EDUMASPUL
JURNAL PENDIDIKAN
Vol. 6 – No. 2, year (2022), page 2435-2444
| ISSN 2548-8201 (Print) | 2580-0469) (Online) |

Early Childhood Science Learning with Models Learning Children Learning in Science

Ayu Pratamawati

(Homebase Lecturer of Early Childhood Islamic Education Study Program, Tarbiyah Faculty, IAIN Fattahul Muluk Papua, Indonesia)

* Corresponding Author. E-mail: ayupratamawati98@gmail.com

Receive: 27/08/2022	***Accepted: 07/09/2022***	***Published: 01/10/2022***

Abstrak

Kegiatan pembelajaran sains bagi anak usia dini hendaknya harus dilakukan secara menyenangkan, mendekatkan anak dengan alam, mengembangkan keterampilan berpikir dan keterampilan proses sains. Salah satu model pembelajaran yang direkomendasikan adalah model pembelajaran *Children Learning in Science*. Penelitian ini bertujuan untuk menganalisis pembelajaran sains anak usia dini dengan model pembelajaran *Children Learning In Science*. Penelitian ini merupakan penelitian literature review dengan memakai search engine google scholar dengan jumlah 76 artikel. Hasil diperoleh 10 artikel yang telah sesuai dengan kriteria inklusi serta eksklusi. Hasil penelitian ditemukan tiga tema yaitu sains anak usia dini, model pembelajaran children learning in science, dan penerapan model pembelajaran children learning in science dalam pembelajaran sains anak usia dini. Pembelajaran sains hendaknya sudah ditanamkan sejak anak usia dini. Pembelajaran sains kepada anak usia dini mencakup produk, proses dan sikap sains. Dengan model pembelajaran tersebut maka anak usia dini dapat belajar sains secara utuh dan sesuai dengan prinsip pembelajaran sains anak usia dini yaitu konkret dan menyenangkan.

Kata Kunci: *Pembelajaran, Sains, Model Belajar, Children Learning in Science*

Abstract

Science learning activities for early childhood should be carried out in a fun way, bringing children closer to nature, developing thinking skills and science process skills. One of the recommended learning models is the Children Learning in Science learning model. This study aims to analyze early childhood science learning using the Children Learning In Science learning model. This research is a literature review study using the Google Scholar search engine with a total of 76 articles. The results obtained were 10 articles that met the inclusion and exclusion criteria. The results of the study found three themes, namely early childhood science, children learning in science learning models, and the application of children learning in science learning models in early childhood science learning. Science learning should be instilled from an early age. Science learning for early childhood includes products, processes and science attitudes. With this learning model, early childhood can learn science as a whole and in accordance with the principles of early childhood science learning, namely concrete and fun.

***Keywords**: Learning, Science, Learning Models, Children Learning in Science*

Introduction

Education is a process that can provide experience and knowledge. The ongoing educational process should be carried out in a professional manner. The continuity of education is inseparable from the role of the teacher, the teacher has dominance in education, especially early childhood education. In addition, teachers must understand how to take advantage of all the potential that exists, such as the use of media. If the teacher does not understand the media, it is difficult to use it. The success of the teaching and learning process carried out by teachers in schools is inseparable from various other educational components. In classroom learning, especially the teaching and learning process, teachers according to their competencies have adequate pedagogic abilities (Rahmah, 2019).

One way to improve the quality of Indonesian education is to introduce scientific literacy as early as possible from the preschool level. Many problems will arise in the future such as clean water crisis, disease control, limited energy to climate change, for that the main key in facing the challenges of the 21st century is Science. Therefore science is categorized as an emergent topic in early childhood education, which means it must be introduced as early as possible. This is because it is very important to build the basis of scientific understanding as early as possible so that a mindset, important skills and attitudes of care and responsibility for oneself, society and global environmental issues are formed in children (Putri & Sugito, 2021).

So far, science learning is seen as a difficult learning and requires a lot of material and quite extensive knowledge. Moreover, knowledge of science is very close to Natural Sciences (IPA). PAUD teachers prefer learning that does not require a lot of reasoning and is in accordance with the conditions of children who are still unable to reason further. Another view of some teachers is that learning science can spend other learning time so that science learning cannot be seen as a result, in contrast to physical motor skills (Baridah, 2021).

Science learning activities for early childhood should be carried out in a fun way, bringing children closer to nature, developing thinking skills and science process skills. One of the recommended learning models is the Children Learning in Science learning model. This learning model allows children to interact directly with scientific phenomena around them and learn scientific concepts (Hariyati et al., 2020). The Children Learning in Science learning model also facilitates children to do hands-on and mind-on activities and the environment is the main source of learning (Akmal, 2020). Thus, this learning model is expected to be able to help early childhood in learning science so that early childhood science learning goals can be achieved optimally (Ellizah et al., 2020).

The Children Learning in Science (CLIS) Learning Model is based on Constructivism theory one of the philosophies of knowledge that emphasizes that our knowledge is our own construction. Knowledge is not an imitation of reality (reality). Knowledge not a picture of the real world that exists. Knowledge is always the result of a cognitive construction reality through one's activities, namely forming schemes, categories, concepts and knowledge structures required for knowledge. The CLIS model consists of five main stages, namely orientation (a), generating ideas (b), rearranging ideas (c), applying ideas (d), strengthening ideas (e). The idea rearrangement stage is still divided into three parts, namely the disclosure and exchange of ideas (i), the opening to the situation (ii), and the construction of new ideas and evaluation (Karsini, 2020).

The advantage of CLIS learning models is to get students to learn independently in solving a problem. Creating students' creativity to learn so as to create a more comfortable and creative class atmosphere, the collaboration of fellow students and students is directly involved in carrying out activities. Creating more meaningful learning, because the emergence of the pride of Shiva determines the scientific concept that is being studied and students will be proud of the results of their theme. Teachers in teaching will be easier, because they can create a more active learning atmosphere, so the teacher only provides various problems related to the concepts they taught, while students can find their own answers. And the teacher can create simple tools or learning media that can be found

in everyday life (Grammatikopoulos et al., 2019).

Based on the problems above, the researchers were interested in conducting a literature review study titled "Early Childhood Science Learning with Models Learning Children Learning in Science".

Method

Inclusion Criteria Framework and Exclusion Criteria

Inclusion criteria articles:
1) Articles are published in English and Indonesian.
2) Articles published in 2012-2022.
3) The article discusses the role of Early Childhood Science Learning with Models Learning Children Learning in Science.

Article Exclusion criteria:
Opinion articles, reports and comments.

Search Flow

Search literature using articles in 2012-2022 using English and Indonesian language limits, free full text, data for the last 10 years. Keywords must appear in the title/abstract. The articles used are from the Google Scholar search engine. Search by keyword in Indonesian ((((((*"Pembelajaran"*) *OR* (*"penerapan"*)) *OR* (*"belajar"*)) *AND* (*"IPA"*)) *OR* (*"Ilmu Pengetahuan Alam"*)) *OR* (*"Sains"*)) *AND* (*"Model Pembelajaran"*)) *OR* (*"Model Belajar"*)) *AND* (*"Children Learning in Science"*)) *OR* (*"Anak Belajar di Sains"*)). Search by keyword in English *((((((""Learning") OR ("application")) OR ("learning")) AND ("IPA")) OR ("Natural Science")) OR ("Science")) AND (" Learning Model"")) OR (""Learning Model"")) AND (""Children Learning in Science"")) OR (""Children Learning in Science""))*, the next stage is the selection of articles by the criteria set by the researcher and by the research questions. The articles that appear are sorted until no similar titles are found. Then sorted based on the inclusion and exclusion criteria that have been determined. The final result is the articles that will be analyzed.

Article Extraction

The obtained articles are then extracted. Extraction of articles by author, country, year, number of samples used, and search results performed and database items.

Results and Discussion

Results

The identification results obtained from the search method on Google Scholar obtained up to 76 search data results. Finder contains selections with the same search data results and the same search title. After the screening step by matching the study data with the inclusion criteria set by the researcher, including the study of the role of Early Childhood Science Learning with Models Learning Children Learning in Science guidance in the full text of the 2012-2022 article. The results of the research are collected and selected to include documents that meet the research criteria. It was found that 10 articles that matched the research criteria were collected and continue to provide important reflections to get the best evidence on the role of The results showed that the process of implementing or namely early childhood science, children learning in science learning models, and the application of children learning in science learning models in early childhood science learning.

Tabel 1. Extraction Article

No	Author/Year	Sample	Results
1	(Bakri et al., 2021)	Early childhood with children who are in the age range 0-8 years.	An easy, beautiful, relaxed and enjoyable learning atmosphere for children can be realized if educators use learning strategies, namely learning strategies that are able to simultaneously involve all of the child's potential and the child's will in the learning process. Among the children's learning strategies that can be implemented are science learning strategies, namely by observing, asking, collecting, associating, and communicating.
2	(Handoko, 2019)	Children aged 5-6 years in preschool	The steps taken by the teacher in the science learning method for children aged 5-6 years in PAUD are by combining several methods that are adapted to the current learning theme and the steps used by the teacher are adjusted to the lesson plan contained in the daily learning implementation plan. made by the class teacher adapted to the child's development. The science learning media used by teachers in science learning methods for children aged 5-6 years in PAUD is good, judging from the media that the teacher makes himself and can recycle used goods for science learning that the teacher will do.
3	(Izzuddin, 2019)	Children aged 4 to 6 years	There are two processes of learning science for early childhood, namely the scientific process and scientific process skills of learning science. In summary, the scientific process and scientific process skills include observing, grouping, measuring, communicating, conducting experiments, concluding and applying.
4	(Luluk Iffatur Rocmah & Nur Hidayatus Sholihah, 2020)	Group B children, totaling 13 children, school principals and class teachers at PAUD Tashwirul Afkar Gedangan Sidoarjo	There was an increase in children's science process skills after carrying out activities with experimental methods made from nature. And the application of experimental methods made from natural materials to improve the science process skills of group B children can be done by inviting children to grind mangosteen peel, grind turmeric, and grind spinach leaves. In the first way, the observing stage such as smelling, seeing the shape or material to be experimented with, the second stage classifying or grouping by comparing, looking for similarities, or looking for differences in the form and function of the material, and the last stage of interpreting by drawing conclusions and giving meaning of the application of the experiments that have been carried out.
5	(Mayar, 2018)	47 teachers in early childhood education	The solution offered is training in the preparation of learning materials based on multisensory-ecology (PSB Mugi) science learning model because the advantage of the PSB Mugi model is that it can improve children's cognitive, social emotional and physical simultaneously. The preparation of science learning materials is a solution to the lack of availability of early childhood science learning materials for PAUD teachers.

No	Author/Year	Sample	Results
6	(Nufus, 2022)	Children aged 4-5 years in Group A2 TK Aisyiyah 12 Singaparna, with a total of 14 children, namely 9 girls and 5 boys	The development of children's science process skills in color propagating science game activities in group A2 at TK Aisyiyah 12 Singaparna developed from cycle I to cycle II with a percentage value of 57.1% to 85.7%. By going through color propagation science games, children's science process skills develop optimally because science games are very beneficial for children, can create an interesting atmosphere so that children can develop science process skills, especially aged 4-5 years, especially in Group A2 TK Aisyiyah 12 Singaparna.
7	(Putri & Sugito, 2021)	Early childhood 4-6 years	The results of the study show that there are two patterns of science learning that are often applied, namely direct and indirect learning patterns. In addition, science learning is effective for stimulating development in three main domains, namely cognitive, psychomotor and affective.
8	(Rahmah, 2019)	There are 30 teachers in Cluster II Melati, Simpang Tiga District, Pekanbaru City	The results of the research data obtained were teacher perceptions about science learning at Gugu II Melati, Simpang Tiga District, Pekanbaru City in terms of the plant or plant study aspect which was quite good and able to apply. Judging from the aspect of the study of animals or animals it is quite good but it is still experiencing difficulties in holding or bringing it into the classroom and the lack of zoos to visit. In terms of the study aspect, the relationship between animals and plants is quite good and easy to explain to children. Sera, viewed from the aspect of the relationship aspect of life, is still difficult to explain and involves something very complex.
9	(Wijaya & Dewi, 2021a)	Early childhood with an age range of 0-6 years	The results of the study state that the Children Learning in Science learning model is appropriate for use in early childhood science learning because it allows children to interact directly with concrete scientific phenomena and learn science in a fun way. The Children Learning in Science learning model is also in accordance with the scope of science learning, namely as a product, process and attitude.
10	(Aminah & Mansur, 2016)	The number of students is 37 people	The results showed that student learning outcomes experienced a good increase, namely from the average score in pre-cycle of 45, with a completeness percentage of 16.21%, then in cycle 1 the average score obtained by students was 60.62 with a completeness percentage of 45, 71% and in cycle II the average score obtained by students was 78.56 with a completeness percentage of 91.89%.

Discussion

Early Childhood Science

Science comes from the English word science which means knowledge. In addition, in German science comes from the word wissenschaft which means systematic knowledge (Hikam & Nursari, 2020). Science is the meaning of nature and various phenomena packaged into a collection of scientific products through a series of scientific processes carried out by humans (Black et al., 2017).

As previously explained that science learning should be started from an early age. The scope of early childhood science learning includes three things, namely products, attitudes and science processes (Olua, 2022). Science learning is given to early childhood so that early childhood will get various scientific knowledge and information and have an interest and interest in science that is found in the environment around where they live (Harahap et al., 2022). In order to carry out science learning for early childhood, the following principles should be considered: 1) concrete; 2) is introductory in nature; 3) there is a balance between physical and psychological activities; 4) paying attention to early childhood development; 5) adapted to a typical child's learning style; 6) integrated and 7) implemented with the concept of playing while learning (Wijaya & Dewi, 2021b).

Regarding the scope of early childhood science learning that has been described previously it should cover the realm of products, processes and attitudes. The realm of science products (concepts) instilled in early childhood is presented in Table 2

Table 2. Early Childhood Science Concepts

No	Topics	Science Concept
1	Limb	Know the names of body parts and their characteristics
2	Action	Distinguish between movable and immovable objects
3	Liquids	Describe the characteristics of liquids
4	Sink and float	Distinguish between floating and sinking objects
5	Soluble and insoluble	Distinguish between soluble and insoluble matter
6	Get to know the scales	Know how to use a scale
7	Play soap bubbles	Make soap bubbles
9	Mixing colors	Recognize color as a result of mixing two or more colors
10	Recognize elastic	Distinguish between elastic and inelastic objects
11	Air/Wind	Describe the characteristics of air / wind
12	Shadow	Explain the cause of shadows
13	Fire and Burn	Know the process of making fire and the nature of fire
14	Get to know ice	Describe the properties of ice
15	Sand	Recognize the difference between sea sand and land sand
16	Sound	Recognize the sound of various types of animals
17	Plant growth	Explain the effect of water on plant growth

Science learning for early childhood must also instill science process skills. Science process skills that are instilled in early childhood include the ability to observe, compare, classify, measure, predict and communicate (Handoko, 2019). Then, the attitude that must be instilled in early childhood is a scientific attitude which includes honest, high curiosity, creative, critical, unyielding and open attitude (Roostin & Swandhina, 2019).

Early childhood science development plays a very important role for the formation of learning abilities and attitudes at a more advanced stage in a learning the role of the teacher is not merely providing information, but also directing and providing learning facilities (directing and facilitating the learning) so that the learning process more adequate (Rusilowati, 2013).

Learning Model Children Learning In Science

The Children Learning in Science learning model was developed by a group of scientists in England and led by an expert named Driver in 1988 (Sutisnawati et al., 2020). This learning model aims to shape scientific knowledge into students' memory so that it can last a long time in memory. The Children Learning in Science learning model has several characteristics including: 1) student-centered; 2) through hands on and thoughts on activities; 3) the main learning source is the environment and 4) the constructivism paradigm (Mayar, 2018).

The Children Learning in Science learning model consists of 5 (five) stages, namely orientation, generating ideas, rearranging ideas, applying ideas and strengthening ideas (Harahap et al., 2022). The explanation of each of these stages is (1) Orientation: is an activity to focus students' attention by bringing up interesting scientific phenomena, (2) Generating ideas: efforts to explore student concepts by asking students to write down whatever is observed from scientific phenomena presented, (3) Rearranging ideas: efforts to organize ideas that students have written down so that they are correct, (4) Application of ideas: activities to invite students to apply ideas they have mastered in new situations, and (5) Consolidation of ideas: strengthening activities students' ideas so that these ideas survive in students' long-term memory (Ismail, 2018).

The advantages of the Children Learning In Science (CLIS) learning model are that it makes it easier for students to create ideas, students are able to solve problems by themselves, increases student creativity in the learning process so that the classroom atmosphere is more conducive and learning is more effective, good collaboration is established. between students in the learning process, students are able to find scientific concepts through observation or experimentation, and learning in class is more effective so that learning objectives are achieved (Ferreira et al., 2015).

Application of the Children Learning in Science Learning Model in Early Childhood Science Learning

The application of the Children Learning in Science learning model is adapted to science topics for early childhood. An example of its application is presented in Table 3:

Table 3. Application of the Children Learning Learning Model

Example Topic	Application	Science Process Skills	Attitude
Float, Sink and Float	Orientation: invite children to play in the pond or aquarium Generating ideas: asking the child the position of these objects, for example the position of fish, the position of stones and other objects. Rearrangement of Ideas: explain to the child that the rock sinks and the fish floats. Explain to children that objects float at the bottom of the water, float in the middle of the water and sink at the bottom of the water. Application of ideas: inviting children to play	Observe, compare, classify and communicate.	Curiosity, critical and open.

	with water, for example preparing a basin filled with water and inserting various children's toy objects such as paper boats, plastic patterns and small imitation cars. Ask the child again which objects float, float and sink. Consolidation of ideas: at a certain time take the child to a place where there is water, for example a ditch and ask again which objects float, float and sink.		

In Table 3 it can be seen that the Children Learning in Science learning model can be applied to science topics for early childhood. In addition, various science process skills and scientific attitudes can be developed in this learning model. In carrying out this learning, the role of the teacher or parents is needed as a teacher at home. Their role is as a learning design, facilitator, motivator and evaluator (Hariyati et al., 2020).

The CLiS learning model has a positive impact on the learning process because the learning process is student-centered, students are given the opportunity to learn, provide ideas or ideas to solve the problems given. Students feel more valued and of course this creates students' self-confidence. Self-confidence can be interpreted as a positive attitude of an individual that enables him to develop a positive assessment of himself and of the environment/situation he faces. The development of self-confidence is greatly influenced by how an educator respects his students. By providing opportunities for students to convey ideas is one thing that can be done. In accordance with previous research, self-confidence will arise if there is fulfillment of the need to be valued and respected, because doing so will give rise to strengths, abilities, and feelings that are useful to others. Based on this description, it can be said that with a sense of self-confidence, it will make student learning outcomes increase. Students' self-confidence will be one of the driving factors for increasing student learning outcomes.

Conclusion

Based on the literature review on Early Childhood Science Learning with the Predetermined Children Learning in Science Learning Model, three themes were found, namely early childhood science, children learning in science learning models, and the application of children learning in science learning models in early childhood science learning. Science learning should be instilled from an early age. Science learning for early childhood includes products, processes and science attitudes. Therefore a learning model is needed that can accommodate this, one of which is the Children Learning in Science learning model. With this learning model, early childhood can learn science as a whole and in accordance with the principles of early childhood science learning, namely concrete and fun.

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Author Profile

Ayu Pratamawati is an alumnus of the Master of Science Education at Cenderawasih University in 2017. In 2019 she graduated to become a permanent lecturer at the Tarbiyah Faculty of Islamic Education study program for Early Childhood at the Fattahul Muluk State Islamic Institute in Papua. Current activity is holding the position of Secretary of the Science Laboratory and teaching staff at the Tarbiyah Faculty of the Early Childhood Islamic Education Study Program at the Fattahul Muluk State Islamic Institute in Papua.