

Pompom Box Toy to Develop Numeracy Skills in Early Childhood

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Abstract: Play supports the development of children's personalities and essential competencies. The study aimed to develop the pompom box toy to build numeracy skills and investigate psychological and sociological aspects in facilitating the improvement of summation literacy in early childhood. The research employed mix method with the Rowntree model and Tessmer formative evaluation. The Observation was used to collect the data. The results prove that the number addition operation game tool (1-10) in group B children in kindergarten is valid and practical. Its practical value reaches 93.5, with an efficient category based on the child's ability indicator. The child can say number symbols (1-10), and can use the play tool easily. Pompom box learning results in the increase of summation literacy and the development of aspects of early childhood psychology and sociology. The study suggests the exploration of other models of the game, which may give positive impacts on the growth of their attitude, knowledge, and skills.

Keywords: early childhood; numeracy skill; pompom box toy; psychological; sociological

Abstrak: Bermain mendukung pengembangan kepribadian dan kompetensi penting anak-anak. Studi ini bertujuan untuk mengembangkan mainan kotak pompom untuk membangun keterampilan numerasi dan menyelidiki aspek psikologis dan sosiologis dalam memfasilitasi peningkatan keterampilan summasi pada masa kanak-kanak. Penelitian ini menggunakan metode mix dengan model Rowntree dan evaluasi formatif Tessmer. Observasi digunakan untuk mengumpulkan data. Hasilnya membuktikan bahwa alat permainan tambahan angka (1-10) di kelompok B anak-anak di taman kanak-kanak valid dan praktis. Nilai praktisnya mencapai 93,5, dengan kategori efisien berdasarkan indikator kemampuan anak. Anak dapat mengatakan simbol angka (1-10), dan dapat menggunakan alat bermain dengan mudah. Pembelajaran kotak Pompom menghasilkan peningkatan literasi summasi dan perkembangan aspek psikologi dan sosiologi masa kanak-kanak awal. Studi ini menyarankan eksplorasi model permainan lainnya, yang dapat memberikan dampak positif pada pertumbuhan sikap, pengetahuan, dan keterampilan mereka.

Kata Kunci: anak usia dini; kemampuan penjumlahan; alat permainan pompom box; psikologis; sosiologis

A. Introduction

Eating, loving, and playing are the three things a child needs most. First, food is the source of everything; we are what we eat. Our brains need food. Our brain determines the foundation of our future: that process will determine how we think, feel, plan, absorb and remember. Second, love. Love is invisible but perceived; it is not a house, toys, food, drinks, or medicine. But love is priceless because, without love, we cannot nurture. Last is playing. Playing is also essential for the child. Play is happiness; through it, a child can be as accessible as possible.¹

Today's children do not necessarily have to learn. They also have to be invited to play more. Because by playing, these parents can train the child's imagination and make the child creative. When kids play, they don't just play. As they play, they learn about their bodies, how to interact with each other, and how to collaborate, negotiate, resolve conflicts, and defend their opinions.² Play supports children in growing up, being independent, and controlling their environment. Not only that, by playing, children can discover new things, explore, imitate, and practice daily life as a step in building their helping skills. Play is a child's job.

Each game has its characteristics. Different game styles will develop unique personality types. The more children play, the more their personalities develop, and they can simultaneously learn to develop essential competencies to become adults. However, if playtime is limited or adults determine children's activities, it could be at the expense of their mental health, as children cannot develop their essential competencies optimally.

Research shows that children today are more likely to experience anxiety, depression, feelings of helplessness, and insecurity. All of them have to do with decreased children's play activities and increased parents' monitoring or arrangement of children's activities. Children who are experiencing the process and development of their intelligence continue to

¹ Laksmi Pamuntjak, "Refleksi dari KHA Pasal 31 (Anak Berhak Beristirahat dan Bermain)," UNICEF Indonesia, November 13, 2019, <https://www.unicef.org/indonesia/id/stories/refleksi-dari-kha-pasal-31>.

² Nuri Kara and Kursat Cagiltay, "Smart Toys for Preschool Children: A Design and Development Research," *Electronic Commerce Research and Applications* 39 (2020): 100909, <https://doi.org/10.1016/j.elerap.2019.100909>.

develop.³ Therefore, it needs to be supported in every child's step to develop their abilities.⁴

Early childhood is an individual who has a time from birth to the age of six years who is undergoing rapid development and the basis for future life.⁵ Children aged 5-6 years are vulnerable, including Piaget's preoperative stage. The child is egocentric at this age. The ability to associate something with him, active in doing activities, improved language development, children's play is still individual even though done together, and high curiosity.⁶ Since birth, every child has had different intelligence and uniqueness. Intelligence can solve problems, and each child has another way of thinking in building new experiences. One of the intelligences is the intelligence of mathematical logic. Mathematical logic intelligence is essential for stimulation because mathematical logic intelligence demands the child to think logically, from a logical thought that will produce a thought or idea that others can receive.⁷

Children with mathematical logic intelligence are interested in manipulating things around them, tend to be happy to try and happy to suspect, have curiosity. The child's intellectual potential begins to form from the age of 4 years, and the child can recognize shapes, sizes, and objects based on his experience. Children aged (5-6) years should be able to say the number of things by counting them based on the indicators in the Minister of Education and Culture Regulation no. 146 of 2014. Adding children aged (5-6) years can

³ Suyadi and Issaura Dwi Selvi, "Online Learning and Child Abuse: The COVID-19 Pandemic Impact on Work and School from Home in Indonesia," *Heliyon* 8, no. 1 (2022): e08790, <https://doi.org/10.1016/j.heliyon.2022.e08790>.

⁴ Menekşe Boz and Hazal Begüm Ünal, "Development of the Child Neglect and Abuse Awareness Scale for Parents and Its Relationship with Various Variables," *International Electronic Journal of Elementary Education* 13, no. 1 (2020): 21-34, <https://doi.org/10.26822/iejee.2020.170>.

⁵ Nika Cahyati and Rita Kusumah, "Peran Orang Tua dalam Menerapkan Pembelajaran di Rumah Saat Pandemi COVID 19," *Jurnal Golden Age* 4, no. 1 (2020): 152-59, <https://doi.org/10.29408/goldenage.v4i01.2203>.

⁶ Suyadi Suyadi and Issaura Dwi Selvi, "Implementasi Mainan Susun Balok Seimbang Berbasis Kearifan Lokal Yogyakarta untuk Anak Usia Dini," *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini* 4, no. 1 (2019): 373-82, <https://doi.org/10.31004/obsesi.v4i1.345>.

⁷ Petronela Joan Patricia Suripatty, Nadiroh Nadiroh, and Yuliani Nurani, "Peningkatan Kecerdasan Logika Matematika Melalui Permainan Bingo," *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini* 4, no. 1 (2019): 100-109, <https://doi.org/10.31004/obsesi.v4i1.282>.

be improved by providing stimulation in a game tool that can stimulate children to understand the concept of addition through concrete objects.⁸

However, it was found, based on observations and interviews in three different kindergartens, namely RA Islamiyah II Kotabaru, TK Islam Al-Kautsar, and TK Pertiwi Indralaya, that number operations had not run optimally. The observations and interviews at the three Kindergartens found that teachers in teaching adding numbers only used media in pictures, magazines, LKPD (Student Worksheets), and blocks with number symbols on them. Furthermore, the teacher himself determines the number of objects the child will count in the learning process. This makes it difficult for children to understand addition because children only count using their fingers and imagine if the added image increases. As a result, some of the children seemed confused calculating the sum that the teacher-directed. This condition causes the children to be less interested in learning to add, which causes them to be less motivated in learning mathematics.

Lack of game tools and the teacher's lack of creativity in providing additional learning makes it difficult for children to understand the concept of addition. All teachers interviewed at RA Islamiyah II Kotabaru, Al-Kautsar Islamic Kindergarten, and Pertiwi Kindergarten confirmed the need to develop media or game tools to understand the concept of adding numbers in children. Therefore, the need for a teacher or educator's role is to choose the appropriate mathematical learning approach and achieve the best level of child development achievement possible.⁹

Mathematics is an elemental device or complex learning system consisting of branches and interrelated but has different characteristics.¹⁰ Whereas in the Regulation of the Minister of Education and Culture of the Republic of Indonesia No. 136 of 2014 states that the level of development of children aged 5-6 years

⁸ Ni Made Muliani and I Made Sukma Muniksu, "Metode Menyenangkan Belajar Penjumlahan dan Pengurangan pada Anak SD," *Adi Widya: Jurnal Pendidikan Dasar* 5, no. 1 (2019): 1-9, <https://doi.org/10.25078/aw.v5i1.1199>.

⁹ Amalina Amalina, "Pembelajaran Matematika Anak Usia Dini di Masa Pandemi COVID-19 Tahun 2020," *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini* 5, no. 1 (2020): 538-48, <https://doi.org/10.31004/obsesi.v5i1.592>.

¹⁰ Rina Kusuma Dewi, Kamid Kamid, and Saharudin Saharudin, "Pemerolehan Pengetahuan Matematika pada Anak Usia Dini," *Edumatica: Jurnal Pendidikan Matematika* 9, no. 1 (2019): 53-60, <https://doi.org/10.22437/edumatica.v9i1.5624>.

in the scope of symbolic thinking is: a) mentions number symbols (1-10), b) matches numbers with number symbols. As well as, indicators of achievement of children aged (5-6) years based on the Regulation of the Minister of Education and Culture of the Republic of Indonesia No. 146 of 2014: first, states the numbers when shown the symbol of the number; second, says the number of objects by counting.¹¹ Based on the level of achievement and achievement indicators, children aged 5-6 years old can count (1-10) so that the teacher can develop the child's addition ability by counting objects up to 10.¹²

Children aged 5-6 years can add initial numbers using natural objects. In addition, children old 5-6 years can do simple calculations, which are limited to addition and subtraction materials using numbers 1 to 10. Based on some of these experts' opinions, the addition operation game tool is by children's abilities (5-6) years, where children can add or add using natural objects.¹³ Therefore, the writer wants to offer an educational game tool based on ers 1-10 operations to readers anywhere useful as a learning medium in schools. The game tool is the Pompom Box.

The addition operation game tool is designed to introduce children and is based on early childhood counting procedures.¹⁴ The method for calculating the expansion in children is; 1) Counting-all is the first counting procedure used by children. For example, when the child counts $3 + 5$, the child will first count 1,2,3 after that again the 1,2,3,4,5. Then the child will combine the two counts, 2) Counting-on is a counting procedure that children more efficiently use.¹⁵ For example, when the child calculates $4 + 2$, the child will count from the more

¹¹ Wiwiek Zainair Sri Utami, "Pengembangan Media Pembelajaran Matematika untuk Meningkatkan Konsentrasi dan Minat Belajar Siswa Tuna Grahita," *Jurnal Teknologi Pendidikan* 2, no. 1 (2017): 76–87, <https://doi.org/10.33394/jtp.v2i1.624>.

¹² Issaura Dwi Selvi, "Pengembangan Bahan Ajar Materi Bilangan Berbasis Saintifik untuk Anak Usia 5-6 Tahun di TK Islam Alkautsar Indralaya," *Tumbuh Kembang: Kajian Teori Dan Pembelajaran PAUD* 6, no. 1 (2019): 1–10, <https://doi.org/10.36706/jtk.v6i1.8338>.

¹³ Annisa Busril, Farida Mayar, and Delfi Eliza, "Pengaruh Permainan Logico terhadap Kemampuan Berhitung di Taman Kanak-Kanak Aisyiyah Bustanul Athfal Kayu Gadang," *Islamic EduKids* 2, no. 1 (2020): 1–9, <https://doi.org/10.20414/iek.v2i1.2270>.

¹⁴ Khadijah Khadijah and Media Gusman, "Pola Kerja Sama Guru dan Orangtua Mengelola Bermain AUD Selama Masa Pandemi Covid-19," *Kumara Cendekia* 8, no. 2 (2020): 154–70, <https://doi.org/10.20961/kc.v8i2.41871>.

¹⁵ Nurul Ezkanandyta, Yeni Rachmawati, and Rita Mariyana, "Efektivitas Penggunaan Busy Book terhadap Kecerdasan Logika Matematika Anak Usia Dini," *Edukid* 16, no. 1 (2019): 42–53, <https://doi.org/10.17509/edukid.v16i1.20874>.

significant number 4,5,6 or, the smaller number 2, 3, 4, 5, 6. Based on the addition counting procedure above, the child does the addition on the addition operation game tool using the counting-all counting procedure. Because the child will first count objects from the initial number, after recalculating things from the initial number, the child will combine the sum of the two counts starting from the initial number.¹⁶

Following the results of previous research, Syafrida et al. developed a ladder snake game to improve the ability to count children aged 4-5 years. The study results showed that children's numeracy skills improved using game tools.¹⁷ In another study, Sari et al. successfully developed Mipon's Daily's game media to enhance children's numeracy skills.¹⁸ But there has been no research that develops pompom boxes to improve the ability to count early childhood. So, this research is very appropriate to be done to increase early childhood numeracy skills.

The development of the numeracy skill is also based on the addition stage. Bruner suggests three stages of adding numbers: the enactive stage, the iconic stage, and the symbolic stage: 1) Enactive stage, in which the child manipulates objects-real or real stuff. For example, the child counts the number of balls in the basket according to the same color. 2) The iconic stage is the child manipulating the pictures of objects or objects according to the learning theme. For example, the child counts the number from number cards. 3) Symbolic stage. The last stage is adding numbers, where the child can use symbols or direct numeric symbols to count. Example of a child measuring $2 + 3 = \dots?$ on the board.¹⁹

Based on the above Bruner theories, learning media such as summation operation game tools need to be used by children in school or Early Childhood

¹⁶ Jayanti Putri Purwaningrum, Imaniar Purbasari, and Hutomo Rusdianto, "Pendampingan Pengembangan Aktivitas Belajar Matematika Berbasis Mainan Anak Tradisional Welahan Jepara," *Jurnal Penelitian dan Pengabdian kepada Masyarakat UNSIQ* 6, no. 3 (2019): 128-31, <https://doi.org/10.32699/ppkm.v6i3.738>.

¹⁷ Fidrayani Fidrayani, Rina Syafrida, and Puspa Ayu Melodyana, "Increased Numeracy Skills of Children with Snakes and Ladders Game," *Journal of Early Childhood Education (JECE)* 2, no. 1 (2020): 62-72, <https://doi.org/10.15408/jecev2i1.14971>.

¹⁸ Nila Mayang Sari, Elindra Yetti, and Hapidin Hapidin, "Pengembangan Media Permainan Mipon's Daily untuk Meningkatkan Kemampuan Berhitung Anak," *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini* 4, no. 2 (2020): 831-39, <https://doi.org/10.31004/obsesi.v4i2.428>.

¹⁹ Daryanto and Aris Dwicahyono, *Pengembangan Perangkat Pembelajaran (Silabus, RPP, PHB, Bahan Ajar)*, ed. Djanji Purwanto, 1st ed. (Yogyakarta: Gava Media, 2014).

Education institutions can improve the ability of number summation materials by using educational game tools. This is what underlies research differently from other studies. Because this research wants to introduce and show the world of games and learning, an educational game tool can improve children's competence in the sum of numbers 1-10 as a medium of learning in school. This research also wants to investigate the psychological and sociological aspects of pompom box learning in facilitating the improvement of summation literacy. The educational game tool that is the topic of this writing study is the math-pompom box.

B. Methods

This type of research is research development (Research Development) using the Rowntree development research model and Tessmer's evaluation. This type of research data uses primary data and secondary data. Primary data is obtained directly through checklists and observations of children's added ability in Kindergarten Pertiwi Indralaya when using addition operation games. Meanwhile, secondary information is data collected from the needs analysis interview results to the teacher regarding the development of game tools obtained based on articles, books, theses, and sites on the internet related to the research being carried out.²⁰

In this study, the data collection technique was through a data validation walkthrough involving several experts to evaluate the product to revise the initial product/prototype 1. The instrument for collecting this technique uses a validation sheet given to the expert or validator. The data collected on the validation sheet are responses and suggestions, which become the basis for researchers to revise the initial product/prototype.²¹ The validation results are then discussed with the expert to clarify information on the validation results as a reference for changing the product/prototype until it is declared feasible to be tested. The instrument used to measure the resulting product is a checklist sheet. The material and media validation instrument grid can be seen in Table 1.

²⁰ Suharsimi Arikunto, *Prosedur Penelitian Suatu Pendekatan Praktik* (Jakarta: Rineka Cipta, 2010).

²¹ Nurkolis Nurkolis and Muhdi Muhdi, "Keefektifan Kebijakan E-Learning Berbasis Sosial Media pada PAUD di Masa Pandemi COVID-19," *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini* 5, no. 1 (2020): 212–28, <https://doi.org/10.31004/obsesi.v5i1.535>.

Table 1
The Content Validity Instrument Grid

No	Aspects of the Assessment	Indicator	Item
1	Content Validity	Suitability of game tools with the curriculum used in Kindergarten	1
2	Construct Validity	Display game tools according to the characteristics of the child	2

Table 2
Grid of Media Validity Instruments

No.	Product Assessment Aspects	Item
1	Educational aspects	1, 2, 3, 4
2	Technical aspects / product design	5, 6, 7, 8
3	Aesthetic / beauty aspects	9, 10, 11, 12

Table 3
Answer Category and Score

Answer category	Score statement
Very Valid	4
Valid	3
Invalid	2
Very Invalid	1

The observation sheet contains an assessment grid that will be assessed to see the practical tool of the addition operation game, containing eight assessment items which are divided into two variables, namely the variable of the ability of addition and the practicality of using the product, among these items are, 1) mentioning numbers when shown symbols numbers, 2) matching the number of objects with the number symbols, 3) mentioning the number symbols (1-10), 4) adding objects by counting, 5) the game tools are easy to use and tidy up again, 6) systematic game rules that are easy to understand, 7) The addition operation game tool is interesting for children, 8) The addition operation game tool is fun for children.

The validation results from the validators are presented in tabular form. Next, look for the average score using the Formula (1):²²

$$X = \frac{\sum x}{N} \dots\dots\dots (1)$$

Note:

- X : Average value
- Σx : Sum of data values
- N : Lots of data

The average score of the validation results from material and media experts is obtained to determine whether the products made are valid or not adjusted to the categories, as shown in Table 4.²³

Table 4
Valid Level Category

Average	Category
82-100	Very Valid
63-81	Valid
44-62	Invalid
25-43	Very Invalid

Product validity is assessed by expert validators who recapitulate the assessment results, comments, and suggestions from the validators, calculated using assessment criteria based on indicators on the validation sheet in the questionnaire. The values in Table 4 are converted using the Formula (2) :²⁴

$$\text{Percentage value} = \frac{\text{Maximum score}}{\text{Maximum score}} \times 100\% \dots\dots\dots (2)$$

²² A Aisa and L Lisvita, "Penggunaan Teknologi Informasi dalam Pembelajaran Online Masa COVID-19," *JoEMS (Journal of Education and Management Studies)* 3, no. 4 (2020): 47-52.

²³ Sugiyono, *Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif dan R & D* (Bandung: Alfabeta, 2014).

²⁴ Chresty Anggreani and Syafdaningsih Syafdaningsih, "Pengembangan Buku Ajar Mata Kuliah Matematika pada Anak Usia Dini," *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini* 4, no. 1 (2019): 124-32, <https://doi.org/10.31004/obsesi.v4i1.286>.

The observed values are converted into the categories defined in Table 5 and Table 6. Table 6 is the category of practical value assessment of the use of the addition operation game tool consisting of 4 categories, namely, the Very Good Developing (BSB) category with an average value of 4, the Developing category according to expectations with an average value of 3, the Start Developing (MB) category with an average value of 2, and the Undeveloped category with an average value of 1.²⁵

Table 5
Practical Value for Using the Number Addition Operation Game Tool (1-10)
for Children Aged (5-6) Years.

Score	Category
4	BSB
3	BSH
2	MB
1	BB

Table 6
Category of Observation Results Value

Score	Category
82-100	Very practical
63-81	Practical
44-62	Impractical
25-43	Very Impractical

The value of the results of research observations is an assessment to see the practicality of a product. The addition operation game tool's usefulness can be expressed. If the game tool is easy to use, safe for children, systematics of easy to understand, and following the stage of achieving the indicators used.²⁶

²⁵ Kiki Mundia Sari and Heru Setiawan, "Kompetensi Pedagogik Guru dalam Melaksanakan Penilaian Pembelajaran Anak Usia Dini," *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini* 4, no. 2 (2020): 900-912, <https://doi.org/10.31004/obsesi.v4i2.478>.

²⁶ Sunarti Sunarti, Selly Rahmawati, and Setia Wardani, "Development of Animation-Based Fairy Tales Learning Model for Elementary School Students," in *Proceeding International Conference on Science and Engineering*, vol. 1, 2017, 239-43, <https://doi.org/10.14421/icse.v1.309>.

C. Results and Discussion

The findings show that pompom box toys can develop the ability to count in early childhood. The materials used to make toys, the steps of using pompom box toy, and the results of the analysis of research data on children will be submitted and described as follows:

Material Addition Operations Game Tools

The learning material provided by the addition operation game tool is in the form of activities that stimulate the summing ability of children aged (5-6) through counting (1-10), matching the number of objects with the number symbol, mentioning the numbers that correspond to the character of the number and counting the number objects that are added. Adding children uses a pompom ball as a tangible object for children to count.

The indicator for assessing the use of the addition operation game tool refers to the Regulation of the Minister of Education and Culture No. 137 of 2014, namely 1) mentioning numbers when shown a number symbol, 2) matching the number of objects with a number symbol, 3) mentioning the number symbols (1-10), 4) adding objects by counting.

Addition Operation Game Tool Design

The addition operation game tool developed is plywood with a thickness of 1cm, 28cm in length, and 8cm in width, attached by two funnels or tubes. There is zinc on which each end is covered with a flannel cloth to attach the magnet symbol of number, equal sign ($=$), and character (+), which symbolizes the number of the sum. The board's base is a block of 28cm long, 11cm wide, and 8.5cm high, with one side of the top beam open and the other side, closed but transparent. Then ten pieces of feather balls or pompoms are provided as concrete objects for children to count, and the symbols of numbers that add up to (1-10) are made of wood and are given a magnet for each number.

This addition operation game tool directs children to add up the results of the pompom balls inserted into the first and second counting funnel by attaching the symbols of numbers corresponding to the number of hops.

There are advantages and disadvantages to the addition operation game tool, namely: 1) the edge of the addition operation game tool is to use a concrete object in the form of a pompom ball to count to make it easier for children to understand the concept of addition. In addition, the material for the game tool

uses materials that are safe for children, attractive designs, and tools; the game is designed not too big and light for children. On the other hand, 2) the weakness of the addition operation game tool is the limited edition of numbers which is only up to 10. The designed game tool is not too large and is adjusted to the indicator of children's achievement levels in the Regulation of the Minister of Education and Culture No. 146 of 2014. However, this game tool can still be played with numbers of more than ten adjusted by adding the number of pompom balls and a game tool that is designed to be slightly larger.



Figure 1
Pompom Box (personal documentation)

Figure 1 shows a real picture of the shape of the pompom box, with some components used such as funnel, ball, and numbers. However, this game tool (Figure 1.) can still be played with numbers of more than ten adjusted by adding the number of pompom balls and a game tool that is designed to be slightly larger. So, this toy can give children a vast opportunity to learn and improve numeracy skills.

Addition Operation Game Tool Steps

The first step in playing the game tool is manipulating real objects to calculate. The real object used in the addition operation game tool is the pompom ball. Pompom balls' selection is based on children's play equipment, namely safe and harmless. Furthermore, the child manipulates the picture with the object counted in the picture game tool provided in a colored number symbol. The child matches the number of pompom balls calculated with the correct number symbol. Finally, the child can add numbers using symbols to count. In the addition operation game tool, after the child counts the pompom ball by matching the number symbols pasted on the board, the child reads the sentence from the sum the child has calculated. Suppose " $2 + 3 = 5$ " the child reads "two plus three equals five".

The steps for using the addition operation game tool are:

1. The teacher conveys information to children about the addition operation game tool and introduces the addition symbol "+," and the logo is equal to "=".
2. The child first determines the number of pompom balls that will be counted.
3. The child who has chosen the number of hops is directed to insert the ball into the funnel I counting while counting
4. The child looks for and attaches the number of balls corresponding to the number inserted into the funnel I count.
5. The child determines the number of balls again and puts the ball back into funnel II by counting
6. Furthermore, the child looks for and pastes the symbol of the number that corresponds to the number of balls inserted into the funnel II
7. The child counts the total number of pompom balls in the container by using the counting sum Counting all procedure
8. Next, the children match and paste the correct number symbols from the sum of the balls that have been calculated
9. In the final step, the child mentions all the number symbols pasted on funnel I and II counting to become a sentence in mathematics.

One to One Evaluation Stage

The one-to-one evaluation stage involved three group B kindergarten children using prototype one simultaneously to see the practicality of the number addition operation game tool (1-10). The research shows the child playing a game and then exemplifies playing a game with the child. Finally, researchers made observations by looking directly at children's activities and behavior when using prototype 1.

Based on the results of children's observation data on the use of the addition operation game tool in the one-to-one evaluation stage of 92.7 with an efficient category where the data obtained was based on the results obtained by three children. Namely, Alf got a score of 29 with a value of 90.6, Frl got a score of 28 with a value of 87.5, and Aql got a score of 32 with a value of 100. Based on the results of these data, the addition operation game tool is declared very practical because it has met the assessment criteria based on indicator 1) states numbers when shown number symbols, 2) matches the number objects with number symbols, 3) mentioning the number symbols (1-10), 4) mentioning the number of objects by counting, 5) the game tools are easy to use and tidy up again, 6) the systematic rules of the game are easy for children to understand, 7) attract children's attention, and 8) fun for children.

The game tool is by the practical assessment aspect based on observing children's behavior using game tools, which are easy to tidy up. The game rules are easy for children to understand and attract attention and fun. This can be seen when the child understands the rules and steps in playing the addition operation tool, then when the child is first shown the game tool, the child looks enthusiastic and asks about the game tool. Game tools are also fun for children when children want to play a game. Furthermore, the addition operation tool's product would be tested in the small group evaluation stage involving 9 group B children in Indralaya Pertiwi Kindergarten.

Small-Group Evaluation Stage

In the small group evaluation stage, a prototype was tested on nine group B kindergarten children. The nine children will be divided into three groups, consisting of three children. Researchers made direct observations on the behavior of nine children towards the active use of the prototype. The results of the observational study are described in the Table 7.

Based on the results of the data Tabel 7, the value of children's observations on the use of the number addition operation game tool (1-10) at the small group evaluation stage was 94.4 with the efficient category obtained from nine children. Based on the results of these data, the addition operation game tool is stated to be very practical and Very Good Developing (BSB/Berkembang Sangat Baik) because it has met the assessment criteria based on indicators, 1) mentioning numbers when shown a number symbol, 2) matching the number of objects with a number symbol, 3) mentioning the number symbol (1-10), 4) mentioning the number of objects by counting, 5) the game tool is easy to use and tidy up again, 6) the systematic rules of the addition operation game tool are easy for children to understand, 7) the game tool attracts children's attention, 8) fun game tools for children.

Table 7
Child Observation Results Using Pompom Box

No.	Child's name	Score	Average	Category
1	Alf	31	96,87	BSB
2	Frl	30	93,75	BSB
3	Aql	32	100	BSB
4	Irf	28	87,5	BSB
5	Arr	29	90,62	BSB
6	Arl	30	93,75	BSB
7	And	32	100	BSB
8	Mrs	29	90,62	BSB
9.	Rfa	31	96,87	BSB

In addition to developing children's numeracy skills, playing using pompom box toys can activate many brain parts. The benefits of this toy can control focus range, emotions, cognitive flexibility, motor physical, and memory. However, when playing, there are times when children face difficulties. That's when children are trained to solve problems and find solutions to the situations they face. For example, children can be taught to discuss and argue with their friends about issues.²⁷

²⁷ Sri Maryani, "Math Game for Early Childhood," *Empowerment* 8, no. 1 (2019): 39–48, <https://doi.org/10.22460/empowerment.v8i1p39-48.1156>.

Through play activities, children develop various abilities with fun and happiness. It should be understood that early childhood's ability to concentrate is still short, the mastery of the language is also limited, and the child is still easily bored.²⁸ Therefore, early childhood is not ready to participate in formal learning activities in school. If the child is forced to participate in routine activities at school, he will feel depressed and experience learning and behavioral disorders.

The addition operation game tool is efficient because it is by the criteria for evaluating the practicality of the game product, namely a game tool that is easy to use and tidied up again by children. Game rules that are easy for children to understand, attract attention and be fun. The results prove that children can develop the ability to count by using pompom box toys through fun play.

Parents and teachers can use pompom box toys. The child can play with the toys along with his parents or friends. Children can also feel the joy of playing together, learning to follow the game's rules, and feelings when losing or winning contests. For example, if your child plays a game that wins or loses is determined by strategy, they will have the opportunity to hone their logical thinking skills.

Psychological and Sociological Aspects

Pompom box games are judged based on valid data and practice used for early childhood. Data shows that children experience improvements in the understanding of summation literacy. This toy gives children space to explore themselves and get to know the other side of learning the concept of summation. As a result, children are increasingly developing in psychological and sociological aspects through this game.

Results of observational research (Figure 2.), children can use pompom boxes according to the direction of the teacher. The child manages to calculate and answer the numbers correctly. Children play the game in a way that alternates with their friends. Children interact with friends and teachers. The game is interactive and fun. Based on observations, pompom box toys can improve a child's psychological and sociological development.

²⁸ Yasmin B. Kafai and Quinn Burke, "Constructionist Gaming: Understanding the Benefits of Making Games for Learning," *Educational Psychologist* 50, no. 4 (2015): 313-34, <https://doi.org/10.1080/00461520.2015.1124022>.



Figure 2
The Child Plays with The Pompom Box (personal documentation)

Psychological aspects that can be seen from the results of playing this game are 1) the child's curiosity, when the child wants to solve the problem, 2) the child's feelings of pride when the child manages to answer questions, 3) the feeling of competing, the child wants to succeed just like other friends, 4) feelings, 5) children show some emotional attitudes, such as anger, happiness, sadness, disappointment and so on. 6) The willingness and unwillingness of children in using this game tool.

While the sociological aspects that can be seen from the results of this game are 1) children learn the concept of imitating, children imitate the teacher or friends who use these toys, 2) children learn the concept of queuing, 3) children learn interaction with friends or teachers, 4) children learn the concept of patience, when other friends use toys, 5) children learn concepts not concerned with their interests or egos, 6) Children learn to share, 7) these games shape children's confidence.

Following the results of previous research, children's numeracy skills development needs to be done with innovative and interactive media. The results of Singh et al.'s study improved children's numeracy skills through card games.²⁹ Febiola's research successfully applied the medium of learning tree

²⁹ Parmjit Singh et al., "Card Game as a Pedagogical Tool for Numeracy Skills Development," *International Journal of Evaluation and Research in Education (IJERE)* 10, no. 2 (2021): 693-705, <https://doi.org/10.11591/ijere.v10i2.20722>.

numbers to enhance children's initial numeracy skills.³⁰ Supported by the results of Novira and Jaya's research, children understand the concept of counting through the medium of hand puppets.³¹ Many media or game tools significantly impact children's numeracy skills.

Many media and gaming tools to improve numeracy skills are commonly used in school or at home by children and widely sold in the marketplace. Of course, it allows the pompom box as a new formula in learning and exploring numeracy skills. Based on the many results of previous research, it is proven that children need tools or media to understand this primary mathematical more easily in building numeracy skills. The increased literacy ability of addition will be increased with the toy patterns that children use as a learning medium. Therefore, the pompom box toy is very valid and effective when used as an innovative and latest medium in developing literacy skills summing children, and improving children's psychological and sociological aspects.

D. Conclusion

Based on several studies that have been carried out, the following conclusions can be obtained: 1) Valid based on the validation carried out at the expert review stage. From the results, the content validity value is 87.5, and the value of the media validity is 93.75. Based on the content validity and media validity assessment, the score was 90.6, with the perfect category. 2) It is stated that it is practical. It is obtained from the value results in the one-to-one evaluation stage of 92.7 and the small group evaluation stage with a value of 94.4. Based on the value of the observation results of the one-to-one evaluation and small group evaluation, the results obtained were 93.5 with the convenient category.

So it can be concluded that the development of a number addition operation game tool (1-10) is declared valid and practical for children in kindergarten in the learning process of introducing the concept of addition. The game tool of summation operation is efficient because it has been following the

³⁰ Komang Ayu Febiola, "Peningkatan Kemampuan Berhitung Permulaan Anak Usia Dini Melalui Pengembangan Media Pembelajaran Pohon Angka," *Jurnal Ilmiah Pendidikan Profesi Guru* 3, no. 2 (2020): 238–48, <https://doi.org/10.23887/jippg.v3i2.28263>.

³¹ Novira Novira and Indra Jaya, "Analisis Metode Bercerita Menggunakan Boneka Tangan dalam Meningkatkan Kemampuan Berhitung Anak Usia 5-6 Tahun," *Edukatif: Jurnal Ilmu Pendidikan* 3, no. 1 (2021): 84–91, <https://doi.org/10.31004/edukatif.v3i1.247>.

criteria of assessing the practicality of the game product. Namely, the game tool is easy to use and re-adjusted by the child, the rules of the game that are easy for the child to understand, attract attention and fun for the child.

This study only reached the small group stage to test the validity and practicality of the product—advice for the next researcher to continue the research into the field test stage. The field test stage is used to test the potential effects. Further research can continue to produce findings of the potential impact of this product.[s]

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