lives, children cannot be separated from being filled with sounds/music or the image of a drawing symbol. Art is fundamental in early childhood education. Art makes children feel happy.

The presence of art in the world of education, especially in early childhood education, indicates that art plays an important role in children's education. For this reason, art in early childhood needs to be performed and given a stimulus so that art education can run optimally. Art education is essential for children, particularly for their growth and development. Art education is also a human need that cannot be abandoned, and offers various benefits [2].

Art education is effective in creating conditions that give children the opportunity to freely and controllably develop their sensitivity, fantasy, imagination, and creativity. Art education is essentially the process of human formation through art. Education serves to develop the ability of every child to find fulfillment.

The context of art and art learning is important for studying and teaching early childhood learning and education [3]. Art is often met as a psychological need. Therefore, studying art plays an important role in building children's imagination in critical thinking skills and creative and innovative abilities [4].

Art develops through the expression and imagination of children given various stimuli. The same was true for [5], which revealed that art development was also carried out to replicate children's expressions and creativity. Opportunities for children to express themselves are crucial. Fantasia, or children's imagination, creativity, and esthetic sense, is also designed to enhance their development. The most

An important aspect of art is the discovery of a space

for self-expression, meaning that art becomes a vehicle through which desires, feelings, and thoughts can be expressed through various forms of artistic activities to bring pleasure and satisfaction [6].

Art education greatly contributes to early childhood development, including mental development, creativity, beauty, emotional, physical, and social development [7].

Art education is related to the beauty of works created by individuals. Knowledge of early childhood art education is part of cognitive development [8]. Through art, children have the opportunity to fantasize, be creative in various ways, and learn to express their interests, abilities, and appearance. Children can express their emotions in various ways. One of his works is the arrangement of geometric shapes from waste that forms a traditional means of transportation, which can then be arranged and painted by children. This is one of the efforts of teachers who are asked to provide interesting and fun learning media to develop early childhood art [8]. Painting is a varied art development activity that stimulates children's expression and makes lessons more meaningful [9].

The geometric patterns provided stimulated the children to express and imagine. Wood waste is also used in an effort to make waste items more useful and meaningful. In this connection, geometric shapes are arranged as a means of transportation that can then be drawn by children. This development can foster artistic expression and imagination during early childhood.

2. Method

This research created a product that fosters artistic expression and imagination in early childhood. This was a development study. Research that creates a product. Development research describes the procedures undertaken by researchers or developers to find, create, or develop products. The proposed model is the ADDIE development model, which is a learning development model based on effectiveness and efficiency (Figure 1). The interactive process allows the proposed model to produce evaluation results for each phase, where the data bring learning development to the next phase [10]. The stages in developing the ADDIE model are analysis, design, development, implementation, and evaluation.



Figure 1. ADDIE model design (developed by the authors)

3. Results and Discussion

The result of this study is a geometric product in the form of geometry, which is used to foster artistic expression and imagination in early childhood. Starting from an initial analysis of the needs of an early childhood environment. Art was chosen because it has a significant impact on early childhood. Next, a design that will be used to make the product is developed. A survey was conducted during this process.

The means of transportation were chosen to prepare geometric shapes based on the results of a survey conducted at kindergarten institutions in the Special Region of Yogyakarta. The selected results were the transportation of pedicabs, locomotives, motorcycles, planes, boats, and bicycles. The survey results are presented in the following graph (Figure 2):

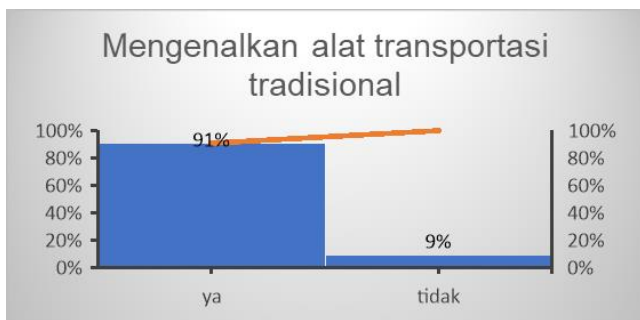


Figure 2. Graphics introducing traditional kindergarten transportation (developed by the authors)

The surrounding environment, which is an industrial environment composed of impactful wood, contains waste. However, unused wood waste can pollute the environment. The use of wood waste as a learning medium for children and teachers can enhance creativity and innovation [11]. In this study, wood waste is used as a medium of expression and imagination for children through geometric shapes arranged into a means of transportation.

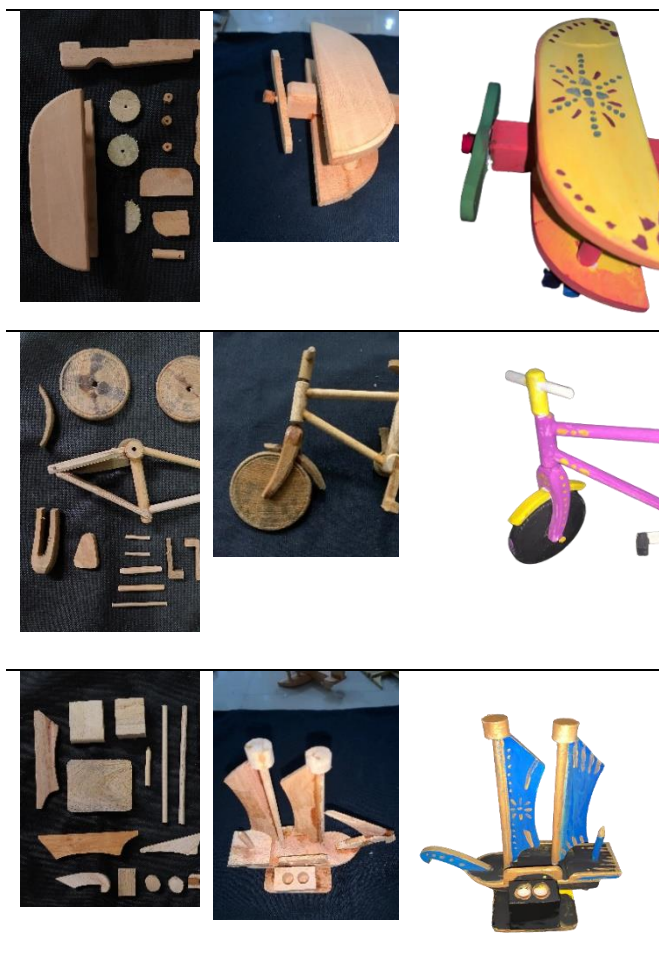
The waste then meets the requirements of art. This art makes waste goods useful. Art is designed to

transform raw materials into beautiful or functional products [12]. In this study, wood waste was formed into geometric pieces that could later be used for learning purposes.

Geometry is difficult for children to understand because they are still in the learning stage of concrete things [13]. Therefore, the geometry in this study was changed into a form of art that is more fun for children, namely, a form of children’s transportation arrangements. The results for the geometric products as a means of transportation are presented in Table 1.

Table 1. Results of using wood waste geometry products (compiled by the authors)

Geometric shapes of wood waste	Transportation results	Expression and imagination



The geometric shapes were then arranged into means of transportation, such as pedicabs, ships, bicycles, planes, motorcycles, and locomotives. The children were then asked to color the means of transportation using a poster paint. Children are free to express what they want according to their imaginations. Children learn art by expressing and imagining it.

Painting the form of a remoter in the form of a transportation device is one of the ways to express the child's soul, which is poured in colors and is part of art. Art in the Substance of Expression. The fields of practice are painting and sculpting. Arranging free waste objects according to the rules of art. The goal is to express opinions, whether spontaneous or not. so that children can express the ideas, ideas, and ideals they want [14].

The opportunity for children to express and imagine themselves through the work of coloring geometric shapes arranged into a means of transportation will allow children to explore themselves, as is the case [15], who said that in this research through art innovation, teachers have given space for students to explore and develop their skills and interests in the field of art.

Art can be a medium to channel emotions experienced by children [16]. Art is a creative activity that pursues beauty, assuming that there are no laws of utility, ethics, and logic [17].

The development of this art must be optimized for children [18]. One activity is the use of geometric wood waste for the growth of children's expressions and imagination.

Art plays an important role in education as it can affect children's physical and mental development. Through art, students' behaviors can be formed in a better direction because art introduces them to values and norms [19]. Art can be an effective tool for fostering children's creativity and expression [20]. This shows that art supports children's expressive activities.

Making children's artwork allows them to explore their imagination freely without limitations and express their hearts and feelings through the colors they choose [21]. This happens when children express their choice of colors to color their work in the form of an arranged geometry. Figure 3 illustrates some examples of children's expressions and imaginations when coloring geometric shapes in the form of transportation.



Figure 3. Children's artistic expression and imagination (the authors' photos)

Wood waste that is no longer used can be used as a stimulus for the development of art. Geometric shapes are arranged as means of transportation. The development of this art involves children expressing and imagining what they want by pouring when coloring the means of transportation.

This study develops the use of wood waste in art learning for early childhood by integrating the concept of geometry into an interesting and easy-to-understand form. This approach not only reduces industrial waste but also encourages children's expressive and imaginative creativity through the medium of art. By transforming geometric shapes into colorable means of transportation, this study provides an innovative way to develop children's creativity, fine motor skills, and self-expression in the context of art education. This is the first step in combining art, education, and sustainability into an exciting unit.

4. Conclusion

Wood waste can be used for various purposes, one of which is to create geometric products that can be arranged into a form of transportation. This geometrical shape includes circles, squares, rectangles, and triangles. Geometry is a useful tool for early childhood education. Geometric shapes that can be used to stimulate cognitive development. This geometric arrangement also fosters artistic expression and imagination during early childhood.

This product was based on geometric pieces of wood waste. The pieces were arranged in miniature means of transportation. The means of transportation include pedicabs, motorcycles, locomotives, bicycles, boats, and planes. The use of wood waste is for artistic expression and imagination when children use colors according to what they want. These colors represent a form of children's exploration of pouring art as a means of transportation.

This study suggests the development of wood-waste-based learning media with various geometric shapes to improve the children's understanding of geometric concepts. Research should also involve a wider age group and other institutions to assess its impact on children's creativity. Additionally, exploring other waste materials and various coloring techniques can enrich the learning experience. From a long-term perspective, the use of wood waste in education opens up opportunities to combine environmental sustainability with arts education, providing practical solutions to waste problems, while enriching innovative and creative teaching methods.

Declarations

Author Contributions

Conceptualization, J.P., and S.C.R.; methodology, J.P., and S.C.R.; software, E.P.A.; validation, J.P., S.C.R., and E.P.A.; formal analysis, J.P.; investigation, J.P., S.C.R., and E.P.A.; resources, J.P.; data curation, J.P.; writing—original draft preparation, all authors contributed equally; writing—review and editing, J.P.; visualization, S.C.R. and E.P.A.; supervision, J.P.; project administration, J.P. All authors have read and agreed to the published version of the manuscript.

Data Availability Statement

The data presented in this study are available on request from the corresponding author.

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Institutional Review Board Statement

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this manuscript.

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