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Relationship between PAUD (Early Childhood Education) Teacher Professional Competence in the 21st Century toward Early Childhood Students' Science Ability

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Abstract

Professional teachers are teachers who have basic competence within themselves. But most of what happens is still not aware of the importance of competence for teachers. This study aimed to determine the relationship between the professional competence of 21st-century teachers and children's science abilities based on their accreditation. Thus, it can be seen the connection between accreditation and the professional competence of PAUD teachers in children's science abilities. The type of research used in this study is quantitative, using correlational methods. Data collection is done by using a questionnaire. It can be seen that with A accreditation with the achievement of children's natural science abilities for problem-solving abilities with a score of 25%, 28% logical thinking, 22% receiving information, and 25% language skills can see and conclude that the professionalism of teachers in educating children in every learning activity has to keep up with the times. Meanwhile, with schools accredited C, it can be seen that scientific ability is 23%, logical thinking is 29%, information reception is 14%, and language skills are 32%. This can be interpreted as scientific ability with a standard level of achievement in learning activities because educators have not applied it professionally in activities with children. It can be concluded that the competence possessed by a teacher who teaches at a school with different accreditation also has further treatment in the learning process. That way, developing science skills is closely related to teacher professionalism so children can develop their science abilities.

INTRODUCTION

According to (NAEYC), children are those between the ages of 0 and 8. Children experience a variety of growth and development during this period with many different aspects of what they experience during their growth and development. (Susanto, 2021). Childhood is a significant age range or the golden age. Every child experiences a phase in every life. (Khaironi, 2018). Early childhood has a unique pattern of development and growth. This development and growth include cognitive, social, emotional, creative, and language aspects. Children between 0 and 8 also experience physical and mental development. (Khairiah & Eliza, 2021).

Education in early childhood aims to motivate the child's growth and development in every aspect of the child's self, which seeks to stimulate the child to be ready for the next element and further education (Kurniawan et al., 2023). This education itself is a form of things that must be understood because, in it, there is a teaching process between educators

and children whose goal is to provide understanding to children in various ways in conveying it to children or the methods used are designed before applied to children in learning (Al Etivali, 2019). With education, it will develop the potential of children by providing systematic and directed education for children's personality activities (Suryana, 2021)

This cognitive development is related to all processes of mental activity directly related to thoughts, solving problems, or everything pertaining to the processes experienced by children, which begin with learning, paying attention, and observing them (Laksana & Dhiu, 2021). The concept of cognitive development is one of the most essential parts of a child. Therefore, cognitive development for children is the most critical part of the child's development phase that needs to be studied and given stimulation (Fatimah & Istikomah, 2021). This method can be applied to children in everyday life because children go through the process and observe and gain knowledge directly. (Khairiah & Eliza, 2021). As a part of cognition that prioritizes processes related to theories, laws, and principles that children get through, such as experimental or experimental activities, children will get conclusions from what they have passed (Putri, 2019).

Science education will provide direct experience to children that Bantian needs to develop several science process skills.(Rahman et al., 2018). Each child's scientific ability differs from one child to another because development is influenced by various things around the child (Tatminingsih, 2019). Science is a method used to gain knowledge through curiosity, perseverance, and accepting other people's input because it relates to scientific processes in learning activities or processes (Rahayu & Jamaludin, 2022). In addition, Leigh and Rebecca 2006, and Baldwin & Kelly 2009 explained that children would better understand and master science process skills when in exploratory activities in various ways, especially in learning science because the exploration of science in children in a scientific method will be able to produce models that are sustainable in children's lives (Rahman et al., 2018).

The use of digital technology in the process of learning activities for children now needs to be done so that they can solve problems in the learning activities that they participate in and the difficulty of the teacher providing natural objects in the classroom in the learning process for children. Digital technology is used to overcome existing problems and make learning more interesting for children because they will be interested and want to do it themselves (Awaluddin et al., 2021). Technology can connect learning activities according to their functions, namely tools, manipulation, and management of information (Ardiana, 2023). According to Chen and Liu (2008), this technology can carry out static learning processes by using images or animations to make learning more interesting for children (Rahman et al., 2018).

A professional teacher is one of the factors for quality learning activities and attracts children's interest. Experienced educators can find their identity and actualize themselves according to their abilities with the characteristics of a professional teacher. According to Hargreaves 1997, teachers have learning skills that create and build and develop relationships between educators and other children so that learning is broad and suitable for child development (Mappapoleonro, 2019). A professional teacher carries out his duties following a profession that has the ability, competence, and attitude per the demands of his profession,

which serves as an introduction to potential in children (Harimurti, 2019). In the learning process, professional teachers have an important role as mentors for children in everything related to children (Maiza & Nurhafizah, 2019).

However, teachers often use monotonous learning methods and focus too much on children's literacy learning. They also do not use technology when teaching using media such as laptops or in focus. According to the findings of research conducted by (Widyastuti et al., 2022), which shows that technology has not been utilized optimally by teachers due to the low professional competence of ECCE teachers. Based on the results of the study (Hibana & Surahman, 2021) that there is a significant influence between teacher digital competition and increasing early childhood education achievement, which shows a coefficient determination rate of 96.7%, which means the magnitude of the influence of teacher digital competence with increasing early childhood education achievement, Meanwhile, based on observations that have been made at Koto Tangah Kindergarten, Bukik Barisan District. It was found that learning is still very minimal in using ICT in learning Because of the competence of teachers who have not mastered it and apply it in every learning process. Among them, teachers in science learning have difficulty preparing science teaching materials that are interesting for children. This happens because of a lack of basic knowledge of teachers or professional teachers about early childhood science. The novelty of this study is to determine the relationship between the professional competence of ECCE teachers in the 21st century to children's science skills and motivate educators to be more professional in learning. These findings will build an understanding of educator professionalism to be more effective in learning carried out in early childhood education related to early childhood science skills.

METHOD

This study uses quantitative research to investigate the relationship between variables measured using instruments so that numerical data can be analyzed. (Creswell, 2016). Sugiyono stated that the research method is one of the scientific methods to obtain data with a predetermined goal. (S. Sugiyono, 2015). Therefore, research is carried out systematically to find answers that will lead to the truth about problems logically and rationally.

This research is included in the correlational research category, which investigates how two or more variables relate to each other. The research method applied in collecting this research data by observation and interview. Observation is carried out when the learning activity process takes place in children. In this operation, researchers looked at the use of ICT in children's science learning. The main purpose of doing this research is to help explain the importance of behavior to give meaning and meaning to something that happens (D. Sugiyono, 2013). The data collection technique used is a questionnaire to understand the natural relationship of variability in the form of a list of questions researchers ask the object of research (Nasehudin & Gozali, 2012). The goal is to describe or describe the research that has been done. The location of this research was carried out in a kindergarten in Koto Tangah with 19 respondents and Pertiwi Sungai Naniang Kindergarten with 14 respondents with a length of research time, namely observation and questionnaires on March 13-17, 2023, distributed to research objects in Bukik Barisan District.

RESULTS AND DISCUSSION

A. Result

The study used observation and interviews with a grid of science capabilities. The research results have been carried out in the field with two observations. It was found that technology is closely related to the science skills of Tunas Harapan Koto Tangah kindergarten children.

Table 1. The Use of Technology in Children's Science Skills at Tunas Harapan Koto Tangah Kindergarten (19 children)

No	Aspects	Statement Item	Assessment
1.	Problem-solving skills	Children solve problems using technology. Children can release new ideas after the teacher's explanation and real examples in learning.	
2	Attitude or logical way of thinking	Children Focus on observing science learning using ICT, such as guessing colors, grouping, and others. Children understand the concept of color, shape, and texture of objects.	
3	Acceptance of Knowledge and Information	Children observe the process of rain.	
4.	Language Skills	Children can mention the process of rain again after seeing the video shown by the educator. The child can name three similar objects in color, for example, chili and red apple.	
5	: Excellent		
4	: High		
3	: Moderate		
2	: Low		
1	: Poor		

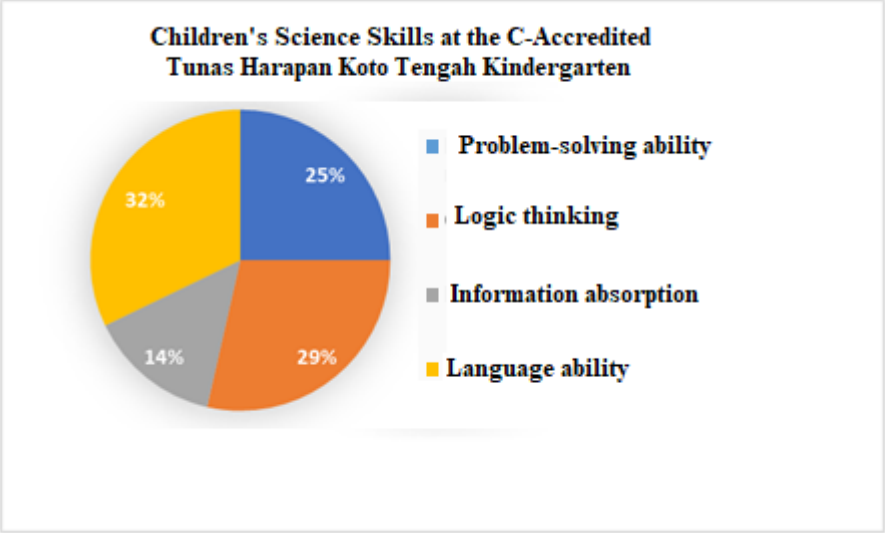

Figure 1. Results of the Use of Technology in Children's Science Skills in Tunas Harapan Koto Tangah Kindergarten with C Accreditation

Based on Figure 1. We can see that technology is related to developing the science skills of Tunas Harapan Koto Tangah kindergarten children, with 23% science skills, 29% logical thinking, 14% information reception, and 32% language skills. It can be said that learning in the 21st century using ICT is closely related to the professional competence of teachers in ECCE.

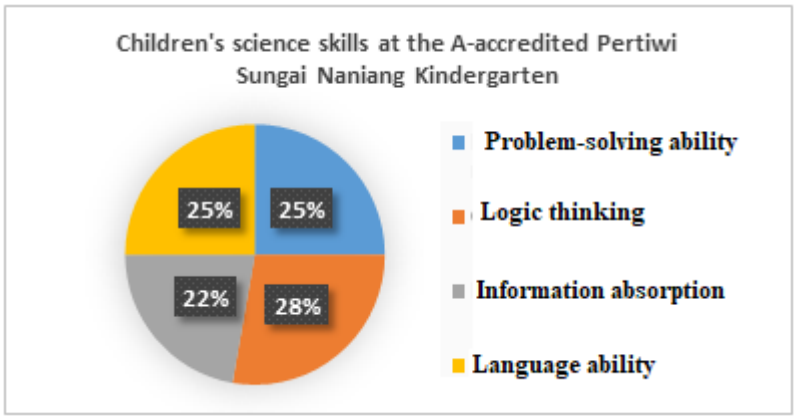

Figure 2. Results of the Use of Technology on Children's Science Skills in Pertiwi Naniang River Kindergarten with A Accreditation

Figure 2 shows the percentage of technology in developing children's science skills in Naniang River Pertiwi Kindergarten. The percentage for problem-solving skills is 25%, logical thinking is 28%, information acceptance is 22%, and language skills is 25%. With results like this, it can be concluded that learning in the 21st century using ICT is closely related to the professional competence of teachers in ECCE.

B. Discussion

Cognitive needs to be developed so that children's abilities can develop properly. This needs to be done with direction and learning from people around children, especially professional educators, with the intention that they can improve the quality of children's education. A better understanding of child development is needed, especially during early childhood learning (Fajriani & Liana, 2019).

Science for early childhood that is applied is adjusted to the level of development and growth of children to develop various aspects of children. As an educator, providing a variety of stimulations in each learning process for children that allow children to discover facts, processes, and ideas immediately will give them new understanding. Following Carl Roger's experimental learning theory, adjustments must follow the wants and needs of the child. This theory explains that children have the ability and desire to learn, and educators must help children learn optimally and obtain satisfying passions. Children aged 4–6 years enter the preoperative development phase into the real surgery phase.

The ability of the science process can occur through the form of direct turn naka, which will get direct experience to children in every activity carried out so that it will encourage them to be creative and develop logical thinking patterns. The educator will encourage the child to learn science skills to understand the environment around the child, and the child also contributes to the learning activities (Izzuddin, 2019).

Professional comes from the word profession, a form of profession or work someone wants to do and pursue to become an expert in their field. According to Martin Yamin 2007, someone who pursues work based on this expertise which is made professionally in the field he pursues, technical abilities, procedures based on expertise, and procedures based on intellectual (Mappapoleonro, 2019). Rice and Bishprick 2003 state that a professional teacher can manage himself in carrying out his tasks. Professionalism is essential to be a good educator, understanding, and teaching. A teacher is form of effort carried out by teaching with morals and ethics, an educator who can be an example for children (Jameel et al., 2021).

An early childhood education teacher provides stimulation and has an important role in conducting learning and challenges in improving the quality of education in the 21st century. By improving quality abilities, the goal of developing children's intelligence will run well and can develop the ability of various aspects in early childhood. According to Hasbi (2020), one of the benefits of using information technology (ICT) by ECCE teachers in children's learning activities is that it can overcome experiences, interact directly with the environment, provide correct experiences and perspectives, and increase the effectiveness and effectiveness of learning (Yuniarni, 2022).

The behavior of teachers and the way they think and act as educators are very important to professional teachers. Modern-century skills are necessary to deal with changes in the modern world. Educators have an important role in conveying and cultivating science skills in children, which impacts teacher interaction with children's learning activities. The rapid development of technology requires teachers to adjust. They must ensure that children can participate in developing the current pad in innovative and creative ways that interest them.

To achieve this, teachers must improve their professional knowledge of modern strategies by teaching by applying them in learning activities. In other words, the most improved teachers in Indonesia are teachers who have professional abilities that can provide learning activities to children in every learning activity that will be carried out by children (Utami & Hasanah, 2020).

According to the National Association for the Education of Young Millennials (NAEYC), technology-based learning media in the twenty-first century is used for early childhood. These technological tools include various devices such as computers, tabs, multitouch displays, interactive whiteboards, mobile devices, cameras, DVD and music players, electronic games, electronic reading books, and usable analog equipment. Based on the explanation above, information technology-based learning media for early childhood uses simple technology tools that teachers can access (Lestari et al., 2023).

CONCLUSIONS

Based on the results of research that has been done, it can be seen that the competence of professional teachers affects the ability of early childhood science. Because results are high and excellent, information and communication technology are strongly related to learning. By using ICT, children are enthusiastic and enthusiastic and active in the ongoing learning provided by educators. It can be seen that with A accreditation with the results of children's achievement in children's science abilities, it can be seen and concluded that professional teachers in educating children in every learning activity have followed the development of today's era, namely the 21st century By developing the ability of problem-solving aspects, attitudes or ways of thinking, the acceptance of knowledge and information and language skills seen in terms of presentation is good and professional teachers have applied it in children's science learning activities. Whereas with C accreditation schools, we can see that with science skills with logical thinking, information acceptance, and language skills with presentations which means that they have applied learning activities still have not maximally developed children's science skills because There is one aspect that is low that the acceptance of information by children occurs because of the lack of professional educators in providing information that can be received by children, one of the reasons is that they have not used science and communication technology in learning activities. Therefore children are low in receiving information in science learning activities in children's science skills. The competence possessed by a teacher in the learning process will be very useful for children because the teacher will understand and understand the learning needs following the characteristics of children and also adapt to the 21st century, which uses ICT in learning.

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