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## Training Early Childhood Science Skills Trought a Scientific Approach assisted by Information and Communication Technology (ICT)

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**Abstract:** the times marked by the development of ICT have an impact on all areas of life, one of which is education. in this century the younger generation should be literate in technology. With this technological development, it is hoped that it will bring changes in the quality of education for the better in the hope of being able to compete globally. educational institutions, especially early childhood education, already have a strategy in learning that is holistic integrative. so that it can run as it should, PAUD institutions apply an approach that is in accordance with the 2013 curriculum, namely a scientific approach, seeing the combination of using ICT in teaching in PAUD institutions by applying a scientific approach researchers are interested in seeing the influence of both in the introduction of science to early childhood. The research method used by researchers is the method of literature by collecting several related references. The reference used is a reference with a range of 3 years. the results of this study are that in the application of science learning in early childhood education institutions or PAUD can be done using a scientific approach this is in accordance with the implementation of the 2013 curriculum. Apart from learning that applies a scientific approach in early childhood education institutions so that learning goes according to the objectives education needs to be supported by the use of ICT as a medium/learning resource

**Keywords:** early childhood science skills; Scientific approach to early childhood; Information and Communication technology

### A. Introduction

Generation Alpha is the generation of children born in the 2011-2025 range. In this generation, early childhood born in 2018-2020 is one of the alpha generations who are experiencing rapid development both physically and mentally (Fitriani & Adawiyah, 2018); (Kamelia, 2019), cognitive (Novitasari, 2018); (Khoiruzzadi et al., 2020), social emotion (Khoiruzzadi et al., 2020); (Sukatin et al., 2020) and development of language and literacy (Karimah & Komalasari, 2019). The visible difference between this generation and the previous generation lies in their closeness from an early age to the development of information and communication technology (ICT). It is not surprising that this generation is known as an advanced and intelligent generation from an early age in the use of ICT. . The presence of ICT gives a signal that ICT has a positive impact on development and makes it easier for humans to obtain information that will be used for their welfare later.

At present the educational process that has occurred has undergone changes, especially in the teaching paradigm. Originally education was run by teacher-centered and become learner-centred ) (Kurniawan, 2020) (Aziz et al., 2021). This has happened, one of which is due to the development of information and communication technology (ICT) which has developed very rapidly in recent decades which has resulted in global competition that can be felt. Various areas of life experienced significant changes caused by the development of ICT.

The development of ICT for the world of education certainly has demands that must be considered so that the quality of education can be in line with the development of ICT. One of the demands that can be felt at a minimum is the habituation of students from an early age in the use of ICT in learning, in this case ICT can be used as a teaching resource (Junindra et al., 2021) teaching materials and even teaching media (Qomario & Agung, 2018). This is intended so that the next generation of the nation will be able to compete globally in the use of ICT wisely and correctly which will produce competent human resources in various fields. These demands have a very significant influence on the development of the potential of students and the teaching carried out by teachers, one of which is in science skills.

Keterampilan sains merupakan keterampilan dasar yang seharusnya sudah dapat diajarkan mulai dari dini pada lembaga pendidikan anak usia dini (PAUD). The purpose of introducing science skills to early childhood is to help students get to know their surroundings through a scientific approach consisting of 5M (observing, asking, gathering information, reasoning and communicating) which can later stimulate students' cognitive intelligence. In line with the changes in the 2013 curriculum at early childhood education institutions (PAUD) that the potential possessed by children on the basis of their development between one child and another is certainly not the same. Recognizing the development of children at an early age is a vulnerable period where children at that age have great sensitivity and sensitivity to curiosity to learn. Responding to these challenges, the government in making policy and regulatory decisions in early childhood education institutions responded by implementing the 2013 curriculum with a scientific approach (Kemendikbud, 2014).

Early childhood education institutions (PAUD) are educational institutions that have a role in the development and needs of early childhood. Amalia & Simatupang, (2022); Sugian et al., (2021) The education program organized by PAUD is an educational program that is carried out by applying holistic principles. This implies that through the early childhood development early childhood development program focuses on early childhood development and is integrated with the needs needed by early childhood in the golden age. It is through these early childhood education institutions that various skills and child development are formed, this also gives a sign that PAUD has an appropriate role in forming the basis of child development.

Based on this, the golden age or what we often refer to as the Golden Age of children for learning requires special attention so that development in early childhood can be achieved optimally, one of which is through education by practicing science skills from early childhood and strengthened with ICT assistance. It is hoped that the development of children in understanding science can increase significantly. Moreover, training science skills using a scientific approach also trains several other skills such as problem solving, critical thinking, creative thinking and communication skills can be well formed.

Seeing the enormous influence of introducing science skills to early childhood with the assistance of the use of ICT in PAUD is an interesting combination to study, the researchers are interested in reviewing how much influence there is from training early childhood science skills through a scientific approach assisted by the use of ICT in accordance with the demands of the times are able to maximize the potential in early childhood in understanding science itself. In addition to this, the results of this study are expected to be able to provide insight and practical guidance to institutions and PAUD teachers in planning to introduce science to early childhood using a scientific approach.

## B. Methods

The research method used by researchers is the library method or known as Literature Review. Research using the library method is research by collecting sources that are relevant to the topic to be discussed by researchers. The sources used by researchers are articles with the keywords early childhood science skills, scientific approaches for early childhood and ICT learning for early childhood. Apart from relevant topics, researchers limit the age of articles to the last 3 years from 2020-2023 with the aim of providing up-to-date information.

## C. Results and Discussion

### Results

Based on several references found by researchers through the search engine on Google Scholar, the researchers found several articles that were relevant to the problem to be resolved by researchers to be studied through the literature review method. The following are articles used by researchers in solving the concerns faced by researchers:

**Table 1. Related articles**

No	Writer's name	Year	Title	Results
1	Komang Wisnu Budi Wijaya, Putu Ayu Septiari Dewi	2021	Pembelajaran Sains Anak Usia Dini dengan Model Pembelajaran Children Learning in Science	Science learning which is literally learning that has results in the form of products, processes and attitudes that are in accordance with the scientific principles of science. Based on this, educational institutions, especially early childhood education institutions (PAUD), should facilitate the introduction of science material by applying appropriate learning models to the principles of science learning.
2	Febriyanti Utami, Mahyumi Rantina, Rodi Edi	2021	Pengembangan Lembar Kerja Anak Menggunakan QR Code pada Materi Sains Anak Usia Dini	Science concepts can be taught to early childhood by integrating technological developments such as the QR Code where the QR code is used to open a child's worksheet. At this point, in addition to introducing the use of technology to children, worksheets certainly support scientific activities such as sensory exploration in the introduction of the natural surroundings.

3	Jeni Roes Widayati, Rien Safrina, Yetti Suproyati	2021	Alat Permainan Edukatif: Analisis Pengembangan Literasi Sains Anak Usia Dini	The concept of science can achieve the goals of early childhood learning through the use of educational game tools, this happens because early childhood is actively involved in learning which leads to exploratory activities so as to produce meaningful science learning.
4	Riskha Hanifa Nasution, Hapidin, Lara Fridani	2020	Pengaruh Pembelajaran ICT dan Minat Belajar terhadap Kesiapan Membaca Anak Usia Dini	The application of interaction-based ICT as a teaching tool has a positive impact on interest in reading in early childhood.
5	Mohammad Salehudin, Gusti Asiyani	2022	Systematic Literature Review: Holistik Integratif Berbasis ICT Pada PAUD Di Indonesia	The quality of education in accordance with the changing times accompanied by technological developments will certainly make the learning process easier for students to understand. This provides a challenge for all educational institutions ranging from early childhood to tertiary institutions to provide holistic, integrative education so that the goals of education are achieved.
6	Nur Afif, Desy Ayuningrum, Ali Imran, Agus Nur Qowim	2022	Inovasi Pengembangan Kurikulum dengan Pendekatan Saintific untuk RA/PAUD di Provinsi Banten	The application of a scientific approach provides opportunities for students to explore further about deepening the material and meaningful experiences through 5M activities
7	Khusnul Laeli, Subiyanto	2021	Implementasi Scientific Approach dalam mengembangkan Multiple Intelligence Anak Usia Dini	Through the application of a scientific approach, one is able to develop multiple intelligence skills such as linguistic intelligence, musical intelligence, mathematical intelligence, physical motor and kinesthetic intelligence, intrapersonal intelligence, interpersonal intelligence, spatial intelligence, naturalist intelligence, spiritual intelligence.
8	I Nyoman Supri	2021	Peningkatan Keterampilan Komunikasi Mellui Pendekatan Saintific PAUD Kumara Widya	Through a scientific approach, it provides opportunities for students to develop their own potential, this is due to the involvement of the senses possessed by students so that through practice between students can interact with each other in depth. This is evidenced by the ability of students to receive and convey messages obtained through interaction with peers
9	Ahmad Izzudin	2022	Implementasi Pendekatan Saintific di Lembaga Pendidikan Anak Usia Dini (Studi	The scientific approach that is carried out in kindergarten educational institutions has an effect on students, especially in stimulating the creativity of

			Kasus di Taman Kanak-kanak Swasta Kecamatan Keruak)	students, this is due to the emergence of an attitude of independence, self-confidence and being able to argue with their own point of view
10	Salsabila Hasiana Tanjung, Kamtini, Suri Handayani Damanik	2022	Pembelajaran Berbasis Kecerdasan Manjemuk dengan Pendekatan Saintific dalam Menstimulasi Kecerdasan Spasial Anak Usia Dini	Spatial intelligence in early childhood requires a stimulation that is appropriate to the age level of students. Based on the results of this research that to develop spatial intelligence requires scaffolding or a learning method by providing learning support for students according to the cognitive level of students
11	Ririn Hunafa Lestari, Sharina Munggaraning Westhisi, Ghina Wulansuci	2023	Media Berbasis TIK Sebagai Media Pengganti Realitas pada Pembelajaran Anak Usia Dini di Masa Pandemi Covid-19	The involvement of ICT in the learning process is used as an auxiliary medium in learning to be able to strengthen abilities according to 21st century skills, including at the kindergarten level.

## Discussion

The word science is a word that comes from the Latin "Scientia" which can be interpreted as I know or I understand. The meaning of the word "I know or I understand" broadly here is not only about knowing but also understanding in depth, the details of what one knows. When viewed more narrowly the meaning of science is knowledge which is divided into two parts, namely 1) physical science and 2) biological science. The physical sciences in this science consist of physics, astronomy, chemistry etc. Meanwhile, the science of biology that is meant by this science is the study of living things starting from anatomy, structure to the reproduction of these living things.

Based on science more narrowly we can mean that science is the study of everything that is around us, both inanimate and living things. Wijaya & Dewi, (2021), Izzuddin, (2022) states that science learning has results from its activities which consist of processes, products and scientific attitudes. The process through which science activities are carried out is scientific observation and experimentation. Science products are the result of the application of science which will be useful for the development of knowledge and technology. Meanwhile, a scientific attitude is an attitude that should be possessed as a scientist/scientist who studies science which consists of being honest, disciplined, curious, objective etc (Afif et al., 2022)..

Seeing the description above related to the concept of science, the concept of science should be introduced early on in early childhood. Utami et al., (2021) states that by introducing the concept of science to early childhood it is able to encourage children to carry out sensory exploration activities of the conditions that exist in the child's environment, this is useful in helping children understand knowledge and practice basic skills that must be possessed by scientists (Afif et al., 2022).

In order for science learning for early childhood to run well, it is necessary to design a plan such as preparing an RPPH before learning is carried out with fun activities for early childhood such as the use of educational games (Widayati et al., 2020), utilization of modern technology such as QR Code (Utami et al., 2021) as well as use of ICT (Lestari et al., 2023),

(Nasution et al., 2020). In facilitating this, the government needs to adjust the curriculum to support this through the 2013 curriculum with a scientific approach (Afif et al., 2022) (Izzuddin, 2022). The stages of the scientific approach include observing, asking, trying, reasoning and communicating or what is often referred to as 5M. Afif et al., (2022) From the results of his research, he stated that implementation in PAUD institutions to introduce science concepts can be applied through a scientific approach. This provides benefits to early childhood in stimulating children's curiosity in thinking critically so that concepts from science can be easily understood by children. This is in accordance with the learning principles applied by early childhood education institutions, namely holistic integrative (Salehudin & Asiyani, 2022).

Nasution et al., (2020) in research that has been carried out by presenting ICT in early childhood learning brings significant changes to children's readiness to read. This statement indicates that along with the times, the development of information and communication technology can have a positive influence on the cognitive development of students. learners. Seeing the results of previous research, it can be concluded in this research that learning in PAUD institutions is in accordance with the current curriculum, namely the 2013 curriculum which applies a scientific approach to having a good effect on early childhood cognitive development. While the development of ICT can be used by educators so that the goals of education can be carried out properly, especially in the introduction of ICT to students.

#### **D. Conclusion**

Based on the results of research conducted from several literatures that have been collected by researchers. Whereas in the application of science learning in early childhood education institutions or PAUD can be carried out using a scientific approach this is in accordance with the implementation of the 2013 curriculum. Where in the 2013 curriculum has a characteristic of the syntax carried out in the learning process which consists of observing, asking, trying, reasoning and communicating. Through these activities are able to provide a response in the form of a stimulus to students to practice critical skills, curiosity about phenomena that occur around the environment of early childhood. This is consistent with the characteristics of early childhood education, namely holistic integrative meaning that PAUD institutions are run according to early childhood development and are expected to be able to optimize multiple intelligences. Apart from learning that applies a scientific approach in early childhood education institutions, so that learning goes according to the goals of education, it needs to be supported by the use of ICT as a medium/learning resource so that the cognitive development of early childhood can be optimized.

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