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Reviews. Influence of Movement on the Learning of Chilean Childhood: A Systematic Review
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Influence of movement on the learning of chilean childhood: a systematic review

Influencia del movimiento en los aprendizajes de la infancia chilena: una revisión sistemática

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Abstract

Movement is something innate in the animal world, and in humans, it is a form of expression, locomotion, and communication. Therefore, in one way or another, it is present at all times, including teaching-learning processes. The main objective of the research is to evaluate the existing evidence on the influence of movement on the learning of boys and girls in the Chilean nursery stage (0 to 6 years). For this, a search was carried out in the Web of Science, Scopus, and Google Scholar databases, using keywords: movement, learning, and early childhood education, considering only empirical studies and other inclusion and exclusion criteria. The results show a relationship between learning and movement, recognizing that it is more significant when integrating movement into the classroom in a comprehensive manner. This approach improves behaviors within the classroom and enhances the effectiveness of using technology in teaching movements. It is concluded that movement is a key element in the construction of learning. However, the limited number of documents regarding this subject in early childhood or preschool education is evident.

Keywords: learning; body language; early childhood education; movement.

Resumen

El movimiento es algo innato en el mundo animal, y en los humanos, es una forma de expresión, locomoción y comunicación, por lo tanto, de una u otra forma está presente en todo momento, incluyendo los procesos de enseñanza-aprendizaje. El objetivo principal de la investigación es evaluar la evidencia existente sobre la influencia del movimiento en el aprendizaje de los niños y niñas de la etapa parvularia chilena (0 a 6 años). Para esto se realizó una búsqueda en las bases de datos Web Of Science, Scopus y Google Scholar, con el uso de palabras claves: movimiento, aprendizaje y educación parvularia, considerando sólo estudios empíricos y otros criterios de inclusión y exclusión. Los resultados dan cuenta de esta relación entre aprendizaje y movimiento, reconociendo que es más significativo al integrar el movimiento al aula de manera integral, con ello mejora los comportamientos dentro de ella y, además, la efectividad que tiene el uso de tecnologías dentro de la enseñanza de los movimientos. Se concluye sobre la importancia del movimiento como elemento clave en la construcción del aprendizaje, pero a la vez, queda en evidencia la baja cantidad de documentos respecto a lo anterior, en etapa de la infancia o educación parvularia.

Palabras clave: aprendizaje; expresión corporal; educación de la primera infancia; movimiento.

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Introduction

Currently, there is a great interest in understanding how movement influences children's learning. Various authors have addressed different aspects of this relationship, from the impact of free play on cognitive development to the effects of physical education on socio-emotional development (Araya, 2017; Ferreira, 2011; Sugrañes et al., 2007).

Classical psychomotricity authors such as Wallon, Le Bouch, and Aucouturier consider movement as an essential part of the discipline (Camargos & Maciel, 2016). Their ideas suggest that children learn and connect with the world through movement. Thus, future learning will largely depend on the quality of movements that allow them to explore their environment. Movement is also the first mode of communication for children from birth, linking with levels of motor expressiveness. This means that through movement, children express their psyche and develop in three fundamental areas: motor, cognitive, and affective (Araya, 2017; Ferreira, 2011; Sugrañes et al., 2007).

Movement plays a crucial role in human development, particularly in children, as it fosters creativity, problem-solving, communication, relationships with others, attention, concentration, and memory (Portillo Mendoza, 2020). Therefore, children must be in constant movement from birth, as it serves as their primary learning source alongside play, which is a satisfying and pleasurable activity for them. Play is a fundamental strategy for learning and acquiring autonomy and independence (Andrade Carrion, 2020).

However, in Chile, there are few studies guiding movement-based learning practices. Most of the available studies are from foreign countries. Only one study focuses on Chile, related to the hours of play allocated in preschool education. The results indicate a significant deficit, with Chilean children lacking 6,000 hours of play by their seventh year, instead of the expected 15,000 hours (Author et al., 2021). This is concerning because, as will be discussed later, movement-based learning generates better academic results and promotes balanced and holistic development in children, covering physical, cognitive, emotional, social, and creative aspects. These activities not

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only support growth and learning but also contribute to children's overall well-being and lay a solid foundation for lifelong learning.

Preschool education in Chile plays a fundamental role in children's comprehensive development, preparing them for academic and personal success. Studies indicate that during this stage, the brain develops at a faster rate due to an overproduction of synapses, opening opportunities for language development and cognitive functions (Cortázar & Vielma, 2017, p. 20). Therefore, it is essential to incorporate the principles of psychomotricity into educational programs, allowing children the space to build their own learning through movement.

This study aims to evaluate the existing evidence on the influence of movement on the learning of preschool-aged children, recognizing movement as a crucial factor in their development.

Methodology

According to Fortich-Meza (2013) and Sánchez-Serrano et al. (2022), a systematic review is a scientific research tool used to summarize, evaluate, and communicate research results and implications while minimizing bias and random error. This involves employing specific strategies.In this case, the systematic review method used is PRISMA, a tool that helps improve clarity and transparency in systematic review publications (Pérez, 2012; Ciapponi, 2021). PRISMA consists of a statement describing the steps to follow, including continuously documenting the process, validating research development, and creating a flow diagram that graphically represents the criteria used in each case. This diagram indicates retrieved, selected, and discarded documents (Sánchez-Serrano et al., 2022).

Search Strategies and Information Sources

For the search process, articles published between 2018 and 2024 were included. The “advanced search” option was used with the keywords “movement,” “learning,” “kindergarten,” and “education,” combined with the Boolean operator “AND.” This search was conducted between April and May 2024. Empirical scientific articles were

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sought using the Web of Science (WOS), Scopus, and Google Scholar databases. Table 1 shows the number of results obtained.

Table 1

Number of results obtained

Database	Search strategy used	Number of results
WOS	Movement AND Learning AND Kindergarten AND Education.	41
Scopus	Movement AND Learning AND Kindergarten AND Education.	53
Google Scholar	Movimiento AND Aprendizaje AND Educación Parvularia.	62

Fuente: Own elaboration.

Regarding the selection criteria, scientific articles published in the databases mentioned above, in Spanish and English, were included. The inclusion and exclusion criteria applied help focus the study's objective to provide more contextualized information, as detailed in Table 2.

Table 2

Inclusion and exclusion criteria for article selection

Aspect	Inclusion criteria	Exclusion criteria
Research country	All countries	Not applicable
Languages	Spanish and English	Other languages
Time range	Publications between 2018-2024	Published before 2018
Type of publication	Scientific articles	Theses, books, and other documents
Access type	Open access	Restricted access
Methodology type	Empirical research	Theoretical literature reviews, systematic reviews, essays, and reviews
Research context	Early childhood education	Primary, secondary, and university education

Source: Own elaboration

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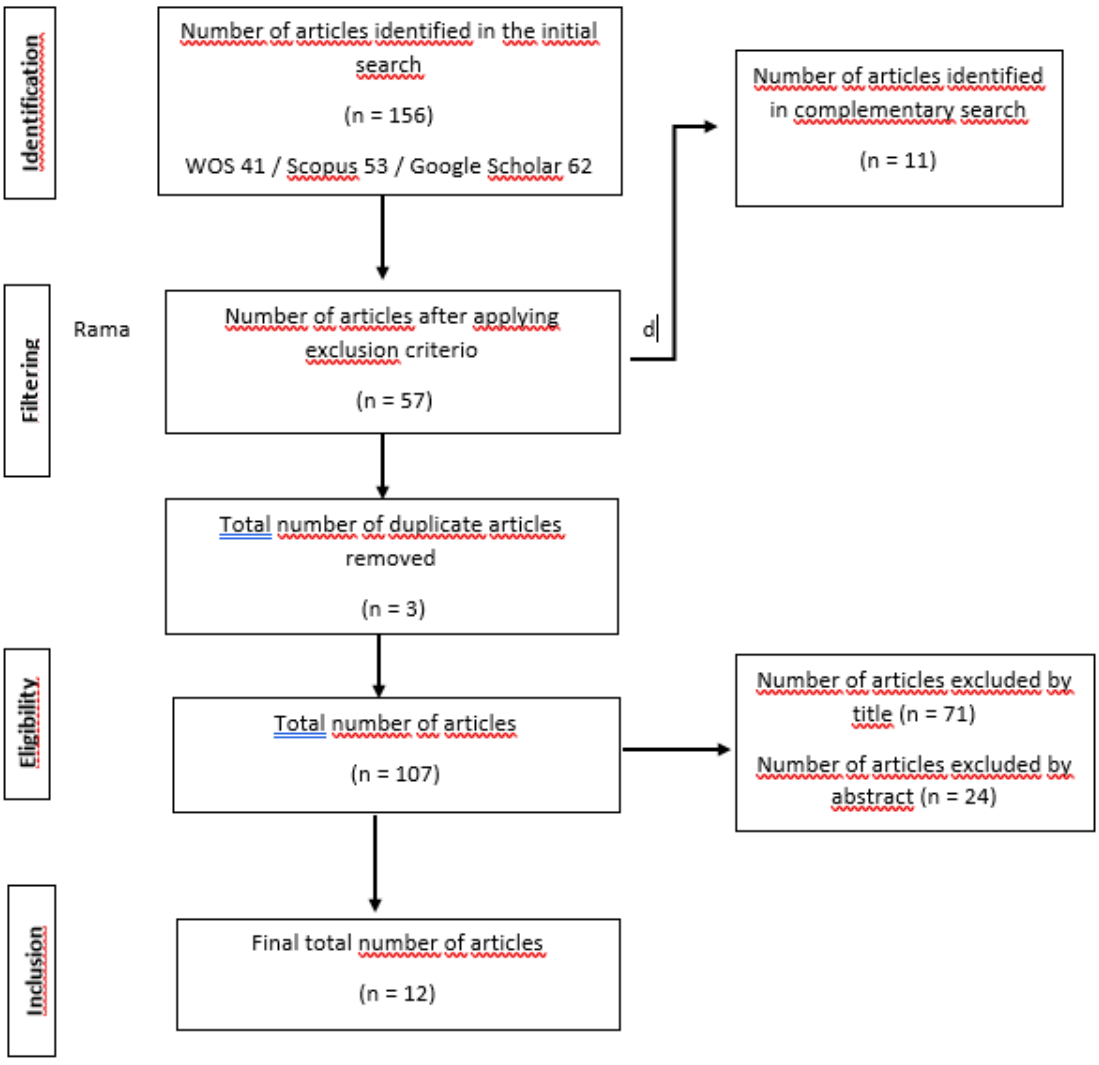
After (1) applying the inclusion and exclusion criteria, (2) the identified articles were analyzed, and duplicates across different databases were removed. Then (3), the titles, abstracts, and results were reviewed to identify relevant articles for the research. Finally, (4) all selected articles were organized in a table by year, author, title, and journal name for a complete and thorough reading to determine a final number of articles for this systematic review. Figure 1 illustrates the selection process.

Figura n° 1

Information flow process through the different phases of the systematic review



Fuente: Own elaboration.

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Results

Through the literature review and the process of synthesizing information, the results presented in Table 3 are provided, this table includes the authors, year of publication, indexing, journal name, sample size, and study findings. The analysis of these results allowed for the creation of four categories: (1) the characteristics of the studies included in the review are described; (2) various studies' perspectives on how movement influences the learning of preschool-aged children are presented; (3) the use of technology and its relationship with movement as a tool to promote learning is discussed and (4) the benefits of movement in the classroom are interpreted.

Table 3

Results of the systematic review

No.	Authors	Year	Indexing	Journal	Sample	Study Findings
1	Bidet-Ildei, C., Vilain, C., Fevin, S., Francisco, V., y Vibert, N.	2024	WOS	Frontiers in Education	43 children	Results suggest that kinematics representing counting can foster the acquisition of number meaning in young children. In other words, kinematics can be crucial for developing numerical processing
2	Capio, C., Lee, K., Jones, R, Masters, R.	2021	Scopus	Frontiers in Psychology	43 children	Results suggest that kinematics representing counting can foster the acquisition of number meaning in young children. In other words, kinematics can be crucial for developing numerical processing
3	García, D., Chávez, M., Cruz, M., Guedea, J., Velázquez Saucedo, G., Zubiaur González, M.	2018	Google Scholar	Sportis. Revista Técnico-Científica del Deporte Escolar, Educación Física y Psicomotricidad.	66 children	A program integrating motor activities with executive functions showed significant changes in cognitive, motor development, executive functions, and reading and writing processes.
4	Hudson, K., Ballou, H., y Willoughby. M.	2020	Google Scholar	Developmental Science	53 children	Motor skill-based interventions are a developmentally appropriate and ecologically valid approach to fostering school readiness skills in early childhood.

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5	Jarraya, S., Wagner, M., Jarraya, M., y Engel, F.A.	2019	WOS	Frontiers in Psycology	45 children	Results indicate a significant positive effect of yoga on visual attention scores compared to the control group. Twelve weeks of yoga in kindergarten improved visual attention, visuo-motor accuracy, and reduced inattention and hyperactivity behaviors in 5-year-old children.
6	Jia, NX., Zhang, XJ., Wang, X., Dong, XS., Zhou, YA., y Ding, M.	2021	WOS	Frontiers in Psycology	40 children (5-6 years old)	Varied exercise plays a significantly beneficial role in promoting cognitive development in 5-6-year-old children.
7	Lalama, A. y Calle, M.	2019	Google Scholar	Sathiti: sembrador	10 teachers and experts	Early psychomotor development is essential for early stimulation, generating greater neural connections that enhance cognitive, social, emotional development, concentration, body awareness, spatial-temporal notions, and rhythm. Neuromotor circuits are proposed as an opportunity to strengthen children's psychomotricity and improve learning.
8	Mena, C., Flores, C., Arteaga, P., Saldaña, D. y Navarrete, E.	2021	Google Scholar	Cuadernos de Investigación Educativa	6 early childhood educators	Results highlight that educators understand and value play as a means of learning. However, its implementation is often instrumentalized rather than naturally integrated.
9	Mohammad, M., y Reda, H.	2023	WOS	Education and Information Technologies,	43 children	Teachers should use video media as a tool to improve children's basic movement skills. Video resources can help children with poor movement skills learn more efficiently in kindergarten.
10	Pastor-Vicedo, J., Martínez-Martínez, J., Jaén, Y., y Prieto-Ayuso, A.	2019	Google Scholar	Revista Euroamericana de Ciencias del Deporte	50 students	Results reflect the importance of physical activity in academic performance and the transversal benefits it provides to health
11	Autor, Flores, M., Rojas, J., Saavedra, M., Domínguez, J. y	2021	Google Scholar	Revista Infancia, Educación y Aprendizaje	X early childhood educators and 1 early childhood educatio	The study examines changes in body awareness and movement development, emphasizing how psychomotricity is understood in the classroom. It concludes that both guided tasks and direct instruction limit students' freedom, creativity, and spontaneity.

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	Espinoza, F.				n professional	
12	Vujičić, L, Peić, M., y Petrić, V.	2020	Scopus	Journal of Elementary Education	34 children from nurseries in Rijeka	Findings suggest that integrated movement-based learning significantly improves the quality of the educational process in early childhood and preschool education.

Fuente: Own elaboration.

Contextual Characteristics of the Included Publications

Based on the search strategy used and the established criteria, 12 empirical articles were included. These were published in various specialized journals on education, psychomotricity, physical education, and psychology, such as: Journal of Elementary Education (1), Frontiers in Education (1), Sportis. Revista Técnico-Científica del Deporte Escolar, Educación Física y Psicomotricidad (1), Developmental Science (1), Frontiers in Psychology (2), Sathiti: sembrador (1), Cuadernos de Investigación Educativa (1), Education and Information Technologies (1), Revista Euroamericana de Ciencias del Deporte (1), and Revista Infancia, Educación y Aprendizaje (1).

Regarding the language of publication, 9 out of 12 articles were published in English, while 3 were in Spanish. All the included articles used empirical research methods. In terms of study participants, the total number comprised 532 preschool children and approximately 17 educators and experts in the field.

Concerning article indexing, *Google Scholar* accounted for the highest number, with six articles, followed by *Web of Science* with four, and *Scopus* with two. The studies were published between 2018 and 2024, with one article from 2018, three from 2019, two from 2020, three from 2021, one from 2023, and one from 2024. This indicates that most research on the relationship between movement and learning in preschool children was conducted between 2019 and 2021.

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Movement-Based Learning

To teach children through movement, it is essential to understand the fundamental laws of psychomotricity, which include the cephalocaudal and proximodistal principles (Lalama Franco & Calle Cobos, 2019). These principles allow the integration of relevant strategies in educational settings, making movement-based learning the central axis. This, in turn, provides several benefits for preschool children, such as cognitive development stimulation, affective and relational situations, symbolic and sensory-motor experiences, reinforcement of reading processes, as well as significant improvements in motor skills (both fine and gross), executive functions, and early numerical skills (Hudson et al., 2020; Lalama Franco & Calle Cobos, 2019; Miller et al., 2013, as cited in García Fernández et al., 2018).

On this topic, Rodríguez et al. (2019) point out that throughout history, movement has not been given the importance it deserves in education. Instead, it has often been used merely as a means of control to prevent it from interfering with children's intellectual learning. This perspective has limited the potential for motor expressiveness in educational settings (as cited in Author et al., 2021). López (2017) adds that for many years, preschool education has been shaped into a preparatory stage for formal schooling, with children sitting in chairs learning letters and numbers at an age when they should be exploring the world through play, using their hands and eyes to discover their surroundings (as cited in Mena Bastías et al., 2021).

For this reason, preschool education should establish a solid foundation in movement mastery, as studies show that there is still a knowledge gap limiting the understanding of how movement competency significantly influences other areas of development and learning (Capio et al., 2021).

Lastly, movement in preschool education is strongly linked to play, which is a natural and fundamental activity in early childhood learning. Play fosters higher cognitive functions, emotional development, socialization, reality comprehension, and adaptation—essential aspects for optimal development (Lansdown, 2013, as cited in Mena et al., 2021). Wedekind has studied the importance of play and its effects on children's development, emphasizing that play allows children to explore and interact

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with others, fostering diverse skills and stimulating learning. Research has shown that children need 15,000 hours of play by their seventh year of life (Author et al., 2021, p. 74). However, in Chile, this goal is not met, with a 6,000-hour deficit compared to international standards. On average, Chilean children play 8,760 hours by the age of seven, distributed as follows: 0 to 2 years old: 2,190 hours; 3 to 5 years old: 4,380 hours 6 to 7 years old: 2,190 hours (González, 2015, as cited in Author et al., 2021, p. 74).

This deficit underscores the need to promote movement-based learning, particularly through play. Studies indicate that just two structured and systematic sessions per week are sufficient to enhance motor skills, cognitive abilities, executive functions, reading, writing, and math skills in preschool children (García et al., 2018; Author et al., 2021).

The Use of Technology in Teaching Movement

Studies conducted in Asia and Europe by Mohammad & Reda (2023) and Bidet-Ildei et al. (2021) highlight the use of technological tools for teaching motor skills, including both fine and gross movements, to enhance learning. This finding is intriguing, as technology is often perceived as a factor contributing to sedentary behavior. However, these studies challenge the idea of completely eliminating technology, instead promoting its use to encourage movement in children.In this context, it is crucial to recognize that effective technology use in education requires digital teaching skills. Teachers must possess the necessary knowledge and ensure that technology is purposefully integrated into the curriculum. This means planning its use in advance to prevent it from being employed indiscriminately or without pedagogical intent (Mohammad & Reda, 2023).

Technology is now present in nearly every environment where children develop. Psychologist Susana Rodríguez emphasizes that the **rapid advancement of technology** and its **uncontrolled use at home** have led children to prefer screen-based entertainment over physical activities that promote body control (Lalama & Calle, 2019, p. 217).

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Moreover, technology is no longer just a source of knowledge, social interaction, or human capability enhancement. It has also become an effective **pedagogical resource**. This does not necessarily mean using specialized educational software or hardware; rather, it includes various tools that facilitate learning and interactions between students and teachers—such as videos (Mohammad & Reda, 2023).

Through research carried out by Mohammad and Reda (2023) and Bidet-IIdei et al., (2021), it has been shown that technology can also be useful regarding movements. On the one hand, Mohammad and Reda (2023), in their study, obtained results that the group that is presented with videos showing the execution of movements has a better performance in the evaluations of basic motor skills, which in turn leads to teachers generating an impact on the improvement of these skills through videos. And on the other hand, there is the study by Bidet-lldei et al., (2021), who obtained positive results regarding those children who were shown the point light screens with the demonstration of the movement of the fingers, so that by observing the movement of the fingers and at the same time using their own fingers, boys and girls acquire the meaning of the number in a better way.

This is how, when talking about movement and its enhancement, we can pedagogically resort to the use of technologies, as long as they are used in an opportune manner and really mean support for education. In this way, children will see their own learning process, assessing their progress and detecting their difficulties, in order to work on them and improve over time. These videos are thus a contribution in various areas, such as recording the process, feedback and evaluation of motor learning.

Benefits of Movement in the Classroom

Piaget (1952), in his theory indicates that “action is the source of perception and the basis of thought, and the psychological development of children is the result of the adaptation of the subject to the object through action” (as cited in Jia et al., 2021, p. 2). Faced with this, various authors (Jarraya et al., 2019; Jia et al., 2021; Pastor-Vicedo, 2019) carried out studies that involve the improvement of learning and behaviors in

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classrooms through movement, which is applied through yoga practice, various exercises and active breaks in boys and girls in early childhood education ages.

The research carried out by Jarraya et al., (2019) showed that the class that received yoga sessions improved in cognitive and behavioral tasks, since yoga is an effective sensorimotor training for boys and girls to reduce emotional, cognitive and behavioral problems. This study also showed that hyperactivity and attention deficit behavior improved significantly in the yoga group compared to the other groups in the study.

On the other hand, Jia et al., (2021) in their study on the effects of performing a variety of exercises on the cognition and mental health of boys and girls, obtained results that by diversifying the exercises performed on boys and girls in China, cognitive-motor interactions are involved that have potential benefits on the cognition of boys and girls, improving temporal-spatial perception, attention, observation, also boys and girls to whom various exercises were applied revealed a tendency to improve cognitive ability, socialization and lifestyle habits. Finally, the study by Pastor-Vicedo et al, (2019) consisted of applying active breaks to one group, while another group did not receive such instances and subsequently the evaluation process was carried out, which obtained results that support the positive relationship between physical activity and the improvement in academic achievements, as well as the improvement of cognitive health and optimization of academic performance.

Several sources have suggested that various play-based exercises might be particularly suitable for preschool-aged children and provide more benefits than a single exercise (Scalise et al., 2018, as cited in Jia et al., 2021). In addition, physical exercise has positive effects on children's academic performance, which include improving their concentration, behavior, and everything that positively impacts learning processes (Pastor-Vicedo et al., 2019). Some systematic reviews on simple aerobic exercise have found that more exercise and less sedentary behaviors may have certain health benefits for the physical, cognitive, social, and emotional development of preschool-aged children (Carson et al., 2017; Kuzik et al., 2020; as cited in Jia et al., 2021, p.2). The articles mentioned above suggest that by participating in physical activities with other children, they learn to share, collaborate, communicate effectively, and respect the

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opinions and limits of others, in order to achieve common goals, which contributes to the formation of a solid foundation for social and emotional skills throughout the life of each child, which improves behavior in the classroom and contributes to a positive environment that leads to better learning in children.

Discussion

In relation to learning in movement, it is important to highlight that movement is a key element in the construction of children's learning and according to what Wallon mentions, from birth, children discover the world through the senses and it is movement, which later together with language, constitutes the perfect combination that allows them to develop in each of their periods, enriching the cognitive, affective and social areas (as cited in Lalama and Calle, 2019).

For this reason, education must primarily provide them with the necessary resources and strategies to promote and enrich this development. Likewise, in these instances it is important that there is a careful and direct observation by the educator of how the child uses his or her body, managing to guide him or her to discover his or her motor and postural possibilities and how he or she relates to the world of objects and others, which will give us important information regarding the evolutionary and maturational development of the child (Arnaiz and Bolarín, 2000, as cited in Villar et al., 2021). Which as educators we must respect and consider when carrying out our learning experiences, since in this way the child will be able to demonstrate confidence and capacity in his or her willingness to face challenges, which will bring with it significant effects on the development of self-awareness, skill, resolution and initiative.

Regarding the use of technologies in teaching movement, it is concluded that these studies demonstrate that the use of videos can be an effective tool when used in a planned manner and with a clear pedagogical purpose. Although there is a general perception that technology encourages a sedentary lifestyle, research such as that of Mohammad and Reda (2023) and Bidet-lldei et al., (2021) indicates the opposite, showing that videos and other technological resources can significantly improve the learning of motor and cognitive skills in boys and girls.

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It is essential that teachers have the necessary knowledge and preparation to properly integrate these technologies into their educational practice, thus transforming the usual technological environment of boys and girls into a medium that favors their comprehensive development. In this way, the potential of technology is recognized, which not only functions as a source of knowledge and entertainment, but also as a valuable pedagogical resource that, when used well, can promote movement and active learning in boys and girls.

Studies or research carried out by different authors agree that through movement, cognitive processes are enriched and these influence the socio-affective sphere of each boy or girl, developing various practices such as yoga, active breaks and exercises can be tools that increase the comprehensive development of boys and girls (Jia et al., 2021; Jarraya et al., 2019; Pastor-Vicedo et al, 2019). All this in turn means an improvement in the classroom environment, since in the study by Jarraya et al., (2019), it is mentioned that yoga significantly improves hyperactivity and lack of attention in boys and girls, a topic of utmost relevance in classrooms, since, when there is no quiet space, all children acquire a hyperactive attitude, which can be remedied with these measures such as yoga and active breaks, which although they do not show explicit results on the concentration and attention of boys and girls, they do allow an optimization of academic performance, as well as improve their behavior and the way they relate to others.

Conclusion

The results derived from the analysis of the literature, from the different studies selected, reveal that movement plays an important role in various areas of children's development, one of them being, specifically, the significant improvement of the learning environment. Through movement, a great impact can be generated in cognitive changes, which develops better environments within the classroom. The literature indicates that the development of classes through movement positively influences essential aspects of the evolutionary development of children, as long as teacher training can generate these spaces. Regarding the limitations of this review, it is important to highlight that a very low number of documents was found regarding the influence of

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movement on the learning of children in early childhood education, especially in regard to studies carried out in Chile, since only 4 of those included in the review are Chilean, the rest are English-speaking; which may mean a limitation by not including other languages, to support the theory that movement significantly enriches and improves the learning of children between the ages of 0 and 6.

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