Develop children's science process skills through building activities in center of beam: optical geometry on focus

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Abstract. The research aims to develop children's science process through building beam learning activities. This research describes of the implementation of building activities in the center of beam focus of optical geometry in beams context. The instrument used in this research is the ability of science process. This study was conducted on 18 children early childhood in Bandung. Design the research used is descriptive qualitative. The results obtained indicate that building beams activity is able to give positive contribution to the development of children science process skills in TK Kartika XVI Bandung. Building activities also provide a positive response to the cognitive, physical, motor, language, religious, and emotional social development of children. The conclusion of this research that the process of building beam can positively impact on various aspects of child development.

1. Introduction

Introducing science from an early age means helping children to start thinking critically and logically. Science helps children experiment, explore, and observe the surrounding environment. It is slowly able to build a child's character to get used to scientific thinking, trained to solve the problem, and has a high analysis. Science for children is everything that is amazing, something that is easy to find and is considered attractive and can provide knowledge or stimulate it to know and investigate. Motivate children to prepare themselves to learn as a whole, which is not only oriented to the mastery of concepts but also the skills of the process of science e.g. [1, 2].

Skills of the science process are the one important thing in teaching method of reaching a good knowledge which is essential for scientific inquiry as a part of cognitive and investigative. Skills of the science process can be categorized into two levels that are basic and integrated. Basic science process skills consist of observing, classifying, measuring, using numbers, using space and time relationship, inferring, predicting, and communicating. Integrated science process skills e.g. [3-5].

Science process skills for early childhood referred to in this study is a child's skills in knowing and understanding the science and concepts that exist in science. With the mastery of the science process
expected the child to change and progress in scientific processes such as classification capabilities, explorative activity, planning activities, cause and effect, initiative, and problem solving. When children understand the process of learning science will provide impressive learning results and not easy to forget. Children can use what is learned in the learning process to solve the problems encountered in everyday life according to indicators on the science process skills [6].

One of the indicators contained in the Skills Process of Science is observing. The child can observe the existing beam pieces according to what the child sees by his sense of sight both visually and closely. This is related to the geometry focus point [7].

![Figure 1. Eye focusing ideally collects all light rays from a point on an object into a corresponding point on the retina.](image)

Optics is a branch of physics that studies light. Optics Geometry discusses the phenomenon of reflection and refraction of light. As already known light is an electromagnetic wave that move with speed three hundred thousand kilometres every second in a vacuum (without medium). We can see the objects around because of the reflection of light from the object. This is related to what will be the focus of the child's observation of the object (beam pieces) [8].

Application of science learning strategies in children done to cultivate a high curiosity, critical and creative. Science learning in children is more emphasis on children that science is a fun thing and very beneficial for their lives. Doing an experiment with the child, children recognize the concept of science is not just a theory but at the same time invites children to think by asking questions what, how, and why so that children can answer it themselves through experimental activities which they do in the learning process. Learning strategy is a series of activities in the learning process associated with student management, management of teachers, management of learning activities, management of the learning environment, management of learning resources and assessing that learning is more effective and efficient in accordance with the intended learning objectives. The strategy used to gain success or success in achieving goals. In the learning strategy there are several components of the teacher, learners, goals, learning activities, methods, tools, resources, evaluation, and environment e.g [9-10].

Learning strategies designed and implemented for early childhood more emphasis on learning approach through play to stimulate child development and pay attention to the stages of its development. In the implementation of learning strategies should pay attention to several things, namely: intense attention, giving encouragement, giving special feedback, provide a model or example, demonstrating, creating challenges, providing assistance, and provide information directly. Strategies used in this learning activity namely by providing information directly related to building blocks activities [11].

The purpose of this research is to develop the process skills of children's science skills through a beam shaped geometry media by observing children through the classification of blocks and communicating building results.
2. Methods

The method used in this research is qualitative description. Data collection techniques are observation and field notes. The instrument uses an observation sheet of the Child Science Process Skills during the learning activities. The collected data is analyzed descriptively qualitative. This research was conducted at Kartika XVI Kindergarten SCAPA-AD Bandung. Research subjects in this study were children B2 class of 18 children, men 7 children and women 11 children.

| Score | Developmental Achievement   |
|-------|-----------------------------|
| ≤ 55  | Undeveloped                 |
| 56-65 | Start Developing            |
| 66-79 | Growing Up Expectations     |
| 80-100| Growing Very Good           |

The table is a measure of the child's developmental achievement in the science process skills. Starting from lowest to highest tailored to the child's abilities in preparing the building activities of the beam in the form of geometry. The assessment is the result of modification [12].

3. Results and Discussion

Early childhood is unique and has tremendous potential. Children's intelligence and skills can be useful for development and their lives. A false stimulation can affect intelligence and child skills. There are several aspects that affect the children's experience. Including a conducive environment, safe and comfortable, an interesting lesson, fun and challenging, which uses all the five senses of the child? The process of learning and experience affects the development of children's intelligence such as the learning activities of building blocks with the concept of playing [13].

Play is an important activity for the growth and development of children. both physically, socially, emotionally, intellectually and spiritually. Through play, children can get to know the environment, can interact with friends, and can develop the imagination and creativity of children. one of the most useful play activities for child development is a kind of game put together building blocks [14].

Arranging blocks is the same as playing a puzzle, because they are both in constructive play. That's because children are actively building things using materials / materials that are already available with the knowledge it has. The child composed and assembled the blocks into a building tower, buildings, houses, roads, parks and others. Stacking blocks is closely related to intellectual ability and motor coordination of children. Here the child expresses the ideas that are in his mind, organizing existing materials, and concentrate on building or a construction. Because the game type is structured, children can develop various aspects of intelligence, such as cognitive, spatial, social, and emotional e.g. [15-16].

The child's developmental aspect arises when building blocks of beams. Children when building actually imitate what they see in their daily life plus his own imagination and creations. The ability of each child in making a construction is certainly not the same, despite the same age. It depends on ability and fine motor maturity respectively and the stimulation of parents and teachers over the years [17].

Teachers should be able to provide guidance in building blocks on learning activities. Child activities built with pieces of beams can be done in groups. There are rules in playing for building blocks in this center group of beams, first take the beam to taste, beam should not be thrown, no running in the room, compile the beam thoroughly, the classification of the beam should be adjusted to the shape and size. Children’s activities in building this block starts from determining the theme of activity. Teacher explains the activities to be built by the children. Children's activity is to build a garden with a beam shaped geometry [18].
After the group is formed, children are welcome to take the pieces of the beam as required by the child. It is intended that the beam is not scattered, other than that the child becomes aware that the beam needs can be adjusted. The geometric blocks are arranged by the child to build a park in cooperation in group activities. Children can classify blocks according to their shape in order to be arranged and the buildings do not collapse. This is a fundamental concept which children have in the process of science activities [19].

On the building activities, the beam is visible any child who can classify the blocks. There are also children who have not been able to classify the beams. The teacher oversees the building blocks in the beam center with a scoring record. The teacher asks the child what the child is up with the beam. Through dialogue activities with children, teachers know the ability of children to classify and communicate the activities of arranging the pieces of the beam [20].

Figure 2. This picture is a child activity in building pieces of beam.

Figure 2 shows those activities to build a garden with pieces of beams in the center of the beam. Children build in various forms; adjust the shape of the block from the bottom first so that the building can be well structured. This block is organized by collaborating with one group. It can develop children's social aspects because children can communicate ideas and collaborate to build blocks. Children pour their creativity through building blocks. On building blocks activities can also develop problem solving, where the child is able to predict the appropriate beam arrangement in order to form a building. Build blocks that fit the shapes and sizes is one way to classify the pieces of the beam.

Classifying blocks can be done during construction activities and after completion of activities. The process of identifying blocks after this activity is related to how to tidy up used media. In the process of clearing the beams a child's motor development develops, where children are from one place to another, resulting in motor development of children [21]. Children are expected to clean up the blocks according to the shape and size. Taking a classified beam should not accumulate should be kept sufficiently by the child. So it can be rearranged on lockers neatly. Here is a picture of the results of the child's science process skills in building pieces of beams:
Figure 3. This image represents the achievement of early childhood science process skills through building blocks of geometric shapes.

Figure 3 shows that early childhood science process skills. Skills of children's science processes in groups B TK Kartika SCAPA AD vary, there are in the category developed very well, growing as expected, began to grow, and not yet developed. Of the 18 children in the group B, on the classification ability there are 17 children who fall into very good developing category, 1 child in the category develops as expected. While the ability to communicate there are 16 children who fall into the category of developing very well, 2 children in the category of developing as expected. Based on the image observations made in this study that the average ability of children in classificate block 88.05%. While the ability of children in communicate with the average 87%. The ability of children in the skills of the science process through the building activities of the block is very good category.

Judging from the results of the ability of the child through the building activities of the beam shaped geometry, can develop aspects of children's science process skills. There are two aspects of the science process skills used in this study. The first indicator to calcify the beam and the second is an indicator in communicating the process as well as the results of the activity.

4. Conclusion
Skills of children's science process at TK Kartika Scapa-AD the average has grown in line with expectations. Building activities can provide a positive response to the development of early childhood related to aspects of social development, cognitive development, physical development, motor development, language development, moral development, and emotional development of children. The conclusion of this research is that the process of building the beam shaped geometry based on aspects of the science process skills can have a positive impact on various aspects of child development through classifying media and communicating project-based learning [22].

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