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A Study on the Development of "Coordination in Movement" in Early Childhood Education

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Abstract: The integration of physical activity and music in early childhood education plays a critical role in supporting the holistic development of children, particularly those around the age of six. This study explores how motor coordination can be enhanced through the combined use of physical exercises and music, aiming to strengthen both cognitive and physical abilities in young learners. Emphasizing the importance of coordinated movement and musical engagement, the study examines the developmental trajectory of six-year-old children and how these activities can be utilized to foster motor skills, emotional regulation, and social interaction. Drawing from the core curriculum for primary education, which advocates for the integration of physical education and arts, the research highlights the interconnectedness of physical-motor intelligence and musical-artistic intelligence, as proposed by Howard Gardner's Theory of Multiple Intelligences. Through a series of case studies and curriculum analyses, the study demonstrates that incorporating rhythmic movements and music-based activities into early learning environments promotes motor coordination, improves physical health, and enhances cognitive functions, thereby contributing to a more comprehensive educational experience. The research identifies gaps in current pedagogical practices, such as insufficient instructional time dedicated to music and physical education, and recommends curriculum adjustments to better support the developmental needs of young children. Ultimately, the study advocates for a more integrated and balanced approach to early childhood education that supports the growth of motor coordination, musical ability, and overall child development.

Keywords: 6-year-old child, rhythm, motor coordination, music

Introduction:

The role of systematic and continuous support for the developmental journey of both teachers and students has become a central focus in modern educational practices. Fostering teachers' professional growth through targeted programs—such as improving their qualifications, providing professional certificates, scholarships, and ongoing training opportunities—has become a priority for enhancing the quality of arts education. Moreover, initiatives aimed at building competitive schools, developing a skilled teaching workforce, and increasing the public's engagement in comprehensive music education have gained momentum in recent years. These efforts aim to improve the overall educational landscape by ensuring teachers are equipped with the necessary resources and skills to meet the dynamic needs of their students.

One key area of development that has received considerable attention in early childhood education is the importance of physical activity in fostering holistic growth. Children, especially those around the age of six, exhibit tremendous energy and curiosity, both of which serve as driving forces behind their cognitive, physical, and social development. The transition from early childhood into formal schooling marks a critical period for establishing foundational skills, and physical activity plays an essential role in this process. At this age, children are not only refining their motor skills but are also strengthening their neurological connections, which are critical for cognitive growth. These developments underscore the necessity of incorporating physical movement into early childhood education, as it enhances both physical and brain development, as well as social and emotional well-being. Physical movement is particularly significant during the early years as it supports various developmental milestones, including motor coordination, balance, and strength. Activities such as running, jumping, and dancing are not just beneficial for physical health; they also contribute to the acquisition of social skills like teamwork, conflict resolution, and communication. Research has consistently shown that physical activity is closely linked to emotional regulation, providing children with opportunities to alleviate stress and experience joy through newly acquired physical competencies [1].

The integration of movement and music offers a powerful tool for young children, fostering a connection between physical and cognitive development. By the age of six, children are capable of understanding basic musical concepts such as rhythm, melody, and pitch. This ability to engage with music through movement not only supports physical coordination but also enhances musical intelligence, which can be further nurtured through activities such as singing,

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dancing, and playing instruments. According to Howard Gardner's "Theory of Multiple Intelligences," musical-artistic intelligence and physical-motor intelligence are deeply interconnected in early childhood, highlighting the benefits of integrating both domains into early learning environments [2].

As evidenced by the core curriculum of primary education, the integration of movement and music into learning activities lays the foundation for a range of cognitive and physical competencies. In particular, by promoting motor coordination, we can help children develop the necessary skills to perform complex physical tasks, acquire knowledge, and foster a sense of confidence in their abilities.

This study aims to explore how the development of "coordination in movement" can be supported within early childhood education, emphasizing the importance of physical and musical activities in the developmental trajectory of six-year-old children. By examining current pedagogical practices and integrating research on motor coordination, musical development, and physical education, this paper seeks to offer insights into how early education can better support the growth of motor coordination, helping to ensure that every child has the opportunity to develop their full potential.

Literature Review

The development of motor coordination in young children, particularly in the context of early childhood education, is a significant area of interest in educational research. Motor coordination, which encompasses the integration of both fine and gross motor skills, plays a crucial role in children's physical, cognitive, and social development. Various studies have emphasized the importance of fostering this skill from an early age to ensure that children are equipped with the foundational abilities necessary for academic success and overall well-being.

Bayarlakh [3] highlights that the first-grade years are pivotal in developing motor coordination. His research points to physical education classes as the primary venue for enhancing children's ability to coordinate movements efficiently. Bayarlakh's dissertation also emphasizes that while motor coordination is often overlooked in curricula, it is crucial for mastering new physical skills, improving sports proficiency, and supporting the development of emotional and social competencies. Furthermore, the author underscores the fact that the rapid physical and neural development occurring during this period, often referred to as the "Golden Age," makes early childhood the ideal time to implement exercises that improve motor skills.

Similarly, Durrant [4] identifies the connection between physical activity and emotional development. The positive methods in daily life education outlined in his study suggest that physical activity alleviates emotional stress, helping children to develop healthier psychological profiles. This perspective supports the notion that motor coordination exercises not only enhance physical well-being but also contribute to emotional resilience and social interaction, laying a solid foundation for academic and social achievement.

Furthermore, the integration of music into early education has been shown to play a critical role in developing motor coordination. As Campbell [5] explains, engaging children in musical activities—such as rhythmic movements, singing, and dancing—helps them refine their motor skills while simultaneously cultivating a love for music. Campbell notes that music and movement are inherently linked, and the rhythm and patterns inherent in musical exercises provide children with opportunities to practice precise motor movements, which are critical for physical coordination. Music education at this stage contributes not only to the development of musical intelligence but also to the refinement of motor coordination through activities that require bodily movements in sync with music.

Ichinkhorloo [6] further supports this by demonstrating how six-year-old children are particularly receptive to musical and motor coordination exercises. At this age, children's cognitive and physical abilities are sufficiently developed to benefit from activities that combine both. Ichinkhorloo's study suggests that children at this stage can perform complex motor tasks, such as dancing to rhythms and following musical instructions, which serve as effective methods for enhancing motor coordination.

Finally, the Core Curriculum for Primary Education [7] stresses the importance of integrating physical education with arts education, which includes music and movement. By promoting coordination through these activities, the curriculum encourages the development of well-rounded children who are capable of performing basic physical movements while also engaging with the creative aspects of education.

Characteristics of Development in a 6-Year-Old Child:(Physical Activity Supports Them)

The transition from early childhood into formal schooling marks a pivotal developmental phase in a child's life. At six years old, children are full of curiosity and eager to take on new challenges. This age is characterized by an innate drive to explore and engage with their environment, as children develop both physically and cognitively. It is during these early school years that children establish foundational skills that will shape their future academic and personal achievements. Therefore, it is critical that teachers create an encouraging learning environment that supports and nurtures children's innate curiosity and desire to learn. At this stage of development, children possess remarkable energy. They are constantly in motion—running, jumping, and engaging in various physical activities. This restlessness is a reflection of their rapidly developing muscles and motor skills, as well as the growing neurological connections within their brains. Physical movement is not just essential for the child's physical growth, but it also plays a crucial

role in cognitive development. Research has shown that these developments, including the strengthening of motor coordination and neural connections, are integral to the child’s overall growth during this period.

Physical activity is essential for the emotional and social development of children as well. Active play offers opportunities for children to develop important social skills, such as cooperation, conflict resolution, and teamwork. Additionally, physical exercise has been shown to alleviate emotional stress and frustration, providing children with a healthy outlet to express and manage their emotions. Physical activity is vital for children's mental well-being, helping them to build resilience and develop a more balanced emotional profile.

In terms of music, children at the age of six begin to refine various developmental skills, including the ability to perform movements in sequence, understand lyrics, follow rhythmic patterns, and distinguish between different musical elements such as pitch and tone. The development of these skills highlights the interconnectedness between physical and musical abilities. By this age, children’s motor coordination and cognitive abilities are sufficiently developed to benefit from music-based activities that involve rhythm and movement.

A key framework that supports the integration of physical and musical activities is Howard Gardner’s "Theory of Multiple Intelligences." Gardner's theory suggests that various forms of intelligence, including musical-artistic and physical-motor intelligence, are deeply interconnected and play a significant role in early childhood development. At six years old, children exhibit both musical-artistic intelligence—such as enjoying singing, playing instruments, and dancing to music—and physical-motor intelligence, which is expressed through activities like dancing, acting, and engaging in physical exercise. This dual development supports the idea that the integration of physical activity and music can enhance a child's overall growth, ensuring a well-rounded and balanced learning experience.

Thus, the physical and psychological developments in six-year-old children create an ideal foundation for the incorporation of physical exercises involving music, which not only supports motor coordination but also nurtures emotional, social, and cognitive development.

Let's Give Every Child the Confidence of "I Can Do It"! From the Core Curriculum of Primary Education:

Table 1: Expected Outcomes of Physical Education (Grade 1)

Competency	Performing and Demonstrating General Physical Development Exercises	Walking, Running	Jumping, Skipping	Throwing, Passing
Class 1	- Perform and demonstrate basic upper and lower body movements.	- Simple walking variants.	- Jump on one or both feet while stationary.	- Throw and catch a ball.
	- Morning gymnastics with basic movements.	- Run quickly for 15 meters straight.	- Push off gently with one foot from a soft jump to land on two feet.	- Throw a ball straight ahead and catch it.
	- Perform jumping and turning techniques.	- Change direction and run at a moderate speed.	- Jump over small hurdles.	- Throw a ball over 1-2 meters high.
	- Sit, lie down, and play with mats.	- Play running games together.	- Play games that involve jumping.	- Play games that involve throwing and passing actions.
	- Play various movement games.			

Table 2: Achieved Outcomes of Artistic Education (Grade 1)

Competency	Perceive, Receive	Performing Skills	Creating	Creative Research	Artistic Language
Class 1	- Observe and listen to various sounds, phenomena, and simple artistic creations in the	- Sing with solo voices.	- Express personal feelings arising from their own experiences.	- Conduct research based on specific topics and select appropriate	- Listen to, distinguish, recognize, and identify characteristics and colors of natural sounds.

surrounding environment.			sounds, rhythms.	
- Share personal feelings and thoughts.	- Make music with simple musical instruments.	- Create two and three-dimensional works.	- Utilize vocal music, musical instruments, body movements, etc.	- Understand, listen to, and differentiate types of music (sound, dance, march).
	- Coordinate movements to musical rhythms.			- Understand and express the roles of tempo and dynamics in the meaning and expression of musical works.
	- Perform by following teacher's support and simple instructions.			

(Battuya, C., Budhhuu, H., Jamts, S., Ganbat, B., Batsukh, D., Urtnasan, L., 2008)

Motor Coordination

In today's rapidly evolving technological landscape, the demand for physical labor has significantly diminished. However, the need for optimized motor coordination—especially in managing muscular strength within spatial and temporal constraints—has become increasingly important. Motor coordination is essential for executing any physical activity, and its development plays a crucial role in a child's ability to perform complex tasks. It allows for the integration of fine motor skills and efficient movement patterns.

For young children, the benefits of well-developed motor coordination are numerous:

- **Efficient Acquisition of Motor Skills:** Children with strong motor coordination can quickly and accurately acquire new physical abilities.
- **Improved Exercise Technique:** A well-coordinated child can master new exercises with precision, which facilitates the adoption of more complex physical activities.
- **Enhanced Sports Skills:** Motor coordination accelerates the development of athletic abilities, enabling children to progress quickly in various sports.
- **Swift Progress in Technical Skills:** Children with well-developed motor skills often demonstrate faster proficiency in technical tasks, contributing to their overall development.
- **Balanced Physical and Emotional Response:** The ability to execute tasks effortlessly during intense physical and emotional activities reflects advanced motor coordination.
- **Optimal Use of Resources:** Children can better utilize available resources, whether these are physical tools or personal energy, improving both efficiency and effectiveness in movement.
- **Continuous Motor Development:** As motor coordination strengthens, so does the child's ability to handle increasingly complex physical challenges, laying the groundwork for lifelong movement patterns.

The Mongolian government, through its "Educated Mongolian People" program, underscores the importance of nurturing each child's unique abilities, including motor coordination. Early childhood education programs are designed to create environments that foster these skills, supporting the holistic development of children.

Motor coordination is especially vital during the early years of primary education. This developmental phase, often referred to as the "Golden Age" of motor coordination, is characterized by rapid physical and neurological growth. During this time, children develop the ability to perform a wide range of motor activities that form the foundation for future physical education and sport.

However, research in Mongolia indicates that there is a noticeable decline in motor coordination among school-aged children. Observations from physical education classes suggest that teachers often rely on a limited range of repetitive exercises, which can hinder the development of more diverse motor skills. This limited approach reduces the overall educational impact of physical education and delays the development of essential motor coordination skills.

To address this gap, it is crucial to implement a more varied and scientifically grounded curriculum in physical education that emphasizes the development of motor coordination through diverse activities. Creating well-equipped classrooms and dedicated spaces for physical exercise is also key to providing children with an environment where they can explore and improve their motor abilities.

Musical Movement

Music classes play a vital role in fostering the holistic development of young children, influencing their physical, cognitive, and social growth. Music reflects the essence of life through its rhythm and melody, acting as a medium to

express various life processes. By integrating music into education, children not only acquire knowledge and skills related to music but also develop creativity, improve social interaction, and cultivate an aesthetic appreciation of the arts.

Active participation in musical activities such as listening to music, singing, performing movements to rhythms, dancing, and engaging in musical games is essential for children's physical development. These activities contribute to the refinement of fine and gross motor skills, promote spatial awareness, and enhance overall physical coordination. Moreover, such activities stimulate brain development, particularly in the formation of neural connections essential for cognitive progress. As researcher Lorna Lutz Heij emphasizes, "Among all movements, we primarily express our innate rhythms. Every person and every body is musical," highlighting the fundamental connection between movement and rhythm.

For six-year-old children, activities such as running, skipping, heartbeat synchronization, and rhythmic exercises are especially important. These exercises not only help children develop physical strength and coordination but also provide opportunities for them to explore their natural rhythms. The act of starting and completing rhythmic exercises, such as moving in sync with a song or rhythm, generates a sense of pride and accomplishment. This reinforces the importance of stability and awareness of one's surroundings, crucial for their developmental phase.

Children at this stage enjoy organizing and coordinating their movements to music. Whether it's singing a song during a bus ride, playing at home, or participating in group activities, children respond positively to structured environments where they can anticipate their next action, such as lining up or moving to a rhythm. This sense of organization is a natural progression of their cognitive and physical abilities, and it helps to build their sense of security and confidence. However, children who struggle with rhythmic perception, pulse, and melody in live music often face difficulties in controlling their movements and understanding time and space. These challenges can impact their ability to engage with music and movement effectively. Research indicates that music provides an essential framework for children to synchronize their movements with rhythms, thus improving motor coordination and temporal awareness.

In a study conducted in a first-grade classroom, a teacher used music and rhythmic cues to organize children. When the teacher sang "Place your notebooks down," the children responded immediately, demonstrating how music can facilitate smooth transitions and cooperation in the classroom. This highlights the significant role of music in fostering not only motor coordination but also social skills, such as timing, collaboration, and following instructions.

The incorporation of music into early childhood education, therefore, not only promotes motor development but also nurtures emotional and social well-being. By incorporating various forms of music, including singing, dancing, and rhythm-based activities, children are provided with opportunities to develop and refine their motor coordination while simultaneously cultivating a deeper understanding of music's expressive power.

Case Study

Study-1:

In an experiment at MUBIS Lyceum School, 21 six-year-old first-grade students were taught the song "Tuurulai." On the first day, the teacher introduced the poem and melody line by line, with the children singing each part. However, when asked to sing the song the following day, the children had completely forgotten it. The teacher then modified the approach by incorporating movement into the lesson. By the third day, all the children had learned both the lyrics and melody thoroughly, primarily through the use of accompanying movements. This demonstrates that children tend to grasp the distribution of words and melodies more effectively when movements are integrated into the learning process.

Study-2:

An analysis was conducted on the activities presented in the "Music-1" textbook of EBS, designed for six-year-old children. The textbook categorizes the activities into five main areas: singing, listening, composing music, dancing, and creative writing. Each section is designed to incorporate movement, facilitating children's physical and cognitive development.

"Let's Sing" Activity: This section includes one game and five songs to aid in learning. It also encourages listening to sounds from animals and natural phenomena and expressing them through rhythmic movements.

"Let's Listen" Activity: Comprising nine tasks and one game, this activity focuses on listening to various sounds, identifying them, and engaging in exercises that help distinguish living from non-living elements of nature.

"Let's Make Music" Activity: Containing eight tasks, this section includes activities for naming, discarding, and composing music, as well as tasks to play using hand movements.

"Let's Dance" Activity: With four tasks, this section involves listening to music, following dance movements, and expressing the lives and emotions of birds through movement.

"Let's Compose and Create" Activity: This part includes seven exercises, such as composing music, listening to music and depicting it, identifying weather conditions, and creating music.

Each activity in the "Music-1" textbook is carefully designed to incorporate movement, thus aligning with our research on the "Impact of Music on Movement Coordination." Movement is embedded in every lesson, promoting the physical development and creative expression of the children.

Study-3:

In the first grade, out of a total of 696 study hours, 56 hours are allocated to physical education and 56 hours to music, amounting to 112 hours, or roughly 16% of the total instructional time. This allocation, while valuable, is insufficient for the comprehensive development of each child. Expanding the time dedicated to music and physical education could significantly enhance students' motor and musical development.

Study-4: Music Teachers' Research

A survey of 38 music teachers from the capital city explored the challenges they face when teaching music to six-year-olds and the methods they use to engage the children. The survey revealed:

A. Challenges: Music teachers find it challenging to maintain the attention of six-year-old children, as their attention spans are short and they often become easily distracted.

B. Teaching Methods: To address this, teachers employ a variety of strategies, including shouting to regain students' focus and engaging them individually. Additionally, all 38 participating teachers (100%) reported incorporating movement and dance into every lesson. Furthermore, 30 teachers (78.9%) use techniques such as creating characters and role-playing to engage the children and develop their musical skills. This shows that movement is essential in expressing musical melodies and notes effectively.

Conclusion

Music has a unique and powerful ability to connect the hearts and minds of individuals through rhythm and melody. In early childhood, music and movement play pivotal roles in developing children's rhythm and coordination. As children grow, their social and cognitive abilities flourish in tandem with their engagement with music.

Incorporating children's songs or poems into rhythmic activities, encouraging them to dance, move, or clap in time with the rhythm, fosters their musical sensitivity. This process, known as "Integrating Rhythm into Movement," involves combining multiple rhythms into a cohesive movement pattern, a concept first discovered by Dutch scientist Christian Huygens in 1665.

Moving forward, there is a need to update the curriculum for physical education, music, and performing arts in early childhood education. Increasing weekly hours for these subjects would better meet the developmental needs of young learners, reflecting the changing demands of technology and innovation in education. Expanding the time dedicated to music and physical movement would offer more opportunities for children to grow both physically and creatively, setting a solid foundation for their future development.

References

- [1] D. Bayarlakh, Developing Motor Coordination in First-Grade General Education Students through Physical Education Classes, Ph.D. dissertation, Ulaanbaatar, 2013.
- [2] J. Durrant, Positive Methods in Daily Life Education, Ulaanbaatar, 2010, pp. 111–112.
- [3] Core Curriculum for Primary Education: Guide, Colorful LLC, Ulaanbaatar, 2014.
- [4] S. Ichinkhorloo, On Teaching Six-Year-Old Children, Ulaanbaatar, 2009.
- [5] D. Campbell, Listening to and Developing Music for Children's Upbringing, Ulaanbaatar, 2012.
- [6] O. Enkhmaa and B. Oyuuntssetseg, Methods and Approaches for Studying and Developing Young School Children: Recommendations, Ulaanbaatar, 2012.
- [7] C. Battya, H. Budhhuu, S. Jamts, B. Ganbat, D. Batsukh, and L. Urtnasan, First-Grade Curriculum for 12-Year General Education Schools, Ulaanbaatar, 2008.