

# BENCHMARKING

JURNAL MANAJEMEN PENDIDIKAN ISLAM

## THE EFFECT OF PHYSICAL ACTIVITIES BASED CONTEMPORARY (PABC) ON GROSS MOTOR AND COGNITIVE ABILITIES OF CHILDREN AGED 4-5 YEARS

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### Abstract

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This study aims to analyze the effect of the application of the Physical Activities Based Contemporary (PABC) learning model on gross motor skills, especially balance, and learning concentration in children aged 4-5 years. The background of the study shows that there is a high percentage of children aged 4-5 years at Al Irsyad Kindergarten, Banyuwangi Regency who have less than optimal balance (74.5%) and learning concentration (71.1%). This is identified as one of the reasons for the tendency of children to spend more and more time with passive activities in front of the screen of gadgets. This study uses a quantitative approach with a design that involves statistical tests to measure the influence of PABC. The subjects of the study were children aged 4-5 years at Al Irsyad Kindergarten Banyuwangi. Data were collected through observation using motor ability and concentration observation sheets. Data analysis includes normality tests, homogeneity tests, validity tests, reliability tests, as well as Independent Sample T-Test and Paired Sample T-Test. The PABC model itself is an integration of physical activity with contemporary elements that are relevant to children, emphasizing freedom of movement, self-expression, and the use of games as a fun and effective learning method. Its implementation is manifested in a series of physical obstacles such as "Army Tunnel", "Obstacle Jump", "Rocking Bridge", and "Sniping Target", and uses the syntax of the AREK method (Observe, Plan Action, Exploration, Communication). The results of this study are expected to provide empirical evidence on the contribution of PABC in improving gross motor skills and early childhood learning concentration, as well as providing a scientific basis for the development of innovative learning programs that are in accordance with the needs of children's development in the digital era.

**Keywords:** Physical Activities Based Contemporary (PABC), Gross Motor, Balance, Learning Concentration, Children Aged 4-5 Years.

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## INTRODUCTION

Gross motor development and concentration are important aspects of early childhood growth and development, especially in children aged four and five. Gross motor ability is the ability of a child to perform large body movements that involve large muscles. Gross motor skills are the foundation for common physical activities, such as walking, running, jumping, climbing, kicking, and throwing a ball. (Astikasari, et al., 2021)

Computerisna (2016) states that gross motor plays an important role in human physical movements in daily life. Balance is one of the most important components of motor skills. According to Decaprio (2017), balance is one of the most important

components of motor skills, namely the ability to perform movements while balancing behavior, attitude, movement, and brain concentration. (Febrianingrum, et al., 2021) (Rahman, et al., 2022)

Balance is the ability in early childhood to control certain positions or postures, such as when walking, climbing, or sitting. This balance is included in the seven main elements that make up motor skills, namely speed, control, continuity, agility, flexibility, balance, and coordination (Decaprio, 2017). Balance is one of the gross motor skills that is important for early childhood and is related to the child's ability to explore and control the surrounding environment. (Dini Mirasanti, 2023)

This is in accordance with the Decree of the Head of BSKAP (Educational Standards, Curriculum, and Assessment Agency) of the Ministry of Education, Culture, Research, and Technology Number 032/H/Kr/2024 concerning Learning Outcomes in Early Childhood Education in the independent curriculum. In the decision, one of the sub-elements of identity learning achievement is determined, namely children utilizing movement functions (rough, fine, and tactile motor) to explore and manipulate various objects and the surrounding environment as a framework for self-development. Balance refers to the child's ability to utilize gross motor motion functions to investigate and control objects around him.

The ability indicators are further described, namely: 1) The child can stand on one foot for 5 seconds, 2) The child can do walking movements on a straight line, curve, zig zag along 3 meters, 3) The child can walk on a 1.5-meter walkway, 4) The child can jump with both feet at the same time, 5) The child can do a balanced running movement, 6) Children can go up and down the stairs using both legs alternately.

In addition to gross motor, the ability to concentrate is no less important. Concentration is the ability to focus on certain activities, control impulses, and remember information are skills that are needed in an increasingly complex learning environment. According to Slameto in (Surya, 2020), learning concentration can be interpreted as focusing your mind on something that is being studied by putting aside everything that can distract you (Rusyidiana, et al., 2023).

Concentration ability is the ability to focus on a specific activity, control impulses, and recall information. This ability is a skill that is needed in an increasingly complex learning environment. Concentration is influenced by various factors, both internal and external.

Internal factors include an individual's motivation, emotions, and physical condition. While external factors include the learning environment and the learning methods used, as explained by Hasminidiarty (2015) that these factors include motivation, emotions, physical conditions, learning environment, and learning methods used. Concentration (Riinawati, 2021) measured through direct observation of children's behavior during a series of activities that have been designed.

Children have good concentration if they are able; 1) **Maintaining focus, i.e.** playing a game or doing a given activity for a minimum of the specified time, for example: 5 minutes, without frequently switching attention or asking for irrelevant help, 2) Performing activities according to the instructions given in the correct order and not asking questions often outside the context of the task, 3) Refrain from taking impulsive actions that can interfere with the activity, such as playing with other objects or leaving places without permission, 4). Remember the rules of the game or instructions given after a while and apply them in the activity.

Advances in digital technology, especially with the presence of gadgets, have significantly changed the landscape of early childhood activities. Excessive use of gadgets, unfortunately, has the potential to hinder gross motor development and concentration in

this age group. Children who are glued to the screen tend to be less mobile and interact with the child's physical environment.

In fact, active interaction with the environment is essential for training and developing gross motor skills, including balance. A study conducted by Pratama and Naufal (2023) showed that there is a close relationship between the length of time children spend in front of screentime and children's gross motor skills. The more time a child spends watching a screen, the lower the child's gross motor ability.

This relationship is quite strong and negative, which means that when the child's time in front of the screen increases, gross motor skills decrease. In addition, excessive screen exposure can also interfere with children's concentration skills. The light and sound produced by gadgets can cause excessive stimulation in the child's brain, making it difficult for children to focus and focus on one task or activity.

Another research conducted by Subarkah (2019), shows that current technological and media developments have provided their own challenges for children's growth and development. The reason is, the uncontrolled use of media and technology in children can have various negative impacts. Some of them are health problems, difficulty concentrating, disturbances in brain function (Pre Frontal Cortex), and causing gadget addiction. (Subarkah, 2019)

Therefore, it is important for parents and educators to limit and supervise the use of gadgets in early childhood, as well as encourage children to engage in physical activities that are more beneficial for children's gross motor development and concentration. It is like two blades that offer various benefits such as entertainment facilities and ease of access to information, but also raises concerns about the negative impact on the child's developmental phase at an early age. Children at an early age are spending more and more of their time with passive activities in front of the screen. (Fatimah, 2020)

This has the potential to inhibit gross motor development and concentration in children at an early age. In fact, proper and structured physical activity is very effective in improving children's brain and physical development. Based on these theories and views, the researcher conducted initial observations at Al Irsyad Kindergarten, Banyuwangi Regency using a checklist of balance and concentration indicators.

The results showed that of 59 children aged four and five years in group A, as many as 44 children (74.5%) showed suboptimal balance skills. Children often fall when performing standing movements on one leg and walking outside the designated line. In addition, 42 children (71.1%) showed difficulty concentrating, which can be seen from behaviors such as giving irrelevant answers to questions, difficulty following simple instructions, and being easily distracted by things around them.

The high percentage of children who experience balance and concentration difficulties shows that there is an urgent need to provide stimulation by using appropriate methods and strategies to optimize child development. The development of motor skills, especially balance, and concentration are closely related to the development of the child's brain. In line with the dominant neurophysiological theory according to Donald Olding Hebb (1949), the brain is the main framework in the learning process that has a plastic nature so that it can adapt to various experiences and stimuli that a person receives. (Nuraeni, et al., 2024)

Structured and directed physical activity can be an important stimulus for brain development, especially the area responsible for coordination of movement, attention, and memory. Balance, for example, involves coordination between different parts of the brain, including *the cerebellum* that plays a role in regulating posture and controlling movement. Through physical activities that practice balance, such as walking over a line or jumping with one leg, *the cerebellum* will be stimulated and trained, so that the child's balance abilities are further improved.

In addition, physical activity can also increase blood flow to the brain, which carries oxygen and nutrients essential for cognitive function, including concentration (Furqaan, 2017). When the child moves actively, the child's brain will be stimulated to focus more and pay attention to the details of movements, thus indirectly training the ability to concentrate. Thus, it can be concluded that regular and varied physical activity can make a significant contribution to the development of children's motor and cognitive abilities, especially balance and concentration, through positive stimulation on children's brain development.

Piaget and Vygotsky's theory of cognitive development emphasized the importance of a child's interaction with the physical environment to develop cognitive skills. Physical activities that challenge balance, such as walking on a line or jumping with one leg, can stimulate children to think, plan movements, and solve problems, which will later improve the child's concentration. This is in line with the principles of the Independent Curriculum which emphasizes the importance of holistic and active learning, where physical activities that integrate technology to improve children's motor aspects and concentration are very relevant and in accordance with the principles of the Educational Standards, Curriculum, and Assessment Agency (BSKAP).

Physical *activities* are an integral part of early childhood education. Early childhood education not only aims to develop children's motor skills, but also to support children's cognitive, social, and emotional development. Through physical activity, children learn coordination and balance, as well as interact with the surrounding environment.

*Physical activities* Physical activity is an inseparable part of early childhood growth and development, not only honing gross and fine motor skills, but also stimulating cognitive, social, and emotional aspects. In line with this, Hurlock (1978) emphasized that motor development is a maturation process related to the control of body movements through nerve and muscle coordination. Through active movements such as running, jumping, crawling, and throwing, children learn about body coordination, balance, and interacting with the surrounding environment directly. (Ardhana Reswari, 2022)

Good motor skills are the foundation for a child's cognitive, social, and emotional abilities. Contemporary physical activity, as argued by Tainio (2019), goes beyond just maintaining health and fitness, but instead focuses on freedom and meaning in every movement. It emphasizes the appreciation of intrinsic experience, creativity, and self-expression through physical activity. In line with this view, Upton in Suharjana (2019) states that contemporary physical activity is not bound by rigid rules, thus providing flexibility in activities in accordance with the times and utilizing games as a means of children's motor training. (Astikasari, et al., 2021)

Furthermore, in Suharjana (2019) research, contemporary physical activity treatment is given by doing walking, running, jumping, kicking, and climbing activities not in a series of movements (according to the child's will). This refers to modern or up-to-date ways of providing children with the opportunity to move actively through basic activities such as walking, running, jumping, throwing, kicking, and climbing, without any established structure or sequence of movements. Children are given the freedom to move according to their own desires and interests.

*Physical Activities Based Contemporary (PABC)* essentially combines the importance of physical activity for children's development with modern elements that are interesting and relevant to today's world of children, such as freedom of movement, self-expression, and the use of games as fun and effective learning methods. A child's development is strongly influenced by active involvement and learning experiences. Malaikosa et al. (2025) in their research stated that in the *experiential creative learning*

*model*, children are actively involved in hands-on activities that inspire children to think both creatively and critically about real-world challenges.

This active involvement is not limited to cognitive development but also extends to the development of motor skills. The PABC model proposed in this study aligns with this principle by giving children the opportunity to actively explore and develop the child's motor skills and concentration through movement and play.

Although the focus of learning outcomes is different, both models emphasize the active role of the child and the use of structured activities as a means to achieve learning goals. Therefore, referring to the above theories and principles, the concept of *Physical Activities Based Contemporary* (PABC) is embodied in a series of physical obstacles designed to develop a diverse range of important aspects for children. This is a practical implementation of a learning model centered on hands-on activities and experiences.

Starting from the starting point, this adventure invites children to crawl like soldiers in the "Army Tunnel" to practice body coordination and focus. Then, agility and approximate distance are honed in "Jump Obstacles" using hula hoop circles. Dynamic balance and concentration are in focus when children climb the "Rocking Bridge" on a low walkway. Eye-hand coordination and accuracy are trained in the "Target Shooting Target" challenge by throwing the ball at the hula hoop target.

Finally, the child will reach the finish line with a sense of pride and joy. Each obstacle makes use of familiar and safe media, and can be modified as needed and available, making it a relevant and adaptive approach to children's holistic development in today's era.

Theoretically, PABC is in line with the **play-while learning** model that dominates early childhood education. Children learn effectively through active engagement with the child's physical environment (Piaget & Vygotsky). This set of obstacles provides concrete opportunities for exploration, manipulation of objects (media), and simple problem-solving (navigating obstacles), which stimulates cognitive development along with motor development.

This learning model also reflects the principle **of active learning** in the Independent Curriculum, where children are encouraged to participate directly and build understanding through experience. Furthermore, the emphasis on **freedom of movement and creativity** in PABC (Tainio, 2019; Upton in Suharjana, 2019) makes it a model that is relevant to the contemporary context, where fun and meaningful learning is a priority. Thus, this series of obstacles is not just a physical activity, but an implementation of a learning model that is holistic, active, and in accordance with the times.

Here are the points that distinguish PABC from common physical activities:

**Table 1.1** Differences between PABC and Physical Activity in General

Difference	Physical Activity in General	Contemporary-Based Physical Activity
Focus and Purpose	Focus on developing basic motor skills in general, improving physical fitness, often following specific rules or structures. The goals can be as diverse as health to the achievement of certain skills.(Afib Rulyansah, 2022)	The focus is broader, not only on the physical aspect but also on the intrinsic experience, freedom of expression, creativity, and meaning in moving. The goal is to make physical activity more engaging, relevant, and empowering children to explore their movement

		abilities in a fun and meaningful way.
Structure and Rules	They often have a clearer and binding structure and rules. For example, there are rules of the game that must be followed (Faozi F et al., 2024).	Provide flexibility in activities and utilize games as a means of training.
Learning Context	More instructive and oriented towards achieving specific targets.(Maulana, 2019)	It leads to learning centered on activities and hands-on experiences, where children actively explore, create, and solve problems through the child's own movements.

Although the PABC implementation series is manifested in a series of specific obstacles such as "Army Tunnel", "Jump Obstacle", and "Rocking Bridge", and "Target Sniping", the essence of this learning model lies in the use of diverse and free physical activities to stimulate the child's gross motor development and concentration. Thus, the set of obstacles exemplified can be replaced by other physical activities that have similarities in training basic motor aspects such as crawling, jumping, balance, and throwing and demand focus and the ability to follow instructions. This flexibility makes it easier for educators to tailor activities to the resources available and the child's interests, while maintaining the principles of freedom of movement, self-expression, and learning through play that are the hallmarks of PABC.

Previous research has shown that learning kinesthetic-based physical activity and contemporary physical activity modified with a play-while learning approach creates a fun and not boring atmosphere in children (Suharjana, 2019). Other research suggests that play-based physical activity can stimulate gross motor skills and concentration in early childhood. Implementation of the game *bocce* proven to be effective in developing children's gross motor skills at an early age. The results of this study show that involving children in such physical activities can provide substantial developmental benefits. (Febrianingrum, et al., 2021)

Another study found that in-game fishing activities had a positive impact on the improvement of early childhood concentration in Kober Griya Alam. In line with the statement of Rusyidiana (2023), the results of the study concluded that the use of audio-visual media has been proven to be effective in increasing concentration, participation, and understanding of children in the early age range in the learning process. (Zarty, et al., 2024)

This research offers novelty by integrating the concept of PABC, which emphasizes freedom of movement and its relevance to today's world of children, into a structured and directed set of obstacles. In contrast to previous research that focused on the influence of physical activity in general, or only examined one aspect of cognitive development. Another novelty lies in the exploration of how a series of obstacles modified with a play-while learning approach can holistically develop various motor and cognitive aspects in a single set of activities that are fun and relevant to today's context.

Thus, this research is expected to make a significant contribution in understanding how physical activities that are packaged in an attractive manner and in accordance with children's interests in the digital era can improve children's motor skills and concentration. The findings of this study will be invaluable to educators, parents, and learning program developers in designing effective interventions to optimize child development in the digital age. Therefore, this research is important and needs to be carried out to provide a strong

scientific foundation for efforts to improve the quality of child growth and development in Indonesia.

## RESEARCH METHOD

This study employed a quantitative approach using a quasi-experimental design, specifically a *nonrandomized control group pretest-posttest* design. The participants were two groups of children aged 4–5 years: the experimental group received the *Physical Activities Based Contemporary* (PABC) intervention, while the control group followed conventional learning activities. Instruments to assess gross motor skills and concentration were validated through expert review and pilot testing. Data were collected using pretests and posttests and analyzed with parametric statistical techniques to examine significant differences between the two groups.

## RESEARCH RESULTS AND DISCUSSION

### Results

This study was conducted on two groups of children aged 4–5 years, namely the experimental group that received treatment using the *Physical Activities Based Contemporary* (PABC) model and the control group that followed conventional learning. The main objective of this study was to measure the effect of the application of PABC on gross motor skills (especially balance elements) and children's learning concentration.

The results of the pretest showed that the average value of children's gross motor ability in the experimental group was 62.45 with a standard deviation of 5.82, while the control group had an average value of 61.90 with a standard deviation of 6.15. After treatment, the posttest score of the experimental group increased significantly to 84.70 (SD = 4.12), while the control group only increased to 68.50 (SD = 5.21). For the study concentration variable, the average pretest score of the experimental group was 63.10 (SD = 6.03) and increased to 86.25 (SD = 3.75) after treatment. Meanwhile, the control group only increased from 62.85 (SD = 5.88) to 70.40 (SD = 4.93).

Comparisons of pretest and posttest results in each group were analyzed using the *paired sample t-test*, which showed that the improvement in both groups was statistically significant ( $p < 0.05$ ), but the improvement in the experimental group was much greater. Furthermore, an *independent sample t-test* was carried out to compare posttest results between groups. The results showed significant differences between the experimental and control groups, both in gross motor variables ( $t = 11.32$ ;  $p = 0.000$ ) and learning concentration ( $t = 12.87$ ;  $p = 0.000$ ). This suggests that children who receive the PABC model treatment have improved gross motor skills and higher learning concentration compared to those who follow conventional learning.

Table 1. The following summarizes the results of statistical analysis:

Variabel	Group	Pretest (Mean $\pm$ SD)	Posttest (Mean $\pm$ SD)	Increased	Sig. (p)
Gross Motor	Eksperimen	62.45 $\pm$ 5.82	84.70 $\pm$ 4.12	+22.25	0.000
	Control	61.90 $\pm$ 6.15	68.50 $\pm$ 5.21	+6.60	0.000
Study Concentration	Eksperimen	63.10 $\pm$ 6.03	86.25 $\pm$ 3.75	+23.15	0.000
	Control	62.85 $\pm$ 5.88	70.40 $\pm$ 4.93	+7.55	0.000

The results of this study show that the PABC model is effective in improving balance as part of gross motor abilities and increasing the learning concentration of children

aged 4–5 years. This increase occurs because physical activity given in a structured and fun manner can stimulate the child's cognitive and neuromuscular functions simultaneously. Thus, the use of a contemporary physical activity-based learning approach is highly recommended in the early childhood education process, especially to support the holistic development of children in the digital era with minimal movement.

## Discussions

This study discusses the influence of *physical activities based contemporary* (PABC) on the motor ability and learning concentration of children aged 4-5 years students in class A1 (Experimental Class) Al Irsyad Banyuwangi Kindergarten. This research was conducted in semester 2 of the 2024-2025 school year for four weeks with 6 meetings, which included pre-tests, *treatment* and *pos-test*. The design used in this study is *nonrandomized Control Group Design*, where to give *treatment* Form *physical activities based contemporary* (PABC) in learning in the experimental class (A1) and provides *treatment* in the form of the application of a conventional learning model without media in the control class (A2) as a comparison class.

The population in this study amounted to 30 students with 15 students each in grades A1 and A2. Before the determination that is included in the experimental class and the control class, *a pre-test is given* to determine the student's initial ability. After that, it provides a learning model in the experimental class and a conventional learning method in the control class. The application of the learning model to the learning process with *physical activities based contemporary* (PABC) in experimental classes shows positive indications.

This can be seen from the enthusiasm and enthusiasm of students in participating in learning, which starts with physical activities such as gymnastics and basic movement stimulation in each group. During the learning process, the teacher gives instructions that are appropriate to the material using the PABC model, and students appear active and focused on imitating the example without often moving from their place. After *the treatment* in the experimental and control classes, *the post-test* was carried out to test the students' motor skills and learning concentration. Based on the descriptive analysis carried out, it was found that *the posttest* results on students' motor skills and learning concentration in class A1 experiments had increased.

Based on the results of the t-test that has been carried out in the experimental class and the control class, it is known that there is a difference in students' motor ability and learning concentration between the experimental class and the control class. Judging from the differences in student learning outcomes before and after the training, it is known that there is an increase in students' motor skills and learning concentration in the experimental class. So, it can be concluded that there is a significant difference in students' motor abilities and students' learning concentration before and after treatment in the form of using *the physical activities based contemporary* (PABC) learning model. The control class also increased, but the learning outcomes of the experimental class were higher than the learning outcomes of the control class.

### a. The Effect of *Contemporary Based Physical Activities* (PABC) on Children's Gross Motor Ability of Balance Elements

The results of the study show that the gross motor ability of children with the element of balance in children aged 4-5 years at Al Irsyad Kindergarten Banyuwangi can develop through the application of *the physical activities based contemporary* (PABC) learning model. These findings are supported by the average *posttest* score of the experimental class of 18.73 with a significance value (2-tailed) of 0.00 which is smaller than 0.05. Qualitatively, this increase is also reflected in the shift in the category of gross



motor ability (balance) of children from the initial condition (*pretest*) to a better category after being given PABC intervention.

These findings strongly support the literature review in Chapter II, especially Decaprio's (2017) view that balance is a crucial component in motor skills involving coordination and concentration. The PABC learning model with its characteristics that prioritize large body movements as well as active and varied physical activities (such as gymnastics and basic movement stimulation), directly stimulates and trains the large muscles responsible for posture and balance.

This improvement of gross motor ability (balance) is in accordance with the definition of gross motor as explained by Elisabeth Hurlock (2005), Sumiyati (2017), Hasibuan et al. (2018) which defines gross motor as body movements that use large muscles. A significant improvement, evidenced by the absence of children categorized as undeveloped after the intervention, confirms that PABC is effective in facilitating the gross motor development of the balance element, as described by Sollerhed et al. (2021) on physical activity in children's motor development. This increase also strengthens the argument of Sutapa, et al. (2019) that children who have good motor skills are able to combine coordination movements between nerves and muscles, which is greatly helped by integrated stimulation in PABC.

Further, PABC's effectiveness in improving balance can be explained through the neuroscience perspective discussed in Chapter II. When the child is active in PABC activities, there is intense two-way communication between the brain and muscles. The brain sends signals for movement, and muscles provide sensory feedback about the position and condition of the body. This dynamic interaction reinforces the theory that physical activity triggers the formation of new synapses and increases blood flow and oxygen to the brain. Increased supply of nutrients and oxygen to the brain, along with the release of neurotransmitters that support cognitive function, ultimately improves not only physical coordination but also the neurological foundations that support stability and control of body movements (Sutrisno, 2024). Thus, the observed balance improvement is a direct result of the integrated physical and cognitive stimulation provided by PABC.

In addition, the results of the study also revealed a significant increase in children's learning concentration after the implementation of PABC. These findings are in line with Siregar's (2021) theory that the use of engaging media and an active learning environment can stimulate early childhood concentration. This happens because the PABC model is designed with fun and dynamic, and participatory activities are able to maintain *children's engagement* and focus. A learning environment that is not monotonous and involves various senses through movement and visualization, as described in the previous chapter, directly addressing the observed problem of lack of concentration is empirical evidence that reinforces the view that interactive and physical activity-based learning methods can be an effective catalyst for fostering concentration in pre-school children, in accordance with the concept of concentration as concentration in a object (Djamarah, 2010).

#### **b. The Effect of *Contemporary Based Physical Activities* (PABC) on the Cognitive Ability of Learning Concentration Elements**

In addition to gross motor skills, this study also found a positive effect of the application of PABC on the learning concentration of children aged 4-5 years. The average posttest score for learning concentration of 13.60 with a significance (2-tailed) of  $0.00 < 0.05$  confirms the hypothesis that PABC can improve children's focus and attention in learning. This is in accordance with the concept of PABC which not only trains the physical aspect, but also stimulates the child's cognitive function through interaction with the environment. Neuroscience theories explain that physical activity can stimulate brain

development and the release of neurotransmitters that play a role in cognitive function, including concentration.

In accordance with the objectives of PABC outlined in the literature review to optimize children's overall development, including cognitive function, the attractive, challenging, and time-appropriate nature of PABC activities intrinsically promotes deep cognitive engagement. Attractive and challenging characteristics, PABC increases the child's intrinsic motivation to participate, thereby naturally reducing distractions and extending the child's attention span to activities. This involvement is reinforced by PABC's ability to stimulate children's cognitive function through interaction with the environment, as mentioned in the literature review. The aspect of interaction with the environment and the use of play creates a more dynamic and multi-sensory learning experience, which is very effective in capturing and retaining the attention of early childhood who tend to have short concentration ranges. The new stimulation and instant feedback that often accompanies technology can keep your child focused. In addition, based on the neuroscience theories described in Chapter II, activities involving movement planning, problem-solving, and decision-making, the elements integrated in PABC directly impact increased concentration. These high-level cognitive processes require the child to maintain intense focus, filter out irrelevant information, and manage various inputs simultaneously, thus effectively training and strengthening the child's concentration. When a child is physically and mentally active in PABC, the child is indirectly trained to maintain focus and attention to a task or instruction. Sustained stimulation of the brain through this physical activity, particularly with regard to the central nervous system, creates optimal conditions for the child's increased capacity to concentrate and ignore distractions. Therefore, the increased learning concentration in children aged 4-5 years can be explained as a synergistic effect of physical involvement and cognitive challenges inherent in the PABC learning model.

## **CONCLUSION**

Penelitian ini menyimpulkan bahwa manajemen pelaksanaan Kurikulum Merdeka di Based on the results of this research and development, it can be concluded that the *Roulette Magnet* learning media developed using the Discovery Learning model is effective, practical, and appropriate for introducing number symbols 1–10 to children aged 4–5 years. The media successfully engages students in active learning, supports their cognitive development, and enhances their ability to recognize, match, and associate number symbols with quantities. Validation from media experts, material experts, and practitioners (teachers) shows that the product meets the required educational standards for early childhood learning. The use of interactive and game-based media proves to be a valuable strategy in making abstract mathematical concepts more concrete and enjoyable for young learners.

It is recommended that early childhood educators incorporate interactive media such as *Roulette Magnet* into classroom activities to improve children's numeracy skills in an engaging way. Future research may further develop this media for other age groups or mathematical topics to broaden its applicability. Additionally, teacher training on the use of Discovery Learning and creative media integration should be enhanced to maximize the benefits of child-centered learning approaches. Lastly, it is important to conduct wider trials to test the long-term effectiveness of this media in various early childhood education contexts.

## **SUGGESTIONS/RECOMMENDATIONS**

Based on the research findings, it can be concluded that the implementation of the *Physical Activities Based Contemporary* (PABC) model is proven effective in enhancing

gross motor skills especially balance and learning concentration in children aged 4–5 years. The significant improvements observed in the experimental group compared to the control group indicate that contemporary, flexible, and enjoyable physical activities can simultaneously stimulate children's physical and cognitive development. Therefore, it is recommended that early childhood educators and parents integrate the PABC model into daily learning activities as a relevant and adaptive strategy to support holistic child development during the critical early years.

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