Early Childhood Education Papers
Volume 14 Issue 2 Year 2025 Pages 101-108

P-ISSN 2252-6382| E-ISSN 2686-3375
https://journal.unnes.ac.id/journals/belia

Effectiveness of Early Childhood Fine Motor Stimulation Using Bubble Wrap at Kindergarten Terang Bangsa 02 Semarang.

Kristanti Dwi Naomi[1*], Edi Waluyo[2]

[1]TK Masehi PSAK Poncol
[2]Department of Early Childhood Teacher Education, Faculty of Education and Psychology, Universitas Negeri Semarang, Indonesia

*Correspondence to: *kristantidnao@gmail.com*

Abstract: Many people in Indonesia have a less caring attitude towards environmental cleanliness. Plastic waste is the largest waste produced by Indonesian people. One type of plastic waste is bubble wrap. So this type of plastic is basically usually used for educational needs, especially for early childhood. This research aims to find out whether the use of bubble wrap can stimulate children's fine motor skills at Kindergarten Terang Bangsa 02 Semarang. This research uses a pre-test and post-test experimental design. There were 12 trials in activities to stimulate fine motor skills in early childhood. The population in this study were children aged 4-5 years at Kindergarten Terang Bangsa 02 Semarang with a research sample of 27 students. The results of this study show that there is a level of effectiveness of fine motor stimulation using bubble wrap with the hypothesis HO being rejected and H1 being accepted. Then the percentage level of the N-Gain score is 58.48%, which means the score is between 0.3 ≤ g ≤ 7 which indicates the category is quite effective. In conclusion, the use of bubble wrap is quite effective in providing stimulation to the fine motor skills of young children at Kindergarten Terang Bangsa 02 Semarang.

Keywords: *Bubble Wrap, Early Childhood, Environment, Fine Motor, Garbage*

INTRODUCTION

Indonesia is the fourth largest country in the world. Located between 50 54' 08" North Longitude and 110 08' 20" South Longitude, as well as 950 00' 38" to 1410 01' 12" East Longitude with more than 17,000 islands spread from Sabang to Merauke (Sahamony et al., 2020). According to the Directorate General of Population and Civil Registration, Indonesia's population in 2023 will be 279,118,886 people. With a dense population in Indonesia, it is certain that there are various kinds of problems faced. The problems faced by Indonesian people are very diverse, namely economic, educational, social, cultural and also environmental problems (Kurniawati, 2022) .

The environment is a very basic aspect for the lives of living creatures in particular (Laily & Najicha, 2022). Environmental problems that occur in Indonesia greatly affect human survival because these problems arise due to human interaction with the surrounding environment which can have a negative impact on the ecosystem and human welfare. One example of the problems faced by Indonesian society is the waste problem.

Waste according to the Kementrian Republik Indonesia (2008) Kementrian Republik Indonesia (2008) Law Number 18 of 2008 Article 1 paragraph (1) states that "Trash is the remains of daily human activities and/or natural processes in solid form". Then, according to the Badan Standardisasi Nasional (2002) concerning Operational Technical Procedures for Urban Waste Management, it states that waste is waste that has solid properties and consists of organic and inorganic materials and is considered useless so it needs to be utilized so as not to have a negative impact on the environment. There are three types of waste, namely organic, inorganic, and B3 (Hazardous and Toxic Materials) (Taufik & Maulana, 2015). The following is the explanation:

1. **Organic waste**, is waste that comes from organic materials such as food waste, leaves and fruit. Usually organic waste can be used as compost through the composting process to produce organic fertilizer which is good for maintaining plant fertility (Jalaluddin et al., 2017).

2. **Inorganic or non-organic waste**, is a type of waste that does not come from organic material and usually takes a long time to decompose because it is hard and difficult to destroy. Examples of this type of waste are paper, plastic, metal, glass and electronic waste. However, because it is difficult to destroy, this type of waste has a lot of potential for recycling. For example, paper, metal, glass and electronic goods can be recycled into the same item, but the recycling process makes a new item, this reduces and saves natural resources and energy. In fact, the best impact is reducing environmental damage from hazardous waste. Apart from that, plastic waste can be recycled into new products such as bags from plastic packaging, then flower decorations from plastic bag waste and straws, and certain types of plastic waste can be used as materials in the world of education (Harimurti et al., 2020).
3. **Hazardous and Toxic Waste or commonly known as B3**, this type of waste contains many materials that are dangerous for the environment and also for human health. Examples of B3 waste include batteries, liquid paint and medicines. Unlike the other two types of waste, this type of waste tends not to be recycled because of its dangerous nature (Aini, 2019).

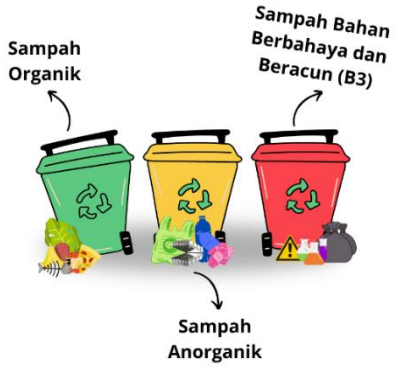

Fig. 1. Types of Waste

There is one type of inorganic waste that is often found in society, namely plastic waste. Plastic waste is a major problem faced by people in Indonesia. Based on data from the Indonesian Plastic Industry Association (INAPLAS) (Warta Geospasial, 2020) and the Central Statistics Agency (Statistik, 2022), Indonesia is the second largest contributor of plastic waste in the world (Priliantini et al., 2020). Around 62% of plastic waste in Indonesia comes from online shopping in e-commerce (Putri, Sari, & Marzuki, 2022). Indonesian people use around 182.7 billion or the equivalent of 1,278,900 tons of plastic bags every year (Making Oceans Plastic Free Data, 2017).

Bubble wrap is a type of material that was originally used as an ingredient in making 3D wallpaper that has a texture Kevin (2020). In general, bubble wrap is used to protect goods when shipping goods for online shopping. So this has resulted in an increase in the use of plastic waste due to the lifestyle of people in Indonesia creating an unexpected amount of waste. According to Joey Green, author of The Bubble Wrap Book, the two men were trying to develop a machine to produce plastic wallpaper from paper. Instead, their machine produces plastic sheets filled with air bubbles or bubble wrap (Auni, 2022).

In the world of education, plastic bubble wrap can be used as an alternative activity to stimulate fine motor skills in early childhood. The motor aspect is an individual's skill in controlling movement which requires coordination of the central nervous system and body muscles (Lestariningrum et al., 2020). The texture of bubble wrap plastic is different from other types of plastic by the presence of air bubbles on the surface of the plastic. Bubble wrap can be used to develop educational play equipment (APE) activities such as recognizing the texture of APE, squeezing activities, and sensory activities to stimulate children towards sound (Dewi, Rahman, & Loita, 2022).

Terang Bangsa Kindergarten 02 Semarang is a place for research regarding the use of bubble wrap as a material for stimulating fine motor skills in early childhood because many children aged 4-5 years at this school have not been able to reach fine motor standards in accordance with Minister of Education and Culture Regulation 137 of 2014 (Kemensesneg, 2014) The reasons for using bubble wrap as a fine motor

stimulation material are:

1. A type of plastic that has flexible properties and is made from polyethylene.
2. Has small air bubbles or bubbles found between the plastic layers.
3. Being a type of plastic that has an insulating and protective function from scratches, impacts and damage to packaged goods.
4. Although effective in protecting, bubble wrap is light and does not add significant weight to the items being protected.
5. Bubble wrap plastic can be recycled, although there are several types that are difficult to recycle because of the different layers.
6. Bubble wrap has the characteristics of being made from plastic which cannot rot, does not rust easily, and is impermeable to water.

Fig. 2. Bubble Wrap

With the many advantages of bubble wrap plastic, it is hoped that it can create fun activities and can have a good impact on the development of children's stimulation, especially fine motor skills. The family is an environment that has a lot of influence on children, so it has an important role in the development of early childhood abilities (Lestari & Waluyo, 2021).

There needs to be a theory underlying this research. A theory that can link the relationship between a child's surrounding environment and the child's abilities. The research theory used by researchers as a basis for conducting research comes from Elizabeth Hurlock's theory. According to (Suryana, 2015) in Hurlock's theory, development is a series of progressive changes resulting from the process of maturity and experiences experienced by a person. The existence of social influences and interactions with the environment greatly influences children's development. So in this case, the stimulation provided during the research will provide a special experience for the child and give rise to good stimulation for the development of the child's abilities, especially in fine motor skills. There are two factors that influence a person's development, namely internal and external factors. Hurlock stated that the cause of development in a person is because:

A. Marturion

It can be seen from physical and mental development which is basically innate and also from the experiences that children gain. Like maturity that occurs innately in the form of puberty transformation in children from toddlers to adults.

B. Study and practice (Learning)

The developments that occur in this stage can occur as a result of the learning process carried out by continuous practice.

C. Combination of maturity and learning (Interaction of Maturation and Learning)

In this case, maturity and learning or training do not occur separately, but simultaneously and are interrelated. Carrying out targeted exercises can produce maximum development according to the child's age.

From the explanation above, it can be understood that the social and educational environment can shape and stimulate children's special abilities. Family and community participation in developing children's potential and abilities needs to be implemented from an early age by providing children with

good educational activities (Waluyo et al., 2018).

The activities carried out refer to Minister of Education and Culture Regulation 137 of 2014 concerning Achievement of Early Childhood Motor Development. The following are the Motor Achievement Standards for Early Childhood Age 4-5 years:

Table 1. Child Achievement Levels

Scope of Development		Child Achievement Levels Age 4-5 Years
Fine Motor Skills	1.	Creative vertical, horizontal, curved right/left, and circle lines.
	2.	Trace a shape.
	3.	Coordinate hands and eyes to do complocated things.
	4.	Carrying out manipulative movements to produce a shape using various media.
	5.	Express yourself by creating art using various media.
	6.	Controls hand movements that use fine muscles such as picking, stroking, poking, clenching, twisting, and squeezing.

The stimulating activities carried out in this research were cutting, writing, coloring and merging. Effective and enjoyable learning is when the teacher able to design learning by actively involving participants during the learning process (Asmoro et al., 2023). All of these activities are packaged in fun learning which can be realized by stimulating children's fine motor skills using bubble wrap. So in this research the researcher will conduct an experiment using bubble wrap as the main ingredient in stimulating the fine motor skills of young children at Kindergarten Terang Bangsa 02 Semarang.

METHODS

The research method used in this research is quantitative. The research design used an experiment with pre-test and post-test actions carried out in one group with a control and experimental group without a comparison group (Sugiono, 2015). To measure children's fine motor skills, teachers provide an assessment before giving action. Then 12 actions were given to see whether there were differences before and after the actions were taken.

Table 2. One Group Pre-test Post-test Design

O_1 *X* O_2

This research was conducted on students of Kindergarten A Kindergarten Terang Bangsa 02 Semarang with a sample of 27 students. Children's fine motor skills are measured based on the developmental achievements of children aged 4-5 years Permendikbud 137 of 2014 (Amalia & Mayar, 2021).

RESULT AND DISCUSSION

1. Result Research

1.1 Effectiveness of Using Bubble Wrap on Children's Fine Motor Skills

The data normality test is carried out to determine whether the data from the research is normally distributed or not. The normality test in this study used the Shapiro-Wilk test because the amount of data

tends to be small to medium, namely only 27 samples.

Table 3. Tests of Normality

	Shapiro-Wilk		
	Statistic	Df	Sig.
Pre-test	.942	27	.133
Post-test	.938	27	.107

Based on the output results, the Sig value is known. in the Shapiro-Wilk test, namely > 0.05 with a Sig value shown. in the pre-test 0.133 > 0.05 and the Sig. in the post-test 0.107 > 0.05, it can be concluded that the research data is normally distributed. Then, after carrying out the data normality test, it is necessary to carry out homogeneity and hypothesis tests in comparing the test statistical values.

Next is the homogeneity test. The homogeneity test is a test that is usually carried out after the normality test to test whether the data in the study has the same variance or not.

Table 4. Tests of Homogeneity of Variances

		Levene Statistics	df1	df2	Sig.
Pre-test and Post-test	Based on Mean	1.589	4	11	.245

From the test of homogeneity table, it can be seen that the base of mean is 0.245, which means that this value has a Sig value. > 0.05. So from both data it can be said that the objects in the research have the same variance. So the conclusion from the normality test and homogeneity test that have been carried out can be said to have a normal distribution because both have a Sig value. > 0.05.

In this research hypothesis test, it is stated that the Sig. (2-tailed) which is 0.000 with the hypothesis Ho being rejected and H1 being accepted, because the Sig. 2 tailed 0.000 > than 0.05. Therefore, these results can be concluded that the use of bubble wrap in early childhood can stimulate fine motor skills in early childhood.

1.2 The Percentage Size Between The Use of Bubble Wrap on The Fine Motor Skills of Young Children

Based on the results of the N-Gain test, it can be seen that the value is 0.58, which indicates that the value is in the medium value category with the description of the N-Gain Score value being between 0.3 ≤ g ≤ 0.7. Then, if the N Gain Score (%) value is presented, it is 58.48%, which means that the N-Gain score category is quite effective in simulating fine motor skills in early childhood.

Table 5. N-Gain Test Results

	Pre-test	Post-test	Post-Pre test	N Gain Score	N Gain Score %
Mean	49,37	78,96	29,59	0,58	58,48%
Min	46	69	18	0,37	36,73%
Max	54	88	40	0,77	76,92%

2. Research Discussion

2.1 Effectiveness of Using Bubble Wrap for Early Childhood Fine Motor

In this research, to see if it is effective or not, it is necessary to test the hypothesis. Assuming that the Ho value is 0.05, then there is effectiveness in using bubble wrap for children's fine motor skills. Because the research carried out has a normal distribution, this can be proven by carrying out the Paired Sample t-Test and Paired Sample Test. From the results of the paired sample t-test, it can be seen that there is an average difference between the pre-test and post-test. In the pre-test score, it can be seen that the average value is 49.37, while in the post-test it is 78.96. So it can be seen that the post-test score > pre-test and shows that there are changes between before and after the treatment. Furthermore, the paired

sample test shows that the Sig. 2-tailed is 0.000 and shows that 0.000 > 0.05, which means that Ho is rejected and H1 is accepted. So there is effectiveness in using bubble wrap for children's fine motor skills.

2.2 The Percentage Size Between The Use of Bubble Wrap on The Fine Motor Skills of Young Children

The N-Gain test in this study obtained 58.48% of the lowest N-Gain score of 36.73% and the highest score of 76.92%. These results come from the average value of the N-Gain Score (%) which means that the N-Gain value is in the category of obtaining N-Gain values which is quite effective and the division of the N-Gain Score is 0.58 which shows that this value is in the medium value category with the translation of the N-Gain Score value being between 0.3 ≤ g ≤ 0.7. This value was obtained from obtaining pre-test and post-test data during research activities.

Thus, it can be concluded that the use of bubble wrap material is quite effective in stimulating fine motor skills in young children. So by using bubble wrap as a material to stimulate children's fine motor skills, it can be done and further developed so that in future research it can produce even more results to stimulate children's abilities, especially their fine motor skills.

CONCLUSION

This research shows the effectiveness of stimulating fine motor skills in early childhood using bubble wrap as the main ingredient. This is shown from several test results carried out, in the hypothesis analysis it states that H0 is rejected and H1 is accepted, which means that there is effectiveness in using bubble wrap in stimulating fine motor skills. The level of effectiveness of the research shows that it is in the quite effective or moderate category as proven by the results of the N-Gain Test which is at a value of 58.48%

REFERENCES

Aini, F. (2019). Pengelolaan Sampah Medis Rumah Sakit atau Limbah B3 (Bahan Beracun dan Berbahaya) di Sumatera Barat. *Jurnal Education And Development*, *7*(1), 1–12. http://journal.ipts.ac.id/index.php/ED/article/view/759

Amalia, W., & Mayar, F. (2021). Perkembangan Motorik Halus melalui Metode Finger Painting. *Jurnal Pendidikan Tambusai*, *5*(3), 9158–9162. https://www.jptam.org/index.php/jptam/article/view/2435

Asmoro, M., Setiawan, D., & Waluyo, E. (2023). Model NHT Berbantu DAVI dalam Meningkatkan Hasil Belajar Siswa SD. *Jurnal Penelitian Tindakan Kelas*, *1*(2), 114–123. https://doi.org/10.61650/jptk.v1i2.151

Auni, H. (2020). Fakta Unik Penemuan Bubble Wrap. Avaliable from Fakta Unik Penemuan Bubble Wrap - Lionel Cargo. https://lionelcargo.com/fakta-unik-penemuan-bubble-wrap/ (accesed 1 September 2024).

Badan Standardisasi Nasional. (2002). SNI 19-2454-2002 :Tata Cara Teknik Operasional Pengelolaan Sampah Perkotaan. *Standar Nasional Indonesia*, *ICS 27.180*, 1–31. http://portal.acm.org/citation.cfm?doid=1833349.1778770

Direktorat Jendral Kependudukan dan Pencatatan Sipil. (2023). Data Kependudukan. Avaliable from DITJEN DUKCAPIL KEMENDAGRI. https://dukcapil.kemendagri.go.id/page/read/data-kependudukan (accesed 1 September 2024).

Frisca Atriana Tungga Dewi, Taopik Rahman, A. L. (2022). Peningkatan Kreativitas Anak Melalui Aktivitas Mencetak Menggunakan Media Bubble Wrap Pada Kelompok B Di RA Padang Wulan Kecamatan Kedungreja Kabupaten Cilacap. *Jurnal Pendidikan Dan Konseling*, *4*. https://doi.org/https://doi.org/10.31004/jpdk.v4i4.6093

Harimurti, S. M., Rahayu, E. D., Yuriandala, Y., Koeswandana, N. A., Sugiyanto, R. A. L., Perdana, M. P. G. P., Sari, A. W., Putri, N. A., Putri, L. T., & Sari, C. G. (2020). Pengolahan Sampah

Anorganik: Pengabdian Masyarakat Mahasiswa pada Era Tatanan Kehidupan Baru. *Prosiding Konferensi Nasional Pengabdian Kepada Masyarakat Dan Corporate Social Responsibility (PKM-CSR)*, *3*, 565–572. https://doi.org/10.37695/pkmcsr.v3i0.883

Jalaluddin, J., ZA, N., & Syafrina, R. (2017). Pengolahan Sampah Organik Buah- Buahan Menjadi Pupuk Dengan Menggunakan Effektive Mikroorganisme. *Jurnal Teknologi Kimia Unimal*, *5*(1), 17. https://doi.org/10.29103/jtku.v5i1.76

Kemensesneg, R. (2014). Undang - Undang Nomor 35 Tahun 2014 tentang Perubahan Atas Undang – Undang Nomor 23 Tahun 2002 tentang Perlindungan Anak. *UU Perlindungan Anak*, 48. https://peraturan.bpk.go.id/Home/Details/38723/uu-no-35-tahun-2014

Kevin, C. (2020). Sejarah dan Fakta Unik Penemuan Bubble Wrap. Avaliable from Kevin, C. (2020). Sejarah dan Fakta Unik Penemuan Bubble Wrap. Avaliable from https://www.brilio.net/amp/creator/sejarah-dan-faktaunik-penemuan-bubble-wrap888f76.html (accesed 1 September 2024).

Kementrian Republik Indonesia. (2008). *UNDANG-UNDANG REPUBLIK INDONESIA NOMOR 18 TAHUN 2008 TENTANG PENGELOLAAN SAMPAH*. 1–46.

Kurniawati, F. N. A. (2022). Meninjau Permasalahan Rendahnya Kualitas Pendidikan Di Indonesia Dan Solusi. *Academy of Education Journal*, *13*(1), 1–13. https://doi.org/10.47200/aoej.v13i1.765

Laily, F. N., & Najicha, F. U. (2022). Penegakan hukum lingkungan sebagai upaya mengatasi permasalahan lingkungan hidup di indonesia. *Wacana Pararmarta*, *21*(2), 17–26. http://www.paramarta.web.id/index.php/paramarta/article/view/184

Lestari, N. A., & Waluyo, E. (2021). Pengaruh Lingkungan Keluarga Terhadap Pemenuhan Hak Bermain dan Hak Rekreasi. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, *6*(3), 1119–1132. https://doi.org/10.31004/obsesi.v6i3.1180

Lestariningrum, A., Isfauzi Hadi Nugroho, & Agustia Budiarti. (2020). Kegiatan Meremas Koran Dalam Mengembangkan Kemampuan Motorik Halus Anak Usia Dini. *Child Education Journal*, *2*(2), 106–113. https://doi.org/10.33086/cej.v2i2.1617

Making Oceans Plastic Free. (2017). The Hidden Cost of Plastic Bag Use and Pollution in Indonesia. Avaliable from The Hidden Cost of Plastic Bag Use and Pollution in Indonesia • Making Oceans Plastic Free. https://makingoceansplasticfree.com/hidden-cost-plastic-bag-usepollution-indonesia/ (accesed 1 September 2024).

Priliantini, A., Krisyanti, K., & Situmeang, I. V. (2020). Pengaruh Kampanye #PantangPlastik terhadap Sikap Ramah Lingkungan (Survei pada Pengikut Instagram @GreenpeaceID)
DOI: 10.31504/komunika.v9i1.2387. *Jurnal Komunika : Jurnal Komunikasi, Media Dan Informatika*, *9*(1), 40. https://doi.org/10.31504/komunika.v9i1.2387

Republik Indonesia. (2014). Undang-Undang Nomor 137 Tahun 2014 Tentang Standar Nasional Pendidikan Anak Usia Dini. Jurnal Educhild : Pendidikan Dan Sosial, 10(1), 6.

Sahamony, A. A., Muta'ali, L., & Mei, E. T. W. M. (2020). Tinjauan Geografis Wilayah Potensial Ibukota Negara Indonesia. *Jurnal Teknosains*, *10*(1), 86. https://doi.org/10.22146/teknosains.36756

Salma Amaliani Putri, Dewi Intan Sari, Khoirul Marzuki, A. T. (2022). Penerapan Design Thinking Eco-Boba dalam Pemanfaatan Limbah Cacahan Plastik dan Kemasan Paket E-commerce. *Journal of Technopreneurship on Economics and Business Review*, *3*(1), 58–68. https://jtebr.unisan.ac.id/index.php/jtebr/article/view/80.

Statistik, B. P. (2022). *STATISTIK*.

Sugiono. (2015). Metode Penelitian Metode Penelitian. *Metode Penelitian Kualitatif*, *17*, 43. http://repository.unpas.ac.id/30547/5/BAB III.pdf

Suryana, D. (2015). Pendidikan Anak Usia Dini Berbasis Psikologi Perkembangan Anak. *Jurnal*

PAUD, 24. repository.unp.ac.id/751/1/DADAN SURYANA_214_13.pdf

Taufik, A., & Maulana, M. F. (2015). Sosialisasi Sampah Organik dan Non Organik serta Pelatihan Kreasi Sampah. *Jurnal Inovasi Dan Kewirausahaan*, *4*(1), 68–73. https://journal.uii.ac.id/ajie/article/view/7898

Waluyo, E., Handayani, S. S. D., & Diana. (2018). Family and community participation in the development of early childhood education after the policy program of one village one ECE. *Ijeces*, *7*(2), 136–140. http://journal.unnes.ac.id/sju/index.php/ijeces

Warta Geospasial. (2020). Bahaya Sampah Plastik. *Warta Geospasial: Media Informasi Badan Informasi Geospasial*. http://ejurnal.ppsdmmigas.esdm.go.id/sp/index.php/swarapatra/article/view/43