Journal of Primary Education
10 (1) (2021) : 55 – 63

https://journal.unnes.ac.id/sju/index.php/jpe/article/view/34027

An Analysis of The Study Scientific Approach Implementation to Develope The Active Learning of Science in The Early Childhood

Catur Wulandari[1]✉, Ali Sunarso[2] & Sungkowo Edy Mulyono[2]

[1] Playground Rumah Kita Semarang, Jawa Tengah, Indonesia
[2] Primary Education Teacher, Universitas Negeri Semarang, Indonesia
[3] Non-formal Education, Universitas Negeri Semarang, Indonesia

Article Info

History Articles
Received:
July 2019
Accepted:
August 2019
Published:
April 2021

Keywords:
active learning,
early childhood,
scientific approach

DOI
https://doi.org/10.15294/jpe.v10i1.34027

Abstract

This research aimed to analyze the study implementation scientific approach to develop the active learning of science in early childhood. This research used a qualitative method to know the result of the research that can be described as factually and profound. For data collection was used interview, observation, and study the documentation by using an interactive data analysis. For the validity data, there is three kinds of triangulation was used a technique of triangulation, source of triangulation, and the theory of triangulation. The result of the research showed that to develop the science academy learning in early childhood should be implemented into five components scientific approach such as observing, questioning, experimenting, associating, and networking. Through five scientific approach components the active learning of science that was seen in children were children bound actively during learning process, children bound in solving problem during experimenting, children were brave in questioning to the teacher, children were associating to the others friends related to the result of their experiment, children train themselves to solve their problem in their experimenting; then, they conclude the result based on their experiment. Based on the scientific approach, the active learning of science in early childhood developed well. Through the research, hopefully, it gave benefit to the society, such as enhancing their knowledge, especially in early childhood education. Also, the society was able to develop the potential of academic research, especially the active learning of science in early childhood.

✉ Correspondence address:
Bukit Cemara Indah C1 No. 11, Meteseh, Tembalang,
Semarang, Jawa Tengah, 50271
E-mail: wulanyuarfa@gmail.com

p-ISSN 2252-6404
e-ISSN 2502-4515

INTRODUCTION

Changing and developing the education system in the early childhood level caused the curriculum into alteration and has been improving time by time. Curriculum 13 change the learning approach paradigm that always based on the teacher. Learning paradigm always based on the teacher that was teacher-centered. Then, it changed to become student-centered. In the early, they learn trough playing; therefore, student-centered will be appropriate to be applied in early childhood level. They need a learning approach that has an impact for all of their aspect development, meaningful, interesting, and functional. Based on the Government Regulation Number 32 of 2013 about the alteration of the government regulation Number 19 of 2005 that contains the national standard education stated that there was alteration on the curriculum aspect and learning process. It applied the scientific and thematic approach. The scientific approach is designed to focus on the research and investigation process toward the area to develop the competence of attitude, knowledge, and skill. Machin (2014) stated that learning process based on the scientific approach was designed to detail so that during the learning process, the student active in constructing concept, law, and principal learning. Subali, Idayani, and Handayani (2012) stated that scientific approach contains observing, researching, trying, and asking. Early children were educated as an active learner. Besides that, the teacher has a function as a facilitator. Based on Astuti, Rif'at, and Putri (2016) scientific approach helped the student to know some lesson by the scientific application. They can get information from various sources and explore independently. Therefore, they have not focused on oneself teachers' information.

Learning process through the scientific process did not merely focus on how teachers transfer their knowledge to the student, but the teacher's role must be more than that. Teacher's obligation was giving the learning process that has meant to their future. Akerson, Buck, Donnelly, Nargund-Joshi, and Weiland (2011) stated that the teaching process was able to correct and improve students science comprehension. There was an enhancement for the student after taught by the teacher. In kindergarten, children were able to conceptualize science during they were taught.

Active learning based on Febrianto (2014) was children's physic and mental activity as long as they active in the learning process. Active learning was applied by giving a chance to the student in the order they learn based on their interest, ability, and talent. In this chance, the teacher was as a facilitator that they should raise the students' passion, critical thinking, and creativity. According to Alamsyah (2016) active learning was one of the important things to support the student in gaining their success. Active learning was based on student-centered. Actively they were observing, questioning, experimenting, enhancing their critical thinking, and communicating their observation — this student-centered method applied in playgroup and kindergarten of *Rumah Kita* Semarang, Central java.

Playgroup and Kindergarten of *Rumah Kita* was a place where the researchers choose to research because it was one of the schools that applied the scientific approach in classroom learning. It applied the central learning process for learning science by using a scientific approach. Based on it, the researcher would know the implementation of the scientific approach in stimulating the active-learning science in early childhood. The active of science learning means that the learners developed ideas and engage in testing on scientific and environmental problems. The scientific approach was closely about scientific activities such as observing, questioning, experimenting, associating, and networking. The study aims to find out deeply how the scientific approach optimally develops the active-learning science in early childhood at playgroup and kindergarten of *Rumah Kita* Semarang, Central Java. Through this research, the researcher expected to explain the theoretical and practical benefit to the society such as increased insight of science especially in the field of early childhood education. In addition, the researchers provided useful

feedback, especially to the teacher and institution in order to develop the scientific approach, began from planning, implementation, and evaluation, as well as follow-up in developing education in the school.

METHODS

The method used in the study uses a qualitative approach. This method was chosen because the researcher would like to reveal in-depth related to the implementation of a scientific approach in helping to develop active science learning in early childhood. The data and source of research used as primary research were five participants as follows headmaster and four teachers, while for secondary data gained from learning process documentation during science learning at playgroup and kindergarten of *Rumah Kita* Semarang, Central Java. The data collecting technique was used are observation, interview, and documentation. In this research, to find the validity, the researcher used technique of triangulation, source of triangulation, and theory of triangulation. The reason for using the triangulation technique was to strengthen the data obtained by the researcher to suit with the other sources. After testing the validity of the data, the researcher carried out the data analysis techniques. The data analysis used the interactive data analysis component by Miles and Huberman's model that consists of several steps, including collecting data, reducing data, presenting data, and making conclusion or verification.

RESULTS AND DISCUSSION

Implementation of Scientific Approach Learning at Playgroup and Kindergarten *Rumah Kita* Semarang

The implementation of learning process used a scientific approach at playgroup and Kindergarten of *Rumah Kita* Semarang was applied with a series of probing and exploring activities. Based on the result of observation, before applied the scientific approach, the teacher should create a lesson plan. The lesson plan based on the integrative curriculum that had created by the institution. Learning science based on the scientific approach made in advance. Planning activities and themes used have been contained in the daily and weekly Learning Implementation Plan. Planning is important before the teacher taught. Also, the activities ready ensured by the stages of child development, functional and certainly interesting and fun for children. It was appropriate with the resulting interview with the headmaster and teachers in February, 5th 2019 stated that the lesson plan was done before the learning year begins. The headmaster and teachers discussed what kind of theme would be used during the learning process. Starting from the reference theme of learning, annual work plan, midterm plan, weekly lesson plan, and special activities that carried out during the school year.

After planning, the teacher carried out science learning activity by applying a scientific approach. A series of activities carried out when conducting science learning as follows: observing, questioning, experimenting, associating, and networking. This was appropriate with the resulting interview with the headmaster and the teachers that learning process in playgroup and kindergarten at *Rumah Kita* applied a scientific approach based on Curriculum 2013. They stated that in applying learning process they invited to go through the process of observing, questioning, collecting information, developing associating, then the teacher tried to invite the children to conclude and communicate the result.

The steps to apply the scientific approach carried out in several components learning process in science center class. The teacher began to invite children to observe tools and materials in order children began questioning. The steps of scientific approach implementation applied in some activities components learning process. This process was applied in science center learning. Furthermore, the main activities of children were invited to conduct the experiments and began to develop their critical thinking skills so that they can communicate the observation result. At the end of the learning process, the

teacher suggests the student conclude the observation result based on their experiment and assimilation process.

The first process of scientific approach was observing. It was shown when the teacher invited the student to activate all the sense of vision, hearing, smell, touch, and taste to know the various components that the child used during the experiment. The more the sense used, the more develop the information process gained in the brain. Based on research conducted by Eshach, and Fried (2005) stated that naturally, children interest in observing and thinking about nature and explore science activities. Similar to Siry, and Lang (2010) stated that children explore based on their first experience and applied on their new experiment. They interpret science trough the tools experiment and asking a question. They are revealed and develop their idea trough commenting related to the process. The teachers organize the communication trough giving back the concept and began to introduce scientific vocabulary.

The second process of scientific approach was questioning. It was seen when children combine all the knowledge they knew with the new knowledge they got during the learning process. To know lots of information, they would ask various questions. The great curiosity would set their critical thinking, and it was applied through questioning to the teacher. This was an important thing for the teachers to pay attention and give a good response in the order they enhance their knowledge. Broström (2015) stated that the child's curiosity was the very first point of scientific approach. They would be brought to the questioning situation. This was the teacher chance to investigate them — the most scientifically interesting based on their curiosity and questions.

The third process of scientific approach was collecting information and observing. It applied during science learning process at playgroup and kindergarten *Rumah Kita* Semarang by exploring a thing, discuss with teachers and friends and experimenting trough the activity. They are collecting information based on some sources. Children assisted by parents can gather information through books, films, and the internet and various places that had visited and their daily activity.

The fourth process of scientific approach was associating. This process was connecting their previous knowledge to the new experiment during the learning process. The scientific approach was closely related to their critical scientific thinking. It helped them to fix experimenting steps and develop their critical thinking. The development of their critical thinking was important because they were in really good brain development. According to the research by Musyarofah, Hindarto, and Mosik (2013) stated that besides good for their cognitive and brain performance, critical scientific thinking developed their characteristics such as responsibility, honesty, cooperation, confidence, curiosity, and creativity.

The fifth process of scientific approach was communicating. Communication is useful to strengthen the new knowledge that children get from learning activities. The process of communicating that occur at playgroup and kindergarten of *Rumah Kita* has carried out trough some various ways such as oral language and creation. In oral language, they showed that they directly communicate their experiment conclusion while in the creation, they showed their work process. Due to the teacher support, the impact was they acquired strengthen comprehension concept. This was appropriate based on research conducted by Mahmudah (2016) that at the communicating process, the teacher strongly participates in which they were able to communicate the findings.

The implementation of 5 scientific approach process was based on the statement of Mulyasa (2015) that scientific approach emphasized the learner involvement in doing some various activities such as observing, questioning, experimenting and associating. In associating was closely related to the development of children's' abilities while networking was closely related to the development of children's' interpersonal.

Sani (2015) stated that scientific approach generally involves the observation process. It has

aimed the children were able to formulate the hypotheses by collecting various data. Rusman (2017) argued that scientific approach provided a large chance to the children in exploring and elaborating the lesson during the learning process. Also, they developed ways of thinking by applying five scientific approach process during the learning process in the school. This was appropriate with research conducted by Hedawiyah, Sada, and Fitriana (2016) they stated that scientific approach implementation involved the students to be active and creative during learning process trough applied five components of scientific approach starting from observing to networking their experiment findings.

The implementation of the scientific approach at playgroup and kindergarten of *Rumah Kita* highly stimulate the child's development. This was appropriate with the research conducted by Budiyanti (2015) that the scientific implementation approach was able to create a pleasant atmosphere and attract children's interest activities. A gratify condition was very important during the learning process. Based on the research conducted by Hapsari, Yulianti, and Susanto (2013) trough playing, the children directly explored and developed all their abilities happily and enthusiastically. It formed the children interest in participating in some activities. They were able to develop their creativity, imagination, and ideas so that a child's spiritual and intellectual intelligence can increase. Otherwise, Machin (2014) stated that the implementation of scientific approach involved children' positive effect on the result of cognitive, affective, and psychomotor.

Developing the Active Learning of Science through the Implementation of the Scientific Approach

The result of the implementation of scientific approach showed that the active learning of science in early childhood was stimulated well. Based on the result of the learning process and interview at playgroup and kindergarten of *Rumah Kita* showed that the implementation of scientific approach helped to stimulate the children to become more active during the science learning process. It was because trough the implementation of scientific approach encouraged them to be more active in exploring, and then communicate their experiment result to the teacher.

The active learning during science learning process was inseparable from the role of teachers who helped them to explore during the learning process. A research conducted by Ahsani, Yulianti, and Khanafiyah (2015) they stated that if the students were given respond from all science scope question both in material and nonmaterial, they highly encouraged to know and discuss it. It developed their creativity in explaining what they just learned during science experimenting. A research, according to Hanifah, Marwoto, and Sugianto (2016) stated that creativity brought big impact. One of the effects of developing creativity is that children will have the ability to solve problems better.

The children active learning at playgroup and kindergarten of *Rumah Kita* on science learning process was seen when they communicate actively with the teacher related to their theme learning. They followed the learning process actively and developed their association process. This shown when the teacher applied a scientific approach in the observation aspect. The teacher used storybook as a media to deliver game ideas. Also, the children active learning on science learning process was shown when they follow a story that was delivered by the teacher. Then, they respond to the story based on their ideas. It was appropriate to a research conducted by Sagala (2010) that the active learning process was a learning process where the atmosphere of learning process full of activities so that the students are questioning actively, questioning and deliver their ideas.

The observation results show the role of the teacher in the play group and kindergarten of *Rumah Kita* when science learning takes place is to create various interesting activities so that the child's curiosity becomes great. The active learning at playgroup and kindergarten of *Rumah Kita* was inseparable from the role of the teacher who applied the scientific approach during learning process. This is in accordance with the

opinion of Colgrove (2012) that providing the right learning approach is very influential on the results of the ability to solve children's problems when science learning was done. The findings of observation showed that the teacher at that school during science learning process was based on created various interesting activities. It had the aim to enhance their curiosity. Saçkes, Trundle, Bell, and O'Connell (2011) stated that the facility of science materials, frequency, and teaching-learning process were some indicators that influence students' success from active participation during science activity. The teachers regularly motivated the students to enhance creativity and critical thinking. A research conducted by Dejonckheere, Wit, Keere, and Vervaet (2016) stated that children easily to explore a new experiment. Some of the external factors that influenced their active learning were the role of teacher, interesting learning process, and the implementation of a scientific approach — besides, internal factors based on themselves, such as their ability, motivation, interest, and habit.

The findings observation showed that scientific approach influence the students to become active during the learning process. They would develop their ability and enhanced their cooperation with their friends. A research conducted by Siry, Ziegler, and Max (2012) stated that trough science learning process they positioned scientific experimenting. Therefore they were in a collaborative process. They would cooperate to build science trough communicating, negotiation, and answer the teacher questions. The student who follows a scientific approach would be involved directly and found a new thing during the learning process so that the goals of the learning process run well. Based on Dimyati, and Mujiono (2006) that student learning activeness is a learning process that leads to the optimization of students' intellectual and emotional abilities during the learning process.

The research findings showed that based on the scientific approach at playgroup and kindergarten of *Rumah Kita*, the children develop their active learning in the science learning process. It showed as follows: children are actively involved in learning activities, children are involved in problem-solving during conducting experiments, children dare to ask the teacher when they got difficulties during experimenting, children communicate the result of experiment to other, children train themselves to solve the problem during experimenting and assess what their findings. It was appropriate with the result of an interview conducted with the headmaster and four teachers. They stated that the scientific approach was based on the student-centered while the teacher was a facilitator. Children held an important role during the learning process so that they were able to develop themselves to enhance their ideas. During the learning process, they look more active trough the implementation of scientific approach components that we're observing, questioning, experimenting, associating, and networking.

The findings were appropriate with a research conducted by Sudjana (2010) that the active learning aspects of student during learning process showed as follows: (1) carried out learning tasks by actively participating, (2) children were active in solving problems, (3) in facing problem, they were not afraid to ask teachers or friends, (4) children try to find information in order to solve their problem, (5) children assessed how much their abilities and experimental results were obtained, (6) children train themselves to develop their solving problem skill, (7) children applied their previous experience to solve their new problem.

Based on the preceding, it can be seen that the aspects of learning activeness can be fulfilled by implementing the scientific approach in carrying out the science learning process. When a scientific approach was implemented during the science learning process, it encouraged them to be more active. In this case, active was not only an in physical matters or talking alone but also mentally and intellectually by developing their thinking patterns. The active children during science learning process would develop their experience. The implementation of scientific learning stimulated them to be active during science learning process so that they did

experiment by themselves. The use of various materials and tools developed their physical motoric skill. The child's ability to conduct experiments made them develop his mindset and critical thinking. This gave an effect on children's cognitive abilities.

Children will develop communication skills during experiments. Delivering their ideas based on their experiment and conveyed the experiment conclusion will affect their language skills. The active learning in the science learning process enhances their cooperation between the student, especially in a group of experimenting. It gave influence on their social-emotional development.

Through this research, it was known that based on the implementation of a scientific approach has the role of developing the active learning of science in early childhood. This research provided benefits for the development of knowledge and insight for the society and those who involved in the field of education, especially in early childhood. It has aimed to develop learning approaches that effectively develop children's potential and learning abilities. The implementation of the scientific approach or student-centered was proven gave a positive impact on their learning process. Children who were taking part in the learning of scientific approach will be directly involved in the process of teaching and learning activities. It made them discover their knowledge and gain real experience so that the success of learning objectives can be achieved.

CONCLUSION

Based on the analysis research findings, it can be inferred that the implementation of scientific approach during the learning process was able to develop the active student learning of science. Five components of the scientific implementation approach were observing, questioning, experimenting, associating, and networking their experiment result. It was a success in developing the active learning of science. This success was also inseparable from the role of the teacher who served as a facilitator. They motivate them during the learning process by preparing interesting activities so that they can generate their curiosity. Clear planning helped the teacher to reach the goals of the learning process.

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