12 (2) (2023) 97-103

Early Childhood Education Papers

http://journal.unnes.ac.id/sju/index.php/belia

The Effectiveness of Thematic Apron Media in Improving the Introduction of Scienctific Literacy in KB Dharma Wanita Kuniran

Evanda Febrianti✉, Dana

Universitas Negeri Semarang, Semarang, Indonesia

DOI: 10.15294/belia.v12i2.61020

History Article

Submitted September 2023
Revised October 2023
Accepted November 2023

Keywords
Thematic Apron Media; Cognitive Development; Scientific Literacy; Early Childhood

Abstract

Apron media is one of the alternative media for early childhood in cognitive development abilities that can make the educators easier to carry out learning. Introduction of scientific literacy aims to acquire new knowledge and learn objects from the environment. Lack of literacy is a crucial problem that affects on the progress and life of the nation. The purpose of this study is to determine the effectiveness of the thematic apron media in improving the introduction of scientific literacy in KB Dharma Wanita Kuniran. This study used a quantitative approach, namely an experimental research with one group pretest-posttest design. The participants of the study consist of 48 children in KB Dharma Wanita Kuniran. The sampling technique is non-probability sampling using a purposive sampling with a sample of 33 children aged 3-4 years. In collecting the data, the researchers used a questionnaire. While, they used descriptive analysis and paired different test, specifically Paired Sample T-Test to analyze the data. The results of the t-test showed that t_value> t_tableie 27,054 > 2,03693 with a significant value (2-tailed) of 0.000. It means that H_o rejected while H_a is accepted or in other words there is an increase in the introduction of children's scientific literacy. There is a difference from the pretest average of 80.45 after being given the posttest treatment, it increased to 122.94 then obtained a significant improvement of 42.49. The results of the n-gain test is 1.28 which indicates that there is an effectiveness of thematic apron media to improve the introduction of scientific literacy with high effectiveness level.

How to cite

✉Correspondence Author:
E-mail: evandafebrianti.unnes.ac.id@students.unnes.ac.id

p-ISSN 2252-6382
e-ISSN 2686-3375

INTRODUCTION

Early childhood education targets children from birth to the age of 6 years by providing educational stimuli to support their physical and intellectual growth and development so that they are ready to take further education (National Education System Law No. 2003 Article 1(14)). According to Diana (2013), early childhood education also can be seen as an effort for preparing children for their next future with guidance, instruction and training. Early childhood educational program is organized through 3 (three) educational ways, which are informal, non-formal and formal way (UU Sisdiknas No. 20 of 2003 article 28 paragraph 2). In early childhood education, the informal way is the way of education in the family environment or institutional education. While in early childhood education in non-formal way that consists of Play Groups (KB), Day Care (TPA), Al-Qur'an Learning Center (TPQ), Muslim Children's Development Center (TBAM), Toddler Family Development (BKB) and any others. In early childhood education, the formal education way is in the form of kindergarten (TK), Raudatul Athfal (RA) and so on(UU Sisdiknas No. 20 of 2003 Article 28 paragraph 3).

Children have the potential to optimize all aspects of developments, including cognitive development. Cognitive development has an important role in a child's life. Cognitive development of children aged 3 to 4 years as regulated in Permendikbud Number 137 of 2014 includes national standards for early childhood education, content standards for child development achievement, scope of education, and cognitive development of children. It includes: a) learning to solve problems; b) logical thinking; c) symbolic thinking. The cognitive development of each child may have different stages based on the child's intervention so far (Gauvain & Richert, 2016) . Piaget (1993) states in Sujiono (2013) that children aged 2 to 7 years are in the preoperative period. The pre-operational stage shows that the children are thinking at a symbolic level but are not yet using cognitive operations. Thus, the learning should be designed in appropriate way that suit with the needs and the ages of each children.

Nowadays, cognitive development in children and the quality of education in Indonesia are very worrying, especially science literacy education which is still low compared to other developing countries. It is indicated by the low level of scientific literacy achievement in the Programme for International Student Assessment (PISA). According to Millah et al. (2021) PISA aims to measure the knowledge and skills of citizen and community and sustainable development. The results of the PISA test in 2009 showed that Indonesia's scientific literacy is much lower than between in the year of 2000 and 2006. The Indonesian state's scientific literacy value is still need attention. In the year of 2006 recorded that the scientific literacy of the Indonesian state was ranked 38 out of 41 countries with a percentage of science aspects, namely 5% for the attitude aspect, 29% for content, 34% for the process aspect, and 32% for the context aspect which had an average test of 393. Then, in 2006, Indonesia was ranked 64th out of 65 countries and had a score of 383 (Kristyowati & Purwanto, 2019) . In 2012, Indonesia obtained a score of 382, ranked 64th among 65 countries (Hewi & Salih, 2020) . Meanwhile, the results of the 2015 PISA test for scientific literacy in Indonesia showed that it obtained a score of 403 from the world average, namely 493, ranked 64th, while Thailand scored 421 with a rank of 54. Furthermore, for the results of the 2018 PISA test on the country's scientific literacy. Indonesia has an average score of 396 at rank 71 below that of Thailand which is ranked 67th, Malaysia is ranked 57th and Singapore is ranked 38th (OECD, 2019) .

According to Abdin (2017) in Handayani et al. (2019) stated that low literacy will have a significant impact on poverty, unemployment, and life gaps. According to Nudiati & Sudiapermana (2020) , literacy will determine the quality of human resources, which is the main requirement for the progress of the nation. Literacy is given to early childhood in particular to help children understand science concepts in everyday life, develop interest in learning about the natural environment, develop an attitude of curiosity, critical thinking, and responsibility, and help children practice science concepts. In addition, it can solve problems in everyday life and realize the greatness of God Almighty.

According to Stone & Conrad (2017) in Widayati et al. (2020) suggests that children who have scientific literacy are children who are able to use what they know to find a solution of the problems they face in their context. Thus, children with scientific literacy skills will be able to critically analyze problems and find solutions. Meanwhile, the fact is that cognitive development in the introduction of scientific literacy in institutions is often abandoned by educators. Parents and educators are also less concerned about children's development, so they focus more on children's activities of playing, counting, reading

and counting. At the age of 3-4 years, children are not able to think abstractly to think concretely before they were taught first. Through scientific literacy, it would encourage individuals to apply their knowledge including behavior, attitudes and concrete ways of thinking.

The problem is that the way to stimulate children in scientific literacy is only done at the beginning of the lesson by educators who have written it down at the time of carrying out activities before starting by using children's worksheets. However, the activities that have been carried out do not yet know whether they are effective in stimulating scientific literacy. Meanwhile, the motivation from parents to stimulate scientific literacy is only a little. This is, of course, influenced by parents who forget and are too busy with their work rather to paying attention on cognitive development in scientific literacy children. In addition, the background of the parents with the level of parental education, the economy and the interaction of children with parents are not well established.

Based on field observations, the KB Dharma Wanita Kuniran is located in Kuniran Village, Batangan District, Pati Regency, is an area that mostly earns a living as farmers, farm laborers and traders and has a large population in Batangan sub-district. The institution is near the rice fields. In addition, during Covid-19 pandemic, the institution is willing to accept the researchers to conduct research. On November 2, 2021, while making observations at KB Dharma Wanita Kuniran, it was found that educators lacked knowledge of science introduction activities and children should be able to learn to observe, solve problems, classify and identify in science learning. The introduction of scientific literacy is still not developed so that children's cognitive abilities and lack of awareness of scientific literacy in the environment are limited.

Apron media comes from aprons and thematics. Apron is a protective medium of cloth that covers the chest to the knees, usually an apron worn by mothers and restaurant chefs (Fatmawati and Putri, 2020) . Meanwhile, according to Amir & Putri (2021) , the apron media is a learning aid in the form of an apron with number cards in the shape of a fruit. While thematics are taken from themes that can later change according to the needs of the child. The theme has a role as an umbrella that functions as a frame for the overall learning material during the activity. The thematic apron media is designed according to the principle of fun learning activities and attracts children's attention, so that they are able to help children to improve cognitive development. The use of thematic apron media is more flexible and makes it easier for educators to carry out learning. Thus, children are more enthusiastic in participating learning activities. The thematic apron media is expected to improve the ability of children in KB Dharma Wanita to increase literacy recognition and children are interested in more fun learning activities in the introduction of scientific literacy from an early age.

The research obtained in this study aims to determine that the thematic apron media is effective in increasing the introduction of scientific literacy in KB Dharma Wanita Kuniran. The novelty of this research is using thematic apron media where the thematic apron contains interesting pictures, shapes, colors and writings. So that it will attract children's attention in aspects of children's cognitive development, one of which is the introduction of scientific literacy. In this thematic apron media, 3 (three) themes are used, namely the theme of animals, fruits and vegetables which are adapted to the interests and interests of children. Researchers laminated the flannel cloth using laminating paper, so that the flannel is not easily dirty, water-resistant and not easily broken.

RESEARCH METHODS

This research applied an experimental research specifically using a quantitative approach. The research method design is a one-group pretest-posttest design that compares the conditions before and after treatment with pretest and posttest to determine the effectiveness of a particular treatment (X), the research design was carried out before treatment (O1) and after (O2). The research population is KB Dharna Wanita Kuniran children for the academic year 2021/2022 aged 3-4 years with a total of 48 children and a sample of 33 children. Sampling is a non- probability sampling that uses a purposive sample to take a subject not based on strata, random or regional but based on a specific purpose (Arikunto, 2020) . Methods of data collection using a questionnaire. The instrument used in this study was a questionnaire using a Likert scale regarding the cognitive development of children aged 3-4 years including indicators of child development achievement in accordance with Permendikbud Number 146 of 2014 and the stages of scientific literacy by Holbrook in Sunarwan. The data analysis of this study used inferential statistical data with parametric statistical types. Parametric statistical techniques are used to analyze interval and ratio data (Sugiyono, 2013) . Paired Sample T-Test

was used to test the hypothesis and different tests were conducted to ascertain whether there was a difference (mean) of the two samples. Normality test is used to test the prerequisites before analyzing the hypothesis. In addition, the n-gain test is used by researchers to assess how well a medium is used.

This study designed the thematic apron media or thematic aprons made of aprons lined with flannel and patchwork and thematically arranged characters made of laminated flannel. This thematic apron media is very safe for early childhood, easy to obtain and easy to clean. In addition, the flannel and patchwork used are safe and friendly materials that are in the child's environment and can be removed and put back together because they are attached to the apron by using an adhesive that does not easily come off. The thematic apron media contains pictures, shapes and colors as well as interesting writing, so that it will attract children's attention in aspects of children's cognitive development, one of which is the introduction of scientific literacy. This thematic apron media provides 3 (three) themes, namely the theme of fruits, animals and vegetables that are tailored to the interests and interests of children.

Figure 1. Thematic Apron Media Design

RESULTS AND DISCUSSION

This study was conducted on children aged 3 to 4 years at KB Dharma Wanita Kuniran with the application of learning media namely thematic apron media in increasing the introduction of scientific literacy. Learning activities at KB Dharma Wanita Kuniran use center-based learning, including the center for natural materials, the center for religion, the center for acting and the center for beams. Educators in conveying learning seem less attractive, so that children do not have interest in the learning process and cause children to pay less attention to educators during the teaching process. In addition, there are several children who are busy chatting with their friends, playing and walking in class. Not only that, in learning activities educators use simple and limited learning media in the form of printed images to stimulate the introduction of scientific literacy in children, there are learning media that do not support learning activities, are less creative, innovative and varied. Therefore, the right step to develop the introduction of children's scientific literacy is to make maximum use of children's stimuli by using learning materials that keep children's attention.

Educators and parents must pay attention to an early childhood cognitive learning in order to achieve the expected abilities. Based on Regulation Number 137 of 2014 issued by the Minister of Education and Culture, it provides an explanation of the scope of cognitive development and the National Standards for Early Childhood Education in the Content Standards of Child Growth Achievement Levels, namely: a) learning to solve problems; b) logical thinking; c) symbolic thinking. The instrument in this study uses elements that have been adapted to the application of thematic apron media , namely children are able to understand various introductions to existing scientific literacy from cognitive development; in terms of physical and motor skills, children are able to stimulate activities by attaching and releasing thematic apron media appropriately in each game; and from a social and emotional point of view, children are able to cooperate with others in completing the tasks assigned to them and teach children to play alternately with patience.

Children's cognitive development really needs to be improved so that children can get to know their surrounding environment. Children who are also able to see, feel and hear will certainly have complex understandings and experiences. This is reinforced by Khaironi (2018) who argues that one aspect of development that must be encouraged from an early age is cognitive development. In addition, children's ability to explore their environment will develop rapidly and become more creative and imaginative as a result of coordination and motor control of their developing cognitive world, which is referred to as cognitive development (Hijriati, 2016) . At this time in the preoperational stage (aged 2-7 years), the child begins to be aware of objects around them by carrying out sensorimotor activities, but it can be done with symbolic activities that are able to build their ability to organize their thoughts.

Scientific literacy is very important to be developed from an early age. According to Handayani & Srinahyanti (2018) , scientific literacy can be developed from an early age. The introduction of scientific literacy in early childhood by exploring the surrounding objects, both inanimate objects and living objects. The introduction of scientific literacy in early childhood through

games that emphasize playing with learning. Through the introduction of scientific literacy, it is not only to be literate about the scientific process, but also to see how science is a condition for adapting. Therefore, scientific literacy is introduced to children so that children are literate in natural science and the development of knowledge through the discovery of facts in the environment.

Apron media is a learning medium that leads to game learning. The media in this study can be called thematic aprons, because they use an apron as a learning medium designed to cover the chest to the knees with variations using flannel and patchwork. According to Fatmawati and Putri (2020) stated that the apron is a cloth-covered barrier media that covers the chest to the knees and is usually often used by mothers and restaurant chefs. In addition, according to Wardani et al. (2016) explained that aprons are covering the chests of small children with clothes as a way to keep them clean. While thematic here means that in taking the theme. The themes used in early childhood education help develop knowledge and all aspects of child development, especially in children's cognitive development (Maryatun, 2017) . The theme used in this study is the theme of animals and plants. Based on this explanation, the thematic apron is an educational game medium in the form of an apron that is used to protect and cover from the top of the chest to the knees with various kinds of flannel and patchwork that is affixed to create different images and can later change or change themes according to the needs of the community children's needs.

Apron media includes the category of visual media in Educational Game Tools (EGT). The thematic apron media is good to be given to early childhood during learning activities. However, the learning can be adjusted to the child's interest in increasing the introduction of scientific literacy. The application of thematic apron media for children can learn while playing by developing aspects of cognitive development, physical-motor aspects and socio-emotional aspects. Educators easily apply learning through thematic apron media , this is because this thematic apron media can be used as a solution for interactive learning, so children will not get bored easily. The use of thematic apron media is expected to make the children interested in more fun learning activities in the introduction of scientific literacy. In addition, helping children to clarify the material or learning materials given to children.

Research by Purwasi & Yuliariatiningsih (2018) , in their research, they suggested that efforts to use serial image media to improve scientific literacy skills in early childhood have been successful and growing. The increase in scientific literacy skills in children increases based on the achievement of the indicators used in scientific literacy skills with the first cycle the average value obtained is 2.2. Then the average value of the second cycle is 2.99, and the average value of the third cycle is 3.48. Widiyana et al. (2021) explained in their research that the N-gain test in animation-based discovery learning was able to improve scientific literacy with an average score of 52%, and the effectiveness test showed an gain of 0.000 < 0.05, which was significant. In line with this opinion, Yusnia (2019) in her research stated that learning science literacy in children using video learning materials scribe is more involved in learning and is better able to understand the material, and has a greater enthusiasm for learning. Then further, research by ZR and Eliza (2021) in their research stated that based on the Minangkabau natural culture, the making of science book models for early literacy and character development was considered valid, practical, and effective for children. This opinion is further strengthened in research from Widayati, et al (2020) from their research explaining that the concept of scientific literacy from educational game tools in PP IPTEK TMII can develop developmental aspects, especially in the development of scientific literacy in children.

Based on the analysis of research by several previous relevant studies that the application of learning media is recommended to be used in stimulating children's cognitive development because it makes children imagine, explore and express in the introduction of scientific literacy. In addition, the availability of media can increasingly stimulate children related to knowledge and support the learning process. Thus, the application of the thematic apron media is useful for stimulating children's cognitive development in increasing the introduction of children's scientific literacy which shows that the improvement is with a high level of effectiveness and a significant increase.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Pretest	33	68	93	80.45	6.491
Posttest	33	113	136	122.94	6.123
Valid N (listwise)	33				

Table 1. Descriptive Data Analysis Results Statistics
Source: 2022 Research Data

Paired Samples Test									
Mean		Paired Differences					T	df	Sig. (2-tailed)
		Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
				Lower	Upper				
Pair 1	Pretest – Posttest	-42.485	9.021	1.570	-45.684	-39.286	-27.054	32	.000

Table 2. Test Results Paired Sample T-Test
Source : 2022 Research Data

From the table 1, it can be seen that the minimum value of pretest data is 68 and the minimum value of posttest data is 113. Meanwhile pretest data results score maximum get 93 and maximum posttest data results obtained 136. Furthermore, the pretest data has an average of 80.45, while the posttest data has an average of 122.94, while the standard deviation of the pretest data is 6.491 and the posttest standard is 6.123.

Table 2 contains about results from paired sample t-test show that t count of 27,054. Based on these data results indicate that the value of t value > t table is 27.054 > 2.03693, with a significance level of 0.000. Therefore, the fact that Ha is accepted while Ho is rejected indicates that children's scientific literacy increases significantly after being exposed to thematic apron media. The magnitude of the significance value (two sides) of 0.000 <0.05 indicates a significant difference. In addition, the difference in the average value (mean) obtained before and after treatment with thematic apron media shows this.

Pretest score 2655
Posttest score 4057
Ideal value : maximum score x number of respondents x number of questionnaires
: 4 x 33 x 39
: 5148

N-gain $: \frac{posttest\ score - pretest\ score}{ideal\ score - posttest\ score}$

N-gain $: \frac{4057-2655}{5148-4057}$

N-gain $: \frac{1402}{1091}$

N-gain : 1.28

Table 3. Interpretation Criteria on the Index

No	N-Gain Value	Criteria
1.	g < 0.3	Low
2.	0.70 g 0.30	Currently
3.	g > 0.70	Tall

The calculation of the n-gain test above is carried out to determine the effectiveness of the use of a particular treatment or treatment in research. It is known that the n-gain value from this study is obtained a value of 1.28. While in table 3 the interpretation criteria for the N-gain index describe that the thematic apron media is effective for increasing the introduction of scientific literacy in children with high effectiveness criteria.

The success in this research that has been achieved by researchers in increasing the introduction of scientific literacy can be seen in the enthusiasm and enthusiasm of children during learning activities while playing with the thematic apron media which is currently taking place. Learning activities in increasing the introduction of scientific literacy through the application of thematic apron media according to the researcher's plan from the beginning. Children feel free from coercion and pressure from outside in carrying out learning. This can be seen by children who are willing to repeat learning activities with thematic apron media. Based on the results and discussion described above, it can be said that the application of the thematic apron media in KB Dharma Wanita aged 3-4 years can be effective in influencing the introduction of scientific literacy by increasing and it can be seen that Dharma Wanita KB children are starting to dare to answer when asked and asking educators, children are able to understand and know how to stick and remove flannel images well, and children are calm and help when learning without their interlocutor.

CONCLUSION

Based on the research results, the thematic apron media proved to be effective from the n-gain test used to improve the introduction of scientific literacy in children with the n-gain test results obtaining a value of 1.28 which indicates that the effectiveness criteria are "high". Thematic apron media can be a solution for teachers, parents and further researchers to increase the introduction of other children's scientific literacy and various variations of themes or by adjusting the characteristics of children.

REFERENCES

Amir, Mohammad Fiazal Putri, RDKN (2021). Stages of Ability to Recognize Number Concepts Through Modified Apron Media for Children with Special Needs. Indonesian Journal of Education Methods Development , 14 (1), 1–16. https://doi.org/10.21070/ijemd.v14i.594

Arikunto, S. (2020). Arikunto 2020.pdf (18th ed.). PT Rineka Cipta.

Diana. (2013). Early Childhood Learning Models (IF Iriyanti (ed.); 1st ed.). Depublish.

Fatmawati and Putri, MY (2020). Improving Vocational Making Aprons Through Practice Rehearsal Pairs Method for Mild Mentally Impaired Children. Indonesian Journal of Instructional Technology , 1 (1), 62–68.

Gauvain, M., & Richert, R. (2016). Chapter 3 Cognitive Development. An Introduction to Educating Children , 1 , 317–323. https://doi.org/10.1016/B978-0-12-397045-900059-8

Handayani, PH, Marbun, S., & Srinahyanti, S. (2019). Validity of Science Literacy Oriented Teaching Materials for Early Childhood. Elementary School Journal , 9 (4), 327–334.

Handayani, Peny Husna;, & Srinahyanti. (2018). Early Childhood Friendly Science Literacy. Early Childhood Education Journal of Indonesia , 1 (2), 46–51.

Hewi, L., & Salih, M. (2020). Reflection on the Results of PISA (The Program For International Student Assessment): Improvement Efforts Rely On Early Childhood Education). Journal of the Golden Age , 4 (1), 30–41. https://doi.org/10.29408/jga.v4i01.2018

Hijriati. (2016). Stages of Cognitive Development in Early Childhood. Journal of Children's Education , 1 (2), 33–49.

Khaironi, M. (2018). Early Childhood Development. Journal of the Golden Age , 3 (1), 1–12. https://doi.org/10.29408/goldenage.v2i01.739

Kristyowati, R., & Purwanto, A. (2019). Learning Science Literacy Through Environmental Utilization. Journal of Education and Culture , 9 (2), 183–191. https://doi.org/10.24246/j.js.2019.v9.i2.p183-191

Maryatun, IB (2017). Development of Learning Themes for Kindergarten. Journal of Children's Education , 1 (1), 41–47.

Millah, S., Rubini, B., & Pursitasari, ID (2021). Analysis of the Science Assessment Items Using Scientific Literacy Competencies. Indonesian Education Ideas , 2 (1), 39–47. https://doi.org/10.30870/gpi.v2i1.10986

Nudiati, Deti & Sudiapermana, E. (2020). Literacy as a 21st Century Life Skill in Students. Indonesian Journal of Learning Education and Counseling , 3 (1), 34–40. https://doi.org/10.31960/ijolec.v3i1.561

OECD. (2019). PISA 2018 Results Combined Executive Summaries. PISA 2009 at a Glance , I , 1–31. https://doi.org/10.1787/g222d18af-en

Purwasi, N., & Yuliariatiningsih, MS (2018). Development of Early Childhood Science Literacy Through Storytelling Method Using Picture Series Media. Early Horizons: Journal of Early Childhood Education , 7 (2), 1–7. https://doi.org/10.17509/cd.v7i2.10531

Sugiyono. (2013). Quantitative, Qualitative, and Action Research Methods (19th ed.). Cv Alphabet.

Sujiono, YN (2013). Basic Concepts of Early Childhood Education (S. Bambang (ed.); Edition 8). PT Index.

Wardani, Fitria Esti, Purwati, S. (2016). The Effectiveness of Apron Stories Media to Improve Children's Speaking Skills (Research in KB Aisyiyah Mungkid Melati Putih subdistrict of Magelang Regency). Journal of Research & Educational Articles , 1 (1), 28–32.

Widayati, JR, Safrina, R., & Supriyati, Y. (2020). Analysis of Early Childhood Science Literacy Development through Educational Game Tools. Journal of Obsession: Journal of Early Childhood Education , 5 (1), 654–664. https://doi.org/10.31004/obsesi.v5i1.692

Widiyana, A., Situmorang, RP, & Tapilouw, MC (2021). Development of Animated Media-based Discovery Learning to Improve Scientific Literacy Content for Senior High School Students in Human Circulatory System Material. Journal of Science Education (Jps) , 9 (1), 69. https://doi.org/10.26714/jps.9.1.2021.69-80

Yusnia, Y. (2019). The Use of Video Scribe Media in Learning Science Literacy for PGPAUD Students. Journal of Early Childhood Education , 10 (1), 71–75.

Zr, Z., & Eliza, D. (2021). Development of Children's Science Books for Literacy and Character Recognition Based on Minangkabau Natural Culture. Journal of Obsession: Journal of Early Childhood Education , 5 (2), 1567–1577. https://doi.org/10.31004/obsesi.v5i2.896