

Designing of Wooden Toys as A Media to Introduce Letters and to Soft Motor Muscles for Early Children

Winarno¹, Hendro Aryanto², Nanda Nini Anggaalih³, Asidigisianti Surya Patria⁴, Nova Kristiana⁴, Winata Riang Saputra⁵

{winarno@unesa.ac.id¹, hendroaryanto@unesa.ac.id², nandaanggalih@unesa.ac.id³}

Universitas Negeri Surabaya^{1,2,3,4,5} PT. Gunung Mas Sumanco⁶

Abstract. In 2022, Indonesia gained global attention through active participation in the G20 summit, attracting investment interest. However, the country's low English proficiency, which ranks 81 out of 111 nations, poses a challenge to its global competitiveness. To address this, the Directorate General of Early Childhood Education, Elementary, and Secondary Education is committed to early bilingual alphabet introduction to enhance literacy. Proficiency in international languages is crucial for the rapid development of young children. An interactive bilingual alphabet book is proposed to aid comprehension and interest during early development, impacting a child's intelligence. The initiative aims to equip the younger generation for global opportunities by creating an interactive wooden toy, focusing on letter recognition, language learning which includes Indonesian and English, and refining fine motor skills in early childhood. The design methodology utilizes qualitative descriptive research and data triangulation. Test results and expert validation confirm the viability of this educational tool.

Keywords: alphabet, bilingual, early childhood, wooden toy.

1 Introduction

In 2022, Indonesia has shown rapid progress in attracting the attention of foreign countries to visit or even consider visiting. This can be seen from the success of the 2022 President of the G20 Indonesia, which succeeded in attracting interest from many developed countries. This provides a profitable opportunity for Indonesia's development, and it is hoped that its people will also grow in preparation for facing global opportunities. English language skills are emerging as a key factor in increasing workers' competitiveness, especially on the global stage [1].

However, the 2022 English Language Proficiency Index Report places Indonesia in 81st place out of a total of 111 countries surveyed, far behind neighboring countries such as Singapore and Malaysia. The population aged 18-20 years in Indonesia shows a much lower level of ability

compared to the age group 26-30 years in the capital [2]. This indicates that the development of English language skills in Indonesia has not occurred consistently throughout childhood and education, but rather when entering the world of work in urban areas. This indicates that the development of English language skills in Indonesia does not occur throughout children's growth and development until school, but rather when they enter the world of work in big cities.

In order to support the Alpha generation so that they can take advantage of global opportunities optimally, the Directorate General of Early Childhood Education, Primary School and Secondary Education under the Ministry of Education, Culture, Research and Technology is also committed to increasing literacy, interest in reading, and reducing levels of illiteracy in Indonesia [3]. This reflects the urgency to introduce bilingual alphabet literacy more intensively from an early age. Bilingual skills in passive and active terms, especially in international languages, are an obligation that Indonesian people must have in order to be able to support life's needs in the future. This also applies to early childhood, where during this age period, humans have the potential for more rapid development [4]. Early childhood children aged 0-6 years need interactive and effective media to improve language skills.

Approximately 50% of an adult individual's intelligence abilities have been formed by the age of 4 years, indicating that most human intelligence develops during childhood [5]. The sooner children acquire bilingual skills, the more educational, social, economic, and cultural opportunities they will have in the future. However, in current conditions, many of the books provided by schools do not attract children's interest in learning, so they have the potential to make children feel bored due to monotonous learning activities. Therefore, an interactive bilingual alphabet character introduction book is needed to help early age learners learn and understand the alphabet more quickly, thereby increasing their interest in learning. This can contribute to children's education, especially since the majority of them today require references in English.

The development process in children involves the development of fine motor skills, gross motor skills, language, and social behavior or adaptation [6]. To train children's fine motor skills, play tools such as blocks, balls or pencils can be used [7]. Toys are made from various materials, one of which is wood. Wooden toys have the advantage of being more environmentally friendly, minimal chemicals and sustainable.

The production of bilingual Alphabet Early Childhood Education wooden toys is expected to increase the effectiveness of learning activities for PAUD students in understanding letters and increase reading literacy rates in Indonesian society. This effort can support Indonesia to start getting its people used to having a pleasant perception of reading activities. Based on the background stated above, the aim of the research are: 1) Describe the results of the design concept for wooden alphabet toys. 2) Describe the process of designing wooden alphabet toys.

2 Literature Review

The Directorate of Early Childhood Education emphasizes that early childhood is a part of early childhood education, which is terminologically referred to as the pre-school age (Golden Age). During this period, there is a maturation of physical and psychological functions that are ready to respond to stimuli provided by the environment. This period is a time to lay the first

foundation in developing physical, cognitive, language, art, social-emotional, self-discipline, religious values, self-concept, and independence abilities. Children require educational stimulation appropriate to their development and potential.

Letter introduction media based on the Indonesian language for early childhood education have been created in various non-digital formats, such as flashcards, [8], busy book [9], big books [10], and spinning wheel games [11]. Meanwhile, in digital formats, they include animation videos [12], educational games [13] and augmented reality [14].

Wooden language learning toys on the market are primarily focused on introducing letters and words in a monolingual context, either in Indonesian or English. The following is an example of a wooden toy introducing letters in English.



Fig. 1. Wooden toy



Fig. 2. Wooden toy with a combination of flashcards

The letter introduction media using bilingual (two languages) in both Indonesian and English for early childhood education already exist in the form of books [15] and play mat [16]. . Apart from non-digital formats, bilingual letter introductions for early childhood education are also carried out in digital formats, such as through websites [17] and using augmented reality [18].

Wooden toys have great potential as tools to introduce letters bilingually to children in a fun and interactive way. It is acknowledged that there is still a shortage in the availability of wooden toys that use two languages, namely Indonesian and English. Therefore, this research aims to fill this gap by designing wooden toys that use two languages or bilingual, so that young children can learn both Indonesian and English simultaneously. Thus, it is hoped that young children can learn while playing and gain a deeper understanding of words in both Indonesian and English.

The relevant research that has been carried out is research entitled "Visual Design of the Block Game "Kajeng Bisu" with Javanese Culture for the Education of Deaf Children" (Wardhani, Harnoko and Utomo, 2022). This research developed an educational toy that aims to provide support to deaf children who have not fully mastered sign language or the alphabet. The approach used in this research is to use the 5 phase design method developed by Robin Lamda.

The research is entitled "Designing Toys for Children Aged 3-6 Years Based on the Montessori Education Method" (Permana and Djatmiko, 2021). This research focuses on developing educational toys made of wood, which are designed to introduce and train children aged 3-6 years in counting skills. This toy is designed using an attractive combination of colors and design shapes. The method applied in this research is the double diamond approach.

Another relevant research is research entitled "Designing Alphabet Teaching Aids as a Medium for Recognizing Letters for Children" (Sujarnoto, 2015). This research focuses on developing an educational toy made from paper, with the aim of helping children recognize and arrange letters. In this research, the design approach involves the use of color variations and interesting illustrations. In its implementation, this research applies the design and construction method by considering design elements.

The research is entitled "Development of Designs for Educational Wooden Toys for Preschool Children with the Theme of Endemic Kalimantan Fauna" (Pahlevy and Mardiana, 2021). The focus of this research is to develop educational toys made of wood, with the aim of introducing and training preschool children in cognitive skills and knowledge about the endemic fauna of Kalimantan. This toy combines colors and attractive design shapes using a disassembly game model that represents endemic Kalimantan animals, by matching and arranging pieces of the animal's body parts to form a whole animal. The method used in this research is a qualitative approach with quantitative data as support. The method applied in this research is a qualitative method with supporting quantitative data.

The research is entitled "Design of Wooden Educational Toys for 3 Year Old Children" (Agustrian and Setiawan, no date). The aim of this research is to develop educational toys made of wood that are able to follow children's movements and help train children's thinking skills. Additionally, this toy is designed so that it can be played by more than one child at the same time. This toy combines a combination of colors and attractive design shapes, using a game model of arranging and installing colorful blocks with additional wheels so that they can move when pulled using a rope. The method used in this research is a design method inspired by the double diamond method which emphasizes children as users.

Play equipment must be produced with children's safety in mind, so that it does not cause injury or threat to their lives. Therefore, the materials used must comply with safety standards and be free from harmful chemicals. Children do not yet have the ability to differentiate between good and bad things, so play equipment has the potential to be eaten, kissed or licked. Material sources must also be easy to obtain, there are learning resources that are naturally available from the environment or learning resources by utilization such as wood, leaves, bamboo and the like. This natural material can be used as the main ingredient in developing learning resources. To stimulate and advance early childhood intelligence, especially linguistic or language intelligence, educational toys such as story books or letter puzzles can be used (Qadafi, 2021).

It is important for APE to prioritize security and safety aspects, namely by ensuring that the materials used are not rough, do not have sharp edges, do not use toxic paint, have adequate strength, are durable, and are easy to store. Apart from that, the game equipment chosen must also support environmental sustainability and energy efficiency (Direktorat Pendidikan Anak Usia Dini, 2021). By considering this explanation, it can be concluded that wood is a very appropriate and suitable choice for use in playing equipment.

3 Research Methods

In this research, a descriptive qualitative approach was used with the application of data analysis through the data triangulation approach developed by Miles and Huberman. Qualitative research is a type of research that produces findings through the stages of data collection, data analysis and data interpretation [19]. Research design begins with data collection steps, followed by analysis, drawing conclusions, developing creative ideas, visualization, validation, and testing.

The aim of the data collection process is to obtain related information, which will later be analyzed using qualitative methods through the data triangulation technique introduced by Miles and Huberman. The data triangulation approach by Miles and Huberman is a method used to analyze data that has been found through three stages, namely data reduction or filtering essential and relevant information, compiling data or organizing information that has been filtered in narrative form, and finally drawing conclusions [20].

In the planning stage, information is needed regarding materials and concepts related to wooden toys. This data was obtained through observations at PAUD TK Labschool, Surabaya State University and PT. Mount Mas Sumanco. Apart from that, interviews were conducted with Erna who serves as the school principal, Ira who is a teacher at PAUD TK Labschool Surabaya State University, and Winata who is the owner of PT. Mount Mas Sumanco. In the design process, collaboration was carried out with a team of writers, translators and editors who have special expertise in the bilingual field, especially in the children's story book category.

Validation of the wooden toy design prototype will be carried out by involving the teacher community at PAUD institutions. The validation process continues until the wooden toy design results receive accurate validation. The implementation of this design was also tested with the aim of measuring the effectiveness of the wooden toy. The trial was implemented in PAUD communities in the Surabaya area. The analysis approach chosen was a qualitative approach that relied on assessment indicators based on children's responses and understanding while interacting with bilingual wooden toy designs. The implementation of this design will also be tested with the aim of measuring the effectiveness of the wooden toy. The trial will be implemented in PAUD communities in the Surabaya area. The analysis approach chosen is a qualitative approach that relies on assessment indicators based on children's responses and understanding while interacting with bilingual wooden toy designs.

Validation by media experts has been carried out on three media validators from school principals and kindergarten teachers and PAUD mothers, namely Mira Ekawati, Siti Asiah, and Puspita Ayuningtyas Prawesti. In the validation process, a Likert scale was used which had been adapted to the assessment qualification criteria which included a very good level of 4 points, a good level of 3 points, a poor level of 2 points, and a very poor level of 1 point.

4 Results and Discussion

In the teaching approach in "Learning by Fun" which is based on the environment and local wisdom. This approach aims to avoid boredom and encourage children's creativity. Even though steps to reduce the use of plastic toys in schools have been implemented, there are some wooden toys that are still considered less attractive compared to plastic toys. However, children tend to be more interested in block toys made of wood compared to those made of plastic.

4.1 Design Concept

This wooden alphabet toy has a cheerful and fun concept which is realized by using colorful and adorable visuals. This toy will utilize words that are commonly used in everyday life, and will present words that have similarities in pronunciation and meaning between Indonesian and English, with the aim of making it easier for children to understand and learn both. language at once. This toy will be supported by illustrations of objects that are familiar to children in adorable visuals and full of cheerful colors. This wooden toy will also have three-dimensional components in the form of colorful alphabet letters. The font used in this toy is a san serif font. This wooden toy is realized in the form of two alternative wooden toy designs.

4.2 Materials and Substances

The material used in making this wooden alphabet toy is rubber wood. This decision was based on the consideration that rubber wood has a higher density so it will not change shape or be damaged when dropped or hit. Despite its high density, rubber wood is light in weight, making it very suitable for use by children. This wooden toy has a height and width of 20 cm each. Meanwhile, the wooden alphabet blocks have a height of 5 cm.



Fig. 3. The Wooden Material of The Alphabet Wooden Toy

4.3 Alternative Design

The first visual design aspect of Wooden Toys Alphabet includes the illustration style used in this wooden alphabet toy, namely an illustration style that is adorable but simple and can be easily understood because it maintains the basic shape of the object, supported by block coloring and bold colors. The color palette choices include a mix of bright, strong and striking colors, aimed at attracting the attention of young children. The color palette used consists of a variety of striking colors such as a rainbow.



Fig. 4. Color Palette First Wooden Toys Alphabet Design

The letters used in this wooden alphabet toy are a colorful san serif font type, namely a font that does not have hooks or tails at the ends. This type of font was chosen because it is easy to read, making it easier for PAUD children to understand the text. Apart from that, the font used is also given bold thickness to make it easier for PAUD children to focus on the letters. The layout used adjusts the empty space in the illustration, so that there is a left-aligned or right-aligned layout. Each illustration is accompanied by text in Indonesian and English which is placed at the bottom or top of the illustration.



Fig. 5. Typography and Layout First Wooden Toys Alphabet Design

The first design of the wooden alphabet toy used a combination of bright, deep and striking colors in the color palette, with the aim of easily attracting the attention of preschool children. Illustrations of adorable objects are accompanied by text in Indonesian and English placed at the bottom of the illustration. The type of typography used is a bold, colorful san serif font. Below is a picture of a wooden toy. This toy has dimensions of approximately 20 cm in height and width. Meanwhile, the colorful alphabet blocks have a height of about 5 cm.



Fig. 6. First Wooden Toys Alphabet Design

The second visual design aspect of Wooden Toys Alphabet includes the illustration style used in this wooden alphabet toy, namely an illustration style that is adorable and has a fantasy impression with illustrations of visual objects made to resemble humans with facial expressions and feet. This is reinforced by the use of soft block colors and a circle background. The chosen color palette consists of a mixture of soft, sweet and calming pastel colors, aimed at attracting the attention of young children.



Fig. 7. Color Palette Second Wooden Toys Alphabet Design

The letters used in this wooden alphabet toy are a black san serif font with regular thickness and uppercase, the san serif font does not have hooks or tails at the ends. This type of font was chosen because it is easy to read, making it easier for PAUD children to understand the text. The layout used is a center aligned layout. Each illustration is accompanied by text in Indonesian and English which is placed at the bottom of the illustration.



Fig. 8. Typography and Layout Second Wooden Toys Alphabet Design

The second design of the wooden alphabet toy uses a combination of bright and soft colors to attract the attention of preschool children. Illustrations of objects made to resemble humans with

facial expressions, feet and hands displayed in an adorable style accompanied by text in Indonesian and English placed at the bottom of the illustration with a center-aligned layout. The type of typography used is a black regular san serif font. This toy has dimensions of approximately 20 cm in height and width. Meanwhile, the colorful alphabet blocks have a height of about 5 cm.

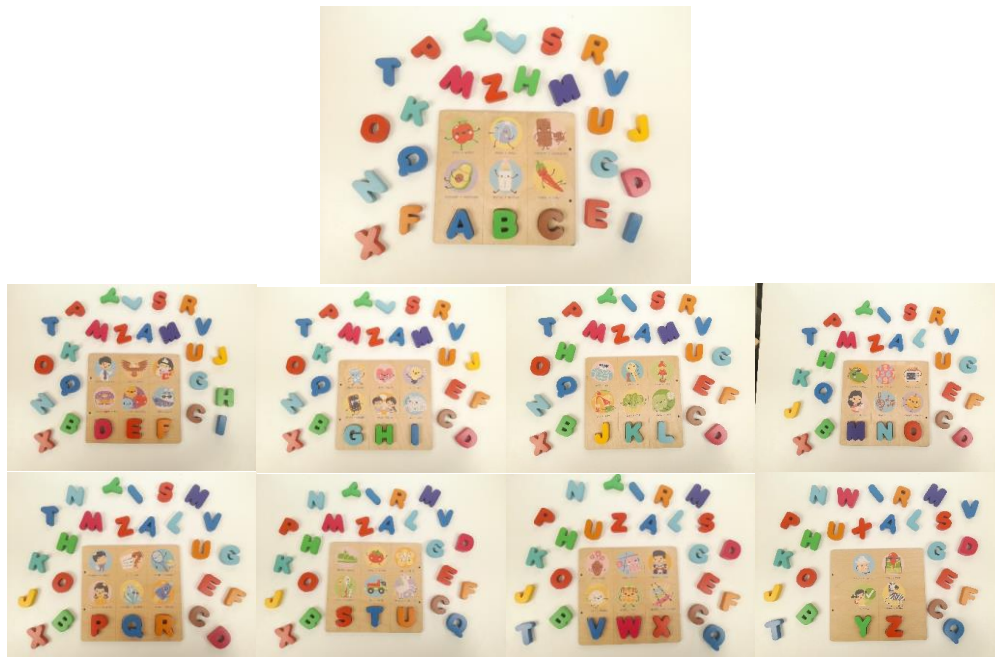


Fig. 9. Second Wooden Toys Alphabet Design

4.4 Expert Validation

4.4.1 First Design

Validation of the first design of the wooden alphabet toy by media experts was carried out with three media validators, namely Mira Ekawati, Siti Asiah, and Puspita Ayuningtyas Prawesti. The first validator stated that 92% of this toy was in accordance with the indicators, while the second validator stated 90% and the third validator 82%. Overall, the three validators show an average accumulated value of 88%. Overall, the validation results produced a very good assessment, but there was an evaluation of increased clarity in the instructions for using the wooden alphabet toy. From these data, it can be concluded that this wooden alphabet toy is considered appropriate and successful in facilitating fine motor development in preschool age children. This can be interpreted as meaning that this wooden toy complies with the Educational Game Equipment (APE) standards.

Table 1 . Media Validation Results Wooden Toys Alphabet First Design

Criteria	No.	Indicator	Mark		
			V1	V2	V3
A. Ease and Simplicity of Design	1.	Ease of use	4	4	4
	2.	Simplicity of design	4	4	4
	3.	Clarity of instructions for use	-	3	-
	4.	Clarity and legibility of letters	4	4	3
B. Multifunction	5.	Useful for playing and learning	4	4	3
C. Uniqueness	6.	The uniqueness of the APE shape	3	4	3
D. Attractiveness	7.	The color composition used	4	3	4
	8.	Illustrative images used	4	3	4
	9.	The size of the letters used	4	4	3
	10.	The type of letters used	4	4	4
E. Size	11.	Big APE	4	4	4
	12.	APE weight	3	3	3
	13.	Wood Size	4	3	3
F. Durability	14.	Materials used in making APE	4	3	4
G. Need	15.	Suitability to children's needs during playtime	4	4	3
H. Security	16.	Materials used	4	3	4
I. Togetherness	17.	Encourage children to play together	4	4	3
J. Fantasy	18.	Develop children's fantasy	4	4	3
Total			66	65	59
Percentage			92%	90%	82%
Average			88%		

From the validation test, there are several reviews and other constructive input, such as the position or layout of the writing should be in harmony, it is better to use lighter materials, the illustrations are visualized cheerfully so they can influence children's emotions, the size of the letters used is not big enough, the shape of the toy is unique, it will be more It is good if it is equipped with audio and is developed in the form of a game on the Play Store, the cover has a picture and an opening picture.

4.4.1 Second Design

Validation of the second design of the wooden alphabet toy by media experts was carried out with three media validators, namely Mira Ekawati, Siti Asiah, and Puspita Ayuningtyas Prawesti. The first validator stated that 86% of this toy was in accordance with the indicators, while the second validator stated 86% and the third validator 74%. Overall, the three validators

show an average accumulated value of 88%. The results of the validation process produced a fairly good assessment, but there was an evaluation of increased clarity in the instructions for using the wooden alphabet toy and the uniqueness of the shape of the wooden alphabet toy. The results of the validation process involving three media validators show an average accumulated value of 81%. From these data, it can be concluded that this wooden alphabet toy is considered appropriate and quite good in facilitating fine motor development in preschool age children.

Table 2 . Media Validation Results Wooden Toys Alphabet Second Design

Criteria	No.	Indicator	Mark		
			V1	V2	V3
A. Ease and Simplicity of Design	1.	Ease of use	4	4	3
	2.	Simplicity of design	3	4	4
	3.	Clarity of instructions for use	4	-	-
	4.	Clarity and legibility of letters	4	4	2
B. Multifunction	5.	Useful for playing and learning	4	4	3
C. Uniqueness	6.	The uniqueness of the APE shape	-	4	3
D. Attractiveness	7.	The color composition used	2	3	3
	8.	Illustrative images used	3	3	2
	9.	The size of the letters used	3	4	2
E. Size	10.	The type of letters used	4	3	2
	11.	Big APE	4	4	4
	12.	APE weight	4	3	4
F. Durability	13.	Wood Size	3	2	4
	14.	Materials used in making APE	4	4	4
G. Need	15.	Suitability to children's needs during playtime	4	4	4
H. Security	16.	Materials used	4	4	3
I. Togetherness	17.	Encourage children to play together	4	4	3
J. Fantasy	18.	Develop children's fantasy	4	4	3
Total			62	62	53
Percentage			86%	86%	74%
Average			81%		

From the validation test, there are several reviews and other constructive input, including, the color composition used is not bright, thick and striking, the font size is too small and without color, writing should only use capital letters at the beginning of sentences, the wood used should be thicker, illustrations are not cute enough, and illustrations must be without backgrounds so that PAUD children can focus better. This wooden alphabet toy should also be designed to be lighter, with wood that is not sharp, and ideally finished or coated with varnish. In addition, it is recommended to develop these wooden toys through games, applications and audio.

From these two validation results, it can be concluded that the design of the first wooden alphabet toy received a higher score than the second toy based on standards and effectiveness as a medium for recognizing letters and training fine motor skills for PAUD age children compared to the design of the second wooden alphabet toy.

5 Conclusions

This wooden alphabet toy has been conceptualized using frequently used everyday words, which have similarities in pronunciation and meaning between Indonesian and English. This toy is equipped with commonly recognized and visually attractive visual images, uses bright colors, and is made from sturdy but light rubber wood. The design process involves several steps, including data collection, data analysis, visualization, validation stages, and testing. From the test results, it can be concluded that the first design of the wooden alphabet toy meets the standards and is proven to be effective in supporting fine motor development in preschool age children.

References

- [1] M. R. Gumilang, "Manfaat Presidensi G20 Bagi Indonesia," *www.djkn.kemenkeu.go.id*, 2022. .
- [2] S. Joewono, "Kemampuan Berbahasa Inggris Warga RI Berada di Urutan Ke 81 dari 111 Negara, Bukti Kurang Fasih?," *ussfeed.com*, 2022. .
- [3] Kemdikbud, "Komitmen Kemendikbudristek dalam Penuntasan Buta Aksara di Indonesia," <https://www.kemdikbud.go.id/>, 2021. .
- [4] Kemdikbud, *Perkembangan Anak Usia Dini Modul 2*. Kemendikbud, 2020.
- [5] H. Widodo, *Dinamika Pendidikan Anak Usia Dini*. Semarang: ALPRIN, 2019.
- [6] A. A. Hidayat, *Pengantar Ilmu Kesehatan Anak Untuk Pendidikan Kebidanan*. Jakarta: Salemba Medika, 2008.
- [7] J. Simanjuntak, *Setiap Anak Bisa Pintar: Prinsip Dan Metode Pembelajaran Terarah Bagi Anak Berkesulitan Belajar*. Yogyakarta: Penerbit ANDI, 2012.
- [8] Dzulkifli, U. M. Maulidiyah, and A. D. Arumsari, "Alat permainan edukatif flashcard alfabet sebagai media pembelajaran untuk anak usia dini," *Motoric*, vol. 6, no. 1, pp. 344–350, 2022.
- [9] M. Karmeliya Firdaus and D. Ayu Puteri Hadayani, "Meningkatkan kemampuan mengenal huruf anak usia dini melalui media busy book 3D," *J. Pendidik. Anak Usia Dini Undiksha*, vol. 9, no. 1, p. 53, 2021, doi: 10.23887/paud.v9i1.35719.
- [10] Y. Wahyuningsih, N. Harsono, and R. Setyaningsih, "Big book bilingual budaya lokal sebagai media pembelajaran pada peningkatan literasi budaya anak Sekolah Dasar," *Pros. Semin. Nas. Pendidik.*, vol. 1, pp. 669–677, 2019, [Online]. Available: <https://prosiding.unma.ac.id/index.php/semnasfkip/article/view/98>.
- [11] Sujarnoto, "Perancangan Alat Peraga Alfabet Sebagai Media Pengenalan Huruf Kepada Anak-Anak," 2015.
- [12] A. Faris and A. F. Lestari, "Rancangan animasi pembelajaran interaktif alfabet pada Pendidikan Anak Usia Dini," *J. Tek. Komput. AMIK BSI*, vol. II, no. 1, pp. 59–67, 2016, [Online]. Available: <https://ejournal.bsi.ac.id/ejournal/index.php/jtk/article/download/363/272>.
- [13] E. Erianto, W. Hadikrisanto, and S. Suherman, "Game edukasi pengenalan huruf alfabet sebagai media pembelajaran untuk anak usia dini," *J. Ilm. Intech Inf. Technol. J. UMUS*, vol. 4, no. 02, pp.

200–206, 2022, doi: 10.46772/intech.v4i02.871.

[14] R. Fernandika, E. M. A. Jonemaro, and ..., “Aplikasi Edukasi Pembelajaran Interaktif Alfabet Anak menggunakan Teknologi Augmented Reality,” ... *Teknol. Inf. dan ...*, vol. 6, no. 10, pp. 4811–4819, 2022, [Online]. Available: <https://j-ptiik.ub.ac.id/index.php/j-ptiik/article/view/11695>.

[15] M. Zhou and D. Brown, *Educational Learning Theories: 2nd Edition*. GALILEO, University System of Georgia, 2015.

[16] S. S. Rahayu, “Inovasi playmate bilingual untuk anak usia dini,” *Direktorat Guru Pendidikan Anak Usia Dini dan Pendidikan Masyarakat Direktorat Jenderal Guru dan Tenaga Kependidikan Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi*, 2023. <https://gurupauddikmas.kemdikbud.go.id/artikel/Artikel/inovasi-playmate-bilingual-untuk-anak-usia-dini>.

[17] W. Yuliyanti, Fathurrahmani, and Apriliyana, “Aplikasi media belajar menulis huruf dan angka bilingual berbasis web,” *J. Hum. Teknol.*, vol. 8, no. 1, pp. 29–38, 2022, doi: 10.34128/jht.v8i1.107.

[18] D. H. Yusuf, A. P. Kurniawan, and A. Sularsa, “Pembelajaran alfabet bilingual berbasis augmented reality,” in *Proceeding of Applied Science*, 2020, vol. 6, no. 2, pp. 2707–2714.

[19] A. Anggito and J. Setiawan, *Metodologi penelitian kualitatif*. Sukabumi: Jejak Publisher, 2018.

[20] W. Hamsia, V. A. C. Erydani, K. D. A. Afian, W. Suweleh, N. Sa’ida, and M. N. Faradita, *Inovasi Pendidikan dan Pembelajaran Abad 21 serta Biodiversitas Indonesia*. Surabaya: UM Surabaya Publishing, 2022.

[21] “15 Kelebihan Mainan Kayu,” *mainankayu.com*, 2020. <https://mainankayu.com/75/artikel-terbaru/Dec2022/15-kelebihan-mainan-kayu-.html>.

[22] M. Agustrian and S. Setiawan, “Perancangan Mainan edukasi berbahan kayu untuk anak usia 3 tahun,” in *e-Proceeding Fakultas Arsitek dan Desain ITN*, 2020, pp. 3–14, [Online]. Available: <https://eproceeding.itenas.ac.id/index.php/fad/article/view/1099>.

[23] M. Qadafi, *Pengembangan Alat Permainan Edukatif Untuk Pendidikan Anak Usia Dini*. Mataram: Sanabil, 2021.

[24] Direktorat Pendidikan Anak Usia Dini, *Panduan APE Aman Bagi Anak Usia Dini*. Jakarta: Direktorat Pendidikan Anak Usia Dini Direktorat Jenderal Pendidikan Anak Usia Dini, Pendidikan Dasar, dan Pendidikan Menengah Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi, 2021.

[25] Y. D. Rovita, “Perancangan mainan edukasi untuk menstimulasi motorik halus anak usia 4-6 tahun,” in *e-Proceeding of Art & Design*, 2019, vol. 4, no. 3, pp. 1550–1557.