


ORIGINAL ARTICLE

Development of gross motor skills: contributions to motor activity in 3-year-old children

Desarrollo de la motricidad gruesa: aportes a la actividad motriz en niños de 3 años

Gema L. Loor 

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Abstract Gross motor skills are one of the areas of psychomotor development that contribute to the child's overall development. Early stimulation of motor skills enables the acquisition of precise movements that allow the child to experience new abilities. In this sense, it is a skill acquired for mastering large movements and movements. This study aimed to design a system of educational activities for stimulating gross motor skills in 3-year-old children. In this descriptive-exploratory study, using a mixed approach, the instruments employed were direct observation guides for the children and interviews with the teachers. It was shown that gross motor development primarily depends on the maturation of the children's muscles, making it necessary to understand the degree of development and the level of stimulation in the motor area of tone and muscle strength. Gross motor skills refer to the movement of the large parts of the body and encompass emotional and intellectual aspects, making them a fundamental tool for the child's holistic development.

Keywords motor development, early stimulation, psychomotor skills.

Resumen La motricidad gruesa es una de las áreas del desarrollo psicomotriz que contribuye al desarrollo integral del niño, por lo que la estimulación temprana de las habilidades motoras, posibilitan adquirir movimientos precisos que le permiten las experimentar nuevas habilidades. En este sentido, es una destreza que se adquiere para el dominio de los grandes movimientos y desplazamientos. Se definió como objetivo del presente estudio, diseñar un sistema de actividades didácticas para el estímulo de la motricidad gruesa en niños de 3 años. En el estudio de tipo descriptivo-exploratorio, bajo un enfoque mixto se emplearon como instrumentos, la guía de observación directa a los niños y entrevista a los docentes. Se mostró que el desarrollo motor grueso depende principalmente de la maduración que los niños tengan en sus músculos, es necesario conocer el grado de desarrollo y nivel de estímulo en el área motora del tono y fuerza muscular. La motricidad gruesa se refiere al movimiento de las grandes partes del cuerpo y engloba aspectos emocionales e intelectuales, lo que la convierte en una herramienta fundamental para el desarrollo holístico del niño.

Palabras clave desarrollo motor, estimulación temprana, psicomotricidad.

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Gema L. Loor
gema.loor2854@utm.edu.ec

Facultad de Filosofía, Letras y Ciencias de la Educación, Universidad Técnica de Manabí, Portoviejo, Ecuador.

Introduction

Motor development in early childhood is a fundamental pillar for the comprehensive growth of children, laying the foundation for acquiring more complex skills in later stages of life. Gross motor skills, which involve large and coordinated body movements, affect physical, cognitive, and emotional development. Children age three go through a critical stage of discovery and exploration, making them particularly receptive to stimuli that enhance their mobility and coordination. According to Sanipatin & Delgado (2022), early stimulation of motor skills during early childhood promotes motor, affective, and intellectual development.

Deficiencies in motor development can negatively impact a child's relationship with themselves and their environment by limiting their ability to explore and learn through movement. García & Isaza (2020) emphasized that activities such as walking, running, jumping, and playing foster both physical development and the child's ability to interact with their surroundings. This sequential and dynamic process evolves throughout childhood, allowing children to acquire fundamental motor skills that grant them greater physical and functional independence.

Various studies reinforce the importance of motor activities in the child's body schema. Mejía (2017) pointed out that these activities offer educational centers an innovative perspective, motivating teachers, parents, and children to engage in motor exercises that benefit both motor and cognitive development. Gavilanes (2022) emphasized that abilities such as balance, strength, and coordination are enhanced through specific activities that positively impact children's physical, social, and emotional development.

Gross motor development is intrinsically related to muscle maturation and the level of stimulation received. Merino (2022) highlighted that adequate muscle tone and strength are determining factors for optimal motor skill development in early childhood. He also noted that gross motor skills improve cognitive aspects such as attention, memory, and social skills.

Jean Piaget's theory asserts that intelligence is constructed through the active interaction of the child with their environment, leading to a series of qualitative stages of cognitive development: sensorimotor, preoperational, concrete operations, and formal operations. This study focused on the preoperational stage (2-7 years), where children begin to use language to symbolically represent their world, although they maintain egocentric thinking and difficulty adopting other perspectives. During this phase, symbolic play and mental images complement motor activity, which remains fundamental.

Key components of gross motor skills include body schema, which is a child's mental representation of their body and its parts in relation to space, both at rest and in motion. Another aspect is body control, which involves mastering balance and precision in movements, achieved through adequate muscle coordination. Lastly, laterality, which reflects the preference for using one side of the body (right-handed, left-handed, ambidextrous), develops through genetic interaction and motor experiences.

Three-year-old children go through a stage of maturational development where they refine skills such as climbing stairs, running, jumping, and riding tricycles. This progress provides them greater independence and autonomy, integrating their physical, cognitive, and emotional advances in a dynamic and exploratory learning framework.

Despite its importance, the stimulation of gross motor skills is not always effectively addressed in educational and family settings. It is essential to design pedagogical strategies that, in a playful and structured manner, promote the development of these skills from an early age. In this context, this research aimed to design a system of educational activities to stimulate gross motor skills in three-year-old children at the Jean Piaget Educational Unit in Portoviejo, Ecuador. This approach seeks to support the motor development of young children and ensure a solid foundation for their comprehensive growth and future quality of life.

Methodology

This descriptive and exploratory study (Sampieri & Mendoza, 2018) analyzed the variables related to gross motor skills and didactic activities in 3-year-old children, considering all their dimensions. A mixed approach was used to understand the experiences and behaviors associated with developing motor skills at this stage of childhood.

The population consisted of 40 children from sublevel I of Initial Education and 8 teachers from the Jean Piaget Educational Unit in Portoviejo, Ecuador. A non-probabilistic intentional convenience sampling method was used to select 4 teachers and 18 three-year-old children as the sample, based on the criterion that this age is key for reaffirming independence and training the muscles through various motor movements.

The system of activities for the development of gross motor skills in three-year-old children at this educational institution was validated through a survey of 12 specialists, including four doctors in Education Sciences, three child psychologists, and five master's degree holders in Initial Education.

Theoretical methods, including analysis and synthesis, were used to break down and understand the key components related to gross motor skills. The inductive-deductive approach was also applied to generalize individual observations about psychomotor development and theoretically validate the findings. Furthermore, a documentary analysis was conducted through a systematic review of academic literature, covering books, articles, and relevant documents, providing a solid foundation for the conceptual framework of the research.

The empirical methods employed in this study included direct observation, using an observation sheet to diagnose the children’s gross motor skills and abilities. Structured interviews were also conducted with the teachers, using questionnaires designed to assess their level of preparation in teaching gross motor skills. Additionally, the mathematical-statistical method was applied to calculate percentages, tabulate data, and analyze the results obtained during the diagnosis.

The instruments used were designed considering the skills of the Ecuadorian Initial Education Curriculum (2014), specifically in the areas of body exploration and motor skills. Before their application, the instruments were validated by nine teachers specializing in Initial Education.

Results and discussion

The evaluation focused on three key aspects: pedagogical relevance and innovation, alignment with the objectives and skills of gross motor development according to the Ecuadorian Early Education curriculum (Ministry of Education, 2014a), and the feasibility of implementation in 3-year-old children in various Early Education service models.

The activities were pedagogically relevant and innovative (100%), aligned with the objectives and skills outlined in the national curriculum (98.2%), and easy to apply in the system across different educational contexts for three-year-old children (100%).

The criteria and suggestions collected during the validation phase were considered for final adjustments to the proposed system of didactic activities. 99.4% of the criteria indicated that the proposal was feasible and relevant for implementation, supporting its potential to generate positive results in the intended context. The diversity of knowledge and experiences represented by the specialists contributed to the strength of the activity system, as it reflected a comprehensive evaluation grounded in multiple perspectives.

Table 1 presents the evaluation of gross motor development in 3-year-old children from the Jean Piaget Educational Unit. The results revealed a mixed picture regarding the development of various motor skills in the 18 children in the sample. Among the main deficiencies, the ability to run in a straight line was not fully developed in all the children (55%). 44% showed difficulties in climbing and descending stairs while alternating their feet.

Less than half of the children (39%) achieved the ability to walk in a coordinated manner while maintaining balance, indicating that a significant proportion required support to improve their coordination and balance across different distances and rhythms.

More than half (55%) of the children demonstrated the ability to throw a large ball forward with both hands, reflecting relatively advanced gross motor development in this activity. A similar pattern was observed in the ability to kick a ball forward, where 56% of the children consistently succeeded.

Table 1. Observation guide applied to 3-year-old children

Gross motor skills of 3-year-old children	Always		Sometimes		Never	
	N	%	N	%	N	%
Walks coordinately while maintaining balance at different distances, orientations, and rhythms, using the entire space	8	39	6	33	4	22
Throws a large ball with both hands forward	10	55	4	22	4	22
Runs in a straight line	8	39	6	33	4	22
Climbs and descends stairs, alternating feet	10	66	4	22	4	22
Kicks a ball forward	10	56	6	33	2	11
Keeps the head upright without visible effort	13	72	4	22	1	5
Holds a relatively heavy object (suitable for their age)	8	44	4	22	6	33
Performs movements when listening to songs, trying to follow the rhythm	9	50	7	39	2	11
Jumps with both feet together	8	44	9	50	1	5
Performs exercises involving segmented movements of large body parts, such as the head, torso, and limbs	8	44	6	33	4	22

Seventy-two percent of the children could keep their heads upright without visible effort, while the remaining children might exhibit neck muscle weakness or underdeveloped postural control. Half of the children could perform movements to songs and attempt to follow the rhythm, highlighting differences in the ability to integrate auditory stimuli with body movements, which is common in motor development at this age.

For jumping with both feet together, 44% of the children achieved this consistently, indicating that a significant percentage are still in the refinement process. When lifting a relatively heavy object (appropriate for their age), 54% of the children managed it with difficulty. Most (55%) showed challenges in their gross motor skills by being unable to perform exercises involving segmented movements of large body parts, including the head, torso, and limbs.

Among the activities carried out to foster the development of gross motor skills in 3-year-olds (Table 2) included running games, rhythmic dances, balance activities, crawling, and scooting games. Some activities were not performed due to time constraints or limitations related to parental overprotection.

Coordination, jumping, and climbing stairs were identified as the gross motor skills with the greatest difficulty. These challenges were linked to a lack of stimulation in some children and the consequences of being born during the pandemic. Outdoor activities were considered the most effective, providing children more space for gross motor movements.

Family involvement was included by sending activities to be performed at home; however, these were often not completed due to lack of time or because some parents preferred to give their children technological devices. Teachers agreed that didactic activities improved gross motor skills and fostered essential physical-motor development abilities in children, influencing aspects such as concentration and autonomy.

The design of the proposed system of didactic activities for the development of gross motor skills in 3-year-olds at the Jean Piaget Educational Unit was based on an organized and structured set of tasks, actions, or exercises designed with a specific purpose. These activities were planned sequentially and coherently, following a methodological approach that facilitates active participation from children and promotes the acquisition of motor skills. In the teaching-learning pro-

Table 2. Educational activities to stimulate gross motor skills in 3-year-old children

Activity	Title	Objective	Teaching resources	Estimated time	Activity development	Evaluation
1	Adventure circuit	Perform a circuit to foster crawling, running, and jumping skills	Cones, ropes, mats, plastic hoops, low bench	30 minutes	Organize a circuit with stations: zigzag running between cones, jumping inside hoops, climbing a low bench, crawling under a rope	Observe if children can perform the actions correctly, evaluating zigzag coordination, control while jumping and crawling
2	Animal walk	Strengthen large body muscles and improve visuomotor coordination	Outdoor area, animal illustrations, ample space	10–15 minutes	Children imitate walking like different animals: cat, rabbit, elephant, duck. It can be a friendly competition or a line following instruction	Observe if children correctly imitate movements and show improvements in balance, strength, and coordination

Activity	Title	Objective	Teaching resources	Estimated time	Activity development	Evaluation
3	Catch the ball	Improve hand-eye coordination and arm strength	Soft balls of different sizes	15 minutes	Pair up children to throw and catch balls at different heights and distances	Evaluate the ability to throw and catch and observe progress in accuracy and throwing strength
4	Dancing with shadows	Develop coordination and flexibility by moving in sync with projected shadows	Shadow projector, music, ample space	15 minutes	Use a projector to display shadows on the wall. Children imitate projected figures or follow shadow patterns as the music changes speed	Evaluate coordination, flexibility, and difficulty in movements
5	Balloon challenge	Develop coordination and arm strength through balloon play	Inflated balloons	15 minutes	Each child keeps a balloon in the air by hitting it with their hands. Increase difficulty by using one hand, feet, or multiple balloons	Assess endurance, strength, and coordination during the activity
6	Giant dice game	Improve leg strength and coordination by performing specific movements indicated by the dice	Large dice with movement instructions	15 minutes	Each child rolls the dice and performs the indicated action (jump, spin, run, etc.). All follow the same exercise, with optional challenges or combinations	Observe if children correctly perform movements indicated by the dice
7	Catch the stars	Develop body movement and coordination by reaching for the stars	Bright-colored ribbons, stars, LED lights	15 minutes	Hang bright ribbons for children to "catch" by jumping or moving. Introduce challenges like hopping on one foot or running before catching the ribbons	Evaluate coordination to catch ribbons and observe improvements in balance

cess, this system emerged as a solution to address practical problems in Early Education, becoming an effective tool for improving gross motor development in children (Delgado & Godoy, 2022).

The activity system, being flexible and development-oriented, proved to be a valuable tool for addressing practical problems in the educational process and facilitating a more inclusive teaching approach. This system is based on systematicity, where each activity complements the others and is applied in an orderly manner. It functions as a subsystem with sequential actions free from interruptions that could affect the effectiveness of the results (Socorro, 2019).

The system of activities exhibited coherence, communicativeness, and reflexivity, fostering independent and continuous learning, as well as the holistic development of children. It promoted improving educational practices and achieving set objectives (Estrella & Pino, 2021). This meant that each activity was designed according to the classroom's specific needs, with planned skills aimed at achieving the established goals. According to the Ministry of Education (2014b), learning environments must integrate the physical setting, both inside and outside the classroom, with the interactions of participants within a given timeframe, facilitating meaningful learning experiences for children. The activities followed these guidelines and focused on fostering more effective learning experiences. They were dynamic, enjoyable, and meaningful, as early education operates under the "play-work" modality, where children learn while having fun.

Conclusions

The validation of the proposal by specialists showed high acceptance and recognition of the system's effectiveness in didactic activities, highlighting its usefulness in the early detection of psychomotor disorders. The results indicated that while most children exhibit adequate gross motor development, there are areas where some require additional support or practice. This development is crucial for children's physical, cognitive, and social well-being, serving as a foundation for their independence. The diagnosis identified specific difficulties in developing these skills, underscoring the importance of continuous observation by teachers. The proposed system, being both flexible and innovative, provides an effective tool for assessing and addressing issues in gross motor skills, enabling early intervention.

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Conflicts of interest

The authors declare that they have no conflicts of interest.

Author contributions

Gema L. Loor: Conceptualization, data curation, formal analysis, research, methodology, software, validation, visualization, writing the original draft, writing, review and edi-

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Data availability statement

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Statement on the use of AI

The authors acknowledge the use of generative AI and AI-assisted technologies to improve the readability and clarity of the article.

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