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Implementation of Small Big Media as a Learning Medium to Introduce the Concept of Size to Early Childhood at Mawar Merah Maga Lombang PAUD

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ABSTRACT

Early childhood cognitive abilities in understanding early mathematical concepts, particularly the concept of size, are often hampered by abstract and less interactive learning methods. At Mawar Merah Maga Lombang Preschool, limited manipulative media is the primary reason for children's low understanding of the dimensions of large and small. This study aims to test the effectiveness of implementing Small Big media in improving understanding of the concept of size in early childhood. The research method used was quantitative with a Pre-Experimental design (One-Group Pretest-Posttest Design) on 28 students. The research instruments used were structured observation sheets and demonstration tests. The results showed a significant increase in average scores between before and after using Small Big media. Data analysis using a t-test demonstrated a significant value, empirically proving that this manipulative media is able to strengthen children's cognitive schemas in accurately distinguishing sizes. In conclusion, Small Big media is an effective educational tool for optimizing mathematical cognitive abilities in early childhood. Implementation of this media is recommended as a standard learning medium at the Early Childhood Education level to optimally facilitate children's visual-tactile learning styles.

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INTRODUCTION

Early Childhood Education (PAUD) is the primary foundation of the national education system, focusing on providing educational stimulation to support children's physical and spiritual growth and development. During this period, cognitive development is a crucial pillar that must be appropriately stimulated, given that children are at a highly receptive stage of development to new information. An introduction to early mathematics, particularly regarding the logic of dimensions and measurement, is a fundamental competency that will form the basis for critical thinking and problem-solving skills at subsequent levels of education. Therefore, PAUD institutions are required to provide a learning environment that fosters children's curiosity through authentic and meaningful learning experiences (Fadillah, 2021).

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One of the basic cognitive concepts that must be mastered is the ability to differentiate and order sizes, such as big and small. This ability involves not only the sense of sight but also cognitive coordination in objectively identifying the physical attributes of an object. However, the reality in the field shows that teachers often rely on lecture methods or the use of two-dimensional images, which provide insufficient sensory experiences for children. At PAUD Mawar Merah Maga Lombang, this phenomenon is evident in the children's difficulty in grouping real objects by size due to a lack of manipulative media stimulation. Children's inability to differentiate sizes from an early age can hinder their mastery of more complex mathematical concepts later in life (Fitriani, 2022).

The use of concrete learning media such as Small Big presents an innovative solution to bridge the gap between abstract theory and the physical reality children understand. Small Big media is designed with objects characterized by contrasting scales, attractive colors, and child-safe textures, thereby simultaneously stimulating visual and kinesthetic learning modalities. Based on cognitive development theory, early childhood learns most effectively through the manipulation of real objects, allowing them to independently explore the relationships between objects. This media innovation is expected to transform conventional learning patterns into more dynamic ones and have a tangible impact on children's cognitive achievement scores in school (Sujiono, 2022).

The urgency of this research lies in the need for empirical evidence regarding the extent to which Small Big media can increase the effectiveness of introducing the concept of size in children at Mawar Merah Maga Lombang Preschool. By applying a quantitative approach, this study seeks to provide valid and measurable data regarding the transformation of children's abilities before and after the intervention. The results of this study are expected to serve as a reference for policymakers at the early childhood education (PAUD) level, encouraging them to prioritize the provision of manipulative educational game tools (APE) to support curriculum success. Through appropriate media integration, it is hoped that the quality of learning at Mawar Merah Maga Lombang PAUD can significantly improve, along with optimal student cognitive development (Yanti, 2023).

The purpose of this study is to quantitatively measure and analyze the effect of the implementation of Small Big media in introducing the concept of size to early childhood at PAUD Mawar Merah Maga Lombang. In more detail, this study aims to describe children's initial abilities in recognizing the concept of size before being given treatment, monitor the effectiveness of the learning process using Small Big media, and prove a significant increase in children's cognitive learning outcomes through statistical testing. Thus, this study aims to validate the use of manipulative media as a reliable learning instrument in optimizing children's spatial-mathematical understanding in the golden age range.

IMPLEMENTATION METHOD

The research used was a quantitative pre-experimental design using a one-group pretest-posttest design. In this design, researchers conducted a pre-test to assess children's abilities before intervention, then administered treatment using the Small Big media, and concluded with a post-test to assess any changes. The quantitative approach was chosen to ensure that the media's effectiveness could be objectively measured through statistical figures indicating the level of significance of the influence of the independent variable on the dependent variable (Sugiyono, 2022).

The research data sources came from all 28 students in Group A at Mawar Merah Maga Lombang Preschool. Primary data were obtained through performance test scores and direct observation of children's performance in grouping and sorting the Small Big media during the research sessions. Additionally, secondary data were obtained from school profile documentation and a list of child development scores held by the class teacher. All data were collected systematically to ensure the integrity of the research results, which will then be processed using statistical applications to obtain an accurate picture of students' cognitive development (Creswell, 2021).

Data collection techniques were conducted through structured observations using child development assessment sheets and performance tests in the form of object manipulation tasks. Researchers prepared a list of assessment criteria covering the ability to identify, classify, and seriate object sizes. Meanwhile, data validity, or instrument validity, was assessed through content validity, consulting with early childhood education experts (expert judgment) and conducting reliability tests

to ensure the consistency of the measurement instruments. Using validated instruments is crucial to ensure that the data obtained truly represents children's cognitive abilities without subjective bias (Arikunto, 2021).

Data analysis techniques employed were descriptive statistics and inferential statistics, using a paired sample t-test to compare the average pre-test and post-test scores. The initial step in the analysis began with a data normality test to ensure normal distribution, a requirement for using parametric statistics. The researchers then calculated the N-Gain score to determine the effectiveness of the Small Big media in the low, medium, or high categories. Conclusions were drawn based on the results of the hypothesis test. If the significance value (p-value) <0.05, the null hypothesis was rejected, indicating a significant effect of the Small Big media implementation on children's ability to recognize size concepts (Miles, 2020).

RESULTS AND DISCUSSION

1. Description of Children's Initial Size Concept Pre-test

Before implementing the Small Big media, researchers conducted a pre-test to determine the extent of children's understanding of the concept of large and small at Mawar Merah Maga Lombang Preschool. Observations showed that most children still experienced confusion in identifying objects if the size differences were not too extreme. Many children were only able to guess an object's size based on the most striking color or position, rather than based on its volume or dimensions objectively. The low average scores at this initial stage indicate that the conventional learning methods currently implemented have not been able to provide a solid conceptual understanding of spatial material.

The main obstacle identified during the pre-test was the children's lack of focus when faced with two-dimensional images on worksheets. These images are static and lack tactile experience, making it difficult for children to relate the images to real-world objects. This results in low learning motivation, with children tending to quickly become bored and unchallenged in completing size classification tasks. This situation reinforces the urgency of shifting learning media from static-visual to dynamic-manipulative to simultaneously stimulate children's motor and cognitive skills (Anggraini, 2021).

Furthermore, the distribution of scores at this early stage indicates a significant gap in ability among students. Some children who receive more stimulation at home may have slightly better comprehension, but overall, the majority of the class falls into the "Beginning to Develop" category. Children often use the terms "big" and "small" interchangeably when asked to describe objects they hold. This phenomenon indicates that linguistic terms related to size have not been fully internalized within their cognitive schema due to the lack of concrete visualization during the teaching and learning process.

Based on descriptive statistical analysis, the average pre-test score obtained by children only reached 45% of the maximum expected total score. This figure serves as a basis for researchers to design appropriate interventions using the Small Big media. Teachers at the school recognize that without strong media intervention, children's cognitive development will continue to stagnate and potentially hinder their readiness to enter elementary school. This initial measurement provides an important foundation for proving the validity of the new media's impact, which will be implemented in subsequent stages.

Theoretically, children's low initial understanding is a consequence of learning that ignores the concrete-operational characteristics of early childhood cognitive development. The use of conventional media has been shown to be less effective in stimulating children's visual-spatial sensitivity compared to the use of educational props that can be touched and played with. The importance of using real objects in early mathematics learning is key to transforming children's abstract perceptions into functional, logical understanding (Pratama, 2022).

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2. Implementation of Small Big Media in the Interactive Learning Process

The intervention phase involved introducing Small Big media through structured and fun play activities at Mawar Merah Maga Lombang Preschool. The teacher began the session by demonstrating how to use the media, placing large and small objects side by side to create a clear visual contrast. Children were encouraged to touch, compare weights, and feel the textures of the media to provide a comprehensive sensory experience. Through this direct interaction, children began to recognize the differences in physical properties between objects without the need for elaborate verbal explanations.

The implementation process continued by dividing the children into small groups to conduct classification and seriation activities using the Small Big V media set. In this activity, children were asked to separate objects into "Large" and "Small" baskets as a group. The teacher acted as a facilitator, providing positive reinforcement each time a child successfully classified objects correctly. The use of this media gradually increased children's attention span, as they felt they were playing rather than engaging in tedious formal learning. Group activities also foster social coordination among children in completing the challenges presented (Ramli, 2023).

The variety of Small Big media formats, from geometric blocks to miniature everyday objects, kept the children engaged throughout the treatment sessions. The teacher incorporated simple competitive games, such as a running race while carrying small objects, effectively integrating gross motor stimulation with size identification skills. These rapid motor responses indicate that children's cognitive schemas regarding size are beginning to form and can be accessed spontaneously during the activities. This media has proven effective in simplifying previously difficult mathematical concepts into a series of activities that children are highly interested in.

During the intervention, researchers observed significant changes in learning behavior, with children actively asking questions and attempting their own experiments with the available media. Children's self-confidence increased as they successfully completed the manipulative tasks. This implementation focused not only on the final results but also on the exploration process children undergo in independently discovering the concept of size. The teacher also noted an increase in children's verbal communication when describing the differences in object size to their peers, an indicator of holistic cognitive development.

The success of the learning process depends heavily on the selection of appropriate media that can stimulate active student engagement in the classroom. The use of three-dimensional manipulative media in the learning process has been shown to stimulate visual-spatial sensitivity and accelerate children's visual discrimination of an object's physical properties (Hasanah, 2022). The application of concrete object-based play methods has been shown to effectively provide space for children to construct their own understanding through enjoyable, empirical experiences in the classroom.

3. Analysis of Post-test Results and Significance of Cognitive Improvement

After a series of interventions using Small Big media were completed, the researcher carried out final measurements or post-tests using the same instruments as the pre-test. The results show a very dramatic increase in scores for almost all students at PAUD Mawar Merah Maga Lombang. Children who previously had doubts about size are now able to identify large and small objects very quickly and accurately. In fact, children's serialization abilities, namely ordering objects from smallest to largest, have progressed rapidly, where children are able to arrange five levels of size sequentially without the teacher's help.

Statistically, the average post-test score jumped to 88%, which represents an increase of 43% from the initial average score. Testing via Paired Sample T-Test produces a significance value (2-tailed) of 0.000, which means it is much smaller than the significance level of 0.05. This provides an empirical conclusion that the implementation of Small Big media has a very significant influence on increasing children's cognitive abilities in recognizing the concept of size. This data proves that manipulative media is not just an additional tool, but is the main instrument capable of fundamentally transforming children's understanding.

This increase occurred evenly across all categories of children, both those with low and medium abilities. Small Big media is successful in equalizing understanding in the classroom because it is easy to understand by various learning modalities. Children who have a kinesthetic

learning style are greatly helped by the physical activity of manipulating objects, while visual children are helped by sharp contrasts of size and color. These results provide optimism for teachers at PAUD Mawar Merah Maga Lombang that appropriate media innovation can overcome learning obstacles that have been considered difficult to solve.

Apart from statistical figures, the quality of children's mastery of concepts also appears to be deeper (long-term memory retention). When randomly retested a few days later, the children were still able to consistently maintain their classification abilities. This proves that learning using Small Big media does not only produce momentary memorization, but rather the formation of concepts that remain in the child's long-term memory. This success is clear evidence that the quantitative approach in this research is able to scientifically and measurably validate the effectiveness of manipulative media in early childhood education (Wulandari, 2021).

Research in the field of children's cognition confirms that concrete sti mulation given repeatedly will strengthen the nerve synapses in the child's brain which are responsible for logical-mathematical thinking abilities. The use of manipulative tactile media has been proven to contribute greatly in bridging abstract spatial understanding into real concepts that are easily mastered by pre-school children. Children's success in mastering the concept of size through visual-tactile media confirms that direct physical experience is the best teacher for children's intellectual growth (Sari, 2022).

4. Psychological Responses and Student Engagement During the Experiment

The quantitative aspects of this study were also supported by observational data regarding the level of student engagement during the experiment. The data showed that during the use of Small Big media, student absence rates in class decreased and active participation levels increased to 95%. Children displayed psychological responses in the form of high levels of joy and enthusiasm, as measured using a Likert scale on a behavioral observation sheet. The intrinsic motivation that emerged from within the children made the learning process very conducive without the need for coercion or strict control from the teacher.

This active engagement was reflected in the children's initiative to explore the media beyond teacher instructions, such as trying to compare the size of the media with other objects in the classroom. This behavior indicates that the children had developed a scientific curiosity, which was fostered by the engaging media. The children were no longer afraid to make mistakes because Small Big media allowed them to self-correct through direct visual comparison. This inclusive and supportive learning environment was a key contributing factor to the success of the quantitative experiment (Nisa, 2022).

Social interaction between students was also observed to increase significantly during the media-based task sessions. Children with higher abilities spontaneously helped their peers who were still struggling to sort objects. This collaboration demonstrates that the Small Big media also has a secondary impact on children's social-emotional development. Qualitative data from behavioral observations complements the quantitative findings, providing a more comprehensive picture of the holistic impact of the media's implementation on the overall personality of children at Mawar Merah Maga Lombang Preschool.

This high level of student engagement is an important indicator that the Small Big media meets the standards of psychological appropriateness for early childhood. Good media is capable of voluntarily capturing children's attention and maintaining their focus for a sufficient duration for learning to occur. The success of this intervention demonstrates that a learning environment rich in manipulative media can create an educational ecosystem that is both enjoyable and effective in achieving the curriculum's cognitive targets (Lestari, 2023).

Children's positive emotional engagement when interacting with educational props has a strong linear correlation with the rate at which they absorb new information into their cognitive structure. The joyful responses and intrinsic motivation that emerge during play while learning have been shown to be effective in optimizing children's long-term memory retention related to basic geometric concepts. Therefore, creating a pleasant classroom climate through manipulative tactile media is absolutely necessary to create a meaningful and humanistic learning ecosystem for children.

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5. Evaluation of Supporting Factors and Sustainability of Media in Early Childhood Education (PAUD)

The successful implementation of the Small Big media at Mawar Merah Maga Lombang PAUD was supported by highly conducive managerial and environmental factors. The principal's full support in facilitating the researchers' experimental needs, along with the classroom teachers' enthusiasm for learning new methods, were crucial internal supporting factors. Furthermore, the affordable and readily available materials for making the media ensured the program's high level of sustainability for routine implementation in the future. Teachers found the media highly practical, requiring no special maintenance and easily stored in a corner of the classroom (kurniawati, 2022).

Quantitatively, the results of the learning efficiency assessment showed that using the Small Big media saved teachers 30% of their time explaining size concepts compared to using conventional drawing methods. This is because children grasp the material more quickly through hands-on practice than through abstract theoretical explanations. This efficiency allows teachers to devote more attention to children who require intensive, individualized guidance. The continued use of this media also received support from parents, who saw tangible changes in their children's abilities at home.

However, the evaluation also noted several areas for improvement, such as increasing the number of media sets so each child can have more time for independent exploration without having to wait in long lines. Researchers also recommended developing Small Big media with a wider variety of textures (rough and smooth) to enrich children's sensory stimulation. External supporting factors, such as the availability of the latest scientific articles and collaboration with university researchers, were also recognized as being very helpful in developing valid research instruments.

As a sustainable measure, Mawar Merah Maga Lombang PAUD plans to integrate the use of Small Big media into its annual learning modules. This step recognizes the empirical success demonstrated through this quantitative research. The school recognizes that investing in appropriate learning media will provide long-term benefits for the school's reputation and the quality of its graduates. Ongoing evaluation will be conducted to refine the implementation of this media in line with the children's evolving needs in the future. The harmonious synergy between the school's managerial aspects, teacher creativity, and the involvement of the parent community has proven to be the main key to the successful adoption of new curriculum innovations at the elementary level. The use of adaptive strategies in overcoming the limitations of learning facilities has been proven to be able to maintain the quality of children's cognitive development achievements optimally in various different geographical environmental conditions (Yusuf, 2021).

CONCLUSION

Based on the results of data analysis and hypothesis testing, this study concluded that the implementation of Small Big media had a very significant impact on the ability to recognize the concept of size in early childhood at Mawar Merah Maga Lombang Preschool. This was evidenced by a jump in children's average cognitive scores from the low pre-test to the high post-test. The use of this three-dimensional manipulative media successfully facilitated children's construction of an understanding of the concept of big and small through real-life visual-tactile experiences, thereby eliminating the perceptual barriers often encountered in conventional, static-image-based learning.

The implementation of Small Big media was not only effective in measurably improving learning outcomes but also created a dynamic, interactive, and enjoyable learning environment for children. The positive response and increased student engagement demonstrated that this media was highly suited to the psychological developmental characteristics of early childhood. Therefore, it is recommended that early childhood educators consistently utilize manipulative media in every introduction to early mathematical concepts. The success of this study provides strong empirical evidence that simple yet targeted media innovation can be a key factor in optimizing children's cognitive potential during their golden period of development.

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