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PLAYFUL BEHAVIOR AND SOCIAL INTERACTION OF CHILDREN FROM 5 YEARS OLD IN A REAL PHYSICAL EDUCATION TEACHING ENVIRONMENT

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Abstract. Movement through play favors the development of physical, cognitive and social skills of schoolchildren during the early childhood education stage. Aim: A pilot study was designed with the aim of analyzing play behavior and social interaction in 5-year-old boys and girls in a real teaching environment, determining the pedagogical characteristics of this learning environment. Method: 21 primary school children (12 girls and 9 boys) aged 5 years participated in this descriptive-cross-sectional study. The evaluation of children's behavior and cognitive functions was assessed using the ACFS includes the Behavior Observation Rating Scale (BORS), which evaluates seven attitudes of the child in relation to learning: self-regulation, persistence, frustration tolerance, flexibility, motivation, interactivity and responsivity. Playful behaviour was evaluated using the Penn Interactive Peer Play Scale (PIPPS). Results: item analysis on the PEPPS scale showed only significant differences by sex on the item: tattletale, tells secrets" ($p < 0.05$). Conclusions: The findings reflected that there were no significant differences when comparing by sex. Children's experiences in a specific sociocultural context. Therefore, it should be repeated in future studies with larger samples, to validate this observational methodology of children's behavior across different learning environments.

Key words: cognition, physical education, play, coordination, motor skills.

COMPORTAMIENTO LÚDICO Y LA INTERACCIÓN SOCIAL DE NIÑOS Y NIÑAS DE 5 AÑOS EN UN ENTORNO REAL DE ENSEÑANZA EN EDUACIÓN FÍSICA

Resumen. Durante la etapa de educación infantil, el movimiento a través del juego favorece al desarrollo de las capacidades físicas, cognitivas y sociales de los escolares. Objetivo: Se diseñó un estudio piloto con el objetivo de analizar el comportamiento lúdico y la interacción social en niños y niñas de 5 años en un entorno real de enseñanza, determinando las características pedagógicas de ese ambiente de aprendizaje. Método: 21 escolares de Educación Primaria (12 niñas y 9 niños) de 5 años participaron en el presente estudio de diseño descriptivo-transversal. La evaluación del comportamiento infantil y las funciones cognitivas se evaluó utilizando la escala de Observación del Comportamiento (BORS). El comportamiento lúdico se evaluó utilizando la escala de juego interactivo entre pares (PEPPS) para profesores en español. El comportamiento lúdico se evaluó mediante la escala Penn Interactive Peer Play Scale (PIPPS). Esta escala evalúa las relaciones lúdicas en el aula de preescolar y los puntos fuertes de juego de los niños pequeños. Resultados: el análisis por ítem en la escala PEPPS mostró

únicamente diferencias significativas por sexos en el ítem: chismorrea, rumorea, dice secretos ($p < 0.05$). Conclusiones: Los hallazgos reflejaron que no existió diferencias significativas al comparar por sexos. Las experiencias de los niños en un contexto sociocultural específico. Por tanto, debe repetirse en estudios futuros con muestras más amplias, con el fin de validar esta metodología observacional del comportamiento de los niños y niñas a lo largo de diferentes ambientes de aprendizaje.

Palabras clave: cognición, educación física, juego, coordinación, motricidad.

Introduction

Motor competence can be defined as the ability of each person to carry out different motor actions, such as coordination and motor skills, which are essential for the development of daily activities during life (Barnett et al., 2016).

Motor skills as purposeful movement or simply physical activity (PA) are primary needs of preschool children. Movement is the fundamental element of physical and cognitive development, exploration of the environment and social interaction. Thus, associating the movement capacity of each person according to age, state of health and quality of life, where the body and movement are two associated and indissoluble concepts from an educational perspective (Latorre-Román et al., 2017)

Vázquez (2001) points out that motor skills are a multifunctional concept with different forms and objectives that give rise to three analytical approaches: psychomotor, biomotor and expressive. Becoming the movement in a fundamental aspect for the morphofunctional development of people, through the discovery, development of body image and social interaction in the psychomotor field, in addition to analyzing the relationship between motor skills and cognitive development of people (Duncan et al., 2022).

The learning environment comprises the psychological, social, cultural and physical setting in which learning occurs and influences learner motivation and success (Rusticus et al., 2023). In this sense, Early Childhood Education is the primary environment for the development of motor skills through the playful practice of Physical Education and other multidisciplinary environments, being considered a fundamental axis in the integral and personal development of children.(Moreira et al., 2016). Thus, motor skills are the means through which children discover their own bodies by interacting with their environment (Alonso Álvarez & Pazos Couto, 2020). Therefore, motor competence in Early Childhood Education (EF), is very immersed in the game, since it increases active participation in motor actions, promotes the integral development and the formation of the personality in schoolchildren in a more playful way (Casolo & Albertazzi, 2013). Thus, the contribution in this case of Physical Education in Early Childhood Education is to contribute to the integral formation of students in all educational areas (cognitive, motor, affective and social). Several authors highlight significant links between motor skills and the development of cognitive functions in preschool children (Latorre-Román et al., 2019; Latorre-Román et al., 2020; Wassenberg et al., 2005).

In the early childhood years, children develop fundamental motor skills such as locomotor skills and object control skills (Stodden et al., 2008) that contribute to children's physical, cognitive and social development and are essential for an active lifestyle (Lubans et al, 2010). In recent years, there has been a growing interest in the analysis of the relationship between PA and cognitive development in children (Berrios Aguayo et al., 2019; Latorre-Román et al., 2016).

During the last decade, experiences have been developed in Early Childhood Education focused on a new organization of the physical space that aimed at staging methodological innovations that in turn entailed the restructuring of the educational projects of the centers and aimed at creating a more open, flexible and dynamic school (Riera Jaume et al., 2014). In this sense, the concept of educational environment is related to the interactions that take place in it and the ability of the children to project themselves into it (Cano y Lledó., 1997).

Thus, learning environments aimed at the stimulation and development of motor skills in an environment where play is the resource par excellence, will not only favor the motor component, but will also strengthen the affective, social and cognitive competencies necessary to creatively face the growing demands of the environment during the first years of life (Sevilla., 2010).

In the early childhood years, children develop fundamental motor skills such as locomotor skills and object control skills (Stodden et al., 2008) that contribute to children's physical, cognitive and social development and are essential for an active lifestyle (Lubans et al, 2010). In recent years, there has been a growing interest in the analysis of the relationship between PA and cognitive development in children (Berrios Aguayo et al., 2019; Latorre-Román et al., 2016).

Another more contemporary understanding of the learning environment points to it as a *learning landscape,* according to which the educational space should provide children with a variety of rich settings that encourage a wide range of activities (Hertzberger., 2008).

In short, learning environments organize the space, time and resources available to create a rich environment that allows for increased opportunities for experimentation, inquiry, play and interaction (Font Ribas., 2011). Consequently, preschoolers can record things in their long-term memory in learning environments that stimulate all the senses, allowing for the joint stimulation of motor, language, and social and emotional development (Yıldırım y Akamca., 2017). Consequently, the physical environment of early childhood facilities, e.g., size, density, type of plan, activity settings, etc., are related to children's cognitive and social development (Moore y Sugiyama. 2007). Therefore, based on the constructivist conception of learning in Physical Education, the creation of different learning environments by modifying their different constitutive dimensions (physical, functional, relational and temporal), represent an essential competence to develop in the future Early Childhood Education teacher in order to promote the integral development of children through the work of motor skills (Sutapa et al., 2021; Tapia-Fuselier & Ray, 2019).

Therefore, infant motor work should foster children's desire to move in an adapted and rich environment that enhances their motor competence as well as other learning skills. Undoubtedly, there is a need to create spaces that contribute to enhance their motor skills (Latorre et al., 2017). Thus, global work through games or different learning environments are the most interesting didactic resources for Physical Education in Early Childhood Education. Play is considered the most important tool for children to learn social norms and values; hence, preschools are generally the first place where children learn to get along with others.

Global work through games or different learning environments are the most interesting didactic resources for Physical Education in Early Childhood Education. Playing is a fun and exciting activity for children. Playing is a necessity, so we could say that playing is the world of children. Play offers children the opportunity to adapt to their peers and environment, and play influences children's motor development, thinking skills, and their ability to solve problems in daily life. Play-based learning environments should provide a safe and conducive space for learning. Play is a universally observed phenomenon in the early years of child development, and yet its potential roles in social development and emotional regulation are

often overlooked when considering mental health (Gibson et al., 2017). They should also provide opportunities for students to interact with each other and access resources that help them learn in different ways.

In this sense Riera (2014) puts forward a series of suggestions for the design and creation of learning environments with the objective of: 1) Promote the creation of connections between experiences and knowledge, 2) Seek to meet developmental needs, 3) Safety and autonomy for children, 4) Useful and innovative environments, 5) Stimulating and motivating, 6) Complex and dynamic*, 7)* Promote the construction of new knowledge and challenges in scenarios and sub-scenarios with different communicative, functional and semantic values.

In the different learning environments we will not only promote the motor development and health of students from 3 to 6 years of age, but we could also consider them as an extraordinary scenario in which to analyze children's play behavior, cognitive functions and social and emotional interaction among students

Based on the above arguments, and in the context of the Teaching Innovation Project entitled: "Good teaching practices and innovation in the selection of didactic material resources for motor development in Early Childhood Education (PIMED52_201921)" of the University of Jaén, the objective of this pilot study was to analyze the playful behavior and social interaction in 5-year-old children in a real teaching environment, determining the pedagogical characteristics of that learning environment.

Method

Design and participants

A total of 21 PD schoolchildren (12 girls and 9 boys) aged 5 years participated in the present descriptive-cross-sectional design study. The criteria for participation were a) To be enrolled in the educational center, b) Not to have any physical disability, c) To present the informed consent voluntarily signed by the representative. In addition, the present study took into account the principles of the Declaration of Helsinki (Helsinki, 2013) and the approval of the Bioethics Committee of the University of Jaén.

Instruments

Scales were used to assess child behavior and cognitive functions: Cognitive Functions Function Application (ACFS) (Lidz & Jepsen, 2003) and the scale: Behavioral Observation Rating (BORS) in Spanish (Aranov.,1999). The BORS scale captures the affective/motivational and metacognitive aspects of the child in seven dimensions. Each dimension consists of three items that are scored from 1 to 3. The scale assesses seven attitudes of the child in relation to learning: self-regulation, persistence, frustration tolerance, flexibility, motivation, interactivity and receptivity. The Spanish adaptation of the instrument has shown good reliability, with a Cronbach's alpha of 0.74 (Calero et al., 2009)

Play behavior was assessed using the interactive play scale (PIPPS) (Fantuzzo et al., 1995; Hampton et al., 1999) for school-age children for teachers in Spanish (Castro et al., 2002). This scale consists of 36 items that identify common gambling behaviors. The PIPPS scale explores children's social behaviors in peer play, including play interruptions and disconnections.

This tool was designed for use with preschool and kindergarten children and includes parallel versions for parents and teachers. Each of the 36 items is measured on a four-point scale, from "1 = never" to "4 = always". This tool has an acceptable internal consistency for

each dimension (Cronbach's alpha = 0.74-0.84) and the inter-rater reliability assessment revealed a significantly high correlation of 0.88 ($p < 0.001$) (Lee et al., 2020).

The three dimensions defined by this tool assess disruption (10 items), disengagement (9 items) and interaction (10 items) (Castro et al., 2002). Disruption reflects behaviors such as aggression and antisocial gambling behaviors. Disengagement reflects non-participation in play, evidenced by withdrawal, wandering, loitering, and being ignored by playmates. The third dimension, interaction, is characterized by sharing ideas, helping and encouraging other children to participate in play and leading (Lee et al., 2020). The scores of the items pertaining to disruption and disengagement are reversed, so that higher scores indicate fewer behavioral problems.

Procedure

Before starting the research, permission was requested from the educational center and informed consent was sent to the participants' representatives. The research was carried out at the educational center. The classroom was set up in an indoor room of approximately 70 square meters. The children were selected by previewing the video. The sample also took into account the participation of 2 children with specific educational support needs and also children of a race other than Caucasian.

Initially, a search for sessions designed for the Physical Education level in Early Childhood Education was carried out in different specialized websites. Once the session has been selected according to the established criteria 1) Specialized session in Early Childhood Education, 2) Thematic: Motor Skills Circuit, 3) Session time: 35 minutes. The circuit of the session to be worked was structured in two parts: a) Initial part: where the static warm-up was performed; b) Main part: a general dynamic coordination circuit was structured. The schoolchildren moved on Swedish benches while maintaining dynamic balance, then overcame several tires placed in single file on the ground. Afterwards, they performed a somersault with the help of the teacher, continued moving on hoops placed on the floor and finally finished the circuit by rolling on mats. Schoolchildren performed the circuit between four and five times. The session was recorded for later analysis.

The video was viewed repeatedly observing the individualized behavior of the selected children. We could qualify this environment as a semi-directed and closed environment. The technique we used to evaluate the students with the aforementioned instruments was systematic observation. This consists of an objective, intentional and systematic process used to obtain detailed information from children.

Data analysis

Data were analyzed using SPSS statistical software v.22.0 for Windows (SPSS Inc. Chicago). U.S.A. USA). The results are expressed as means and standard deviation (SD) for quantitative variables and as percentages (%) for qualitative variables. The significance level was set at $p<0.05$ and 95% CI. Descriptive data were reported in terms of means and standard deviations (SD) and percentages. Chi-square and Mann-Whitney U tests were used to analyze gender differences

Results

Table 1 shows the results by sex in the *Behaviour observation rating scale* in its different dimensions. There were no significant differences (p>0.05) when comparing by sex. In the total sample, high percentages are reached in rating 3, except for persistence.

Table 1
Results of the BORS scale by sex (expressed in percentages)

Variables	Total (n=21) %	Children (n=9) %	Girls (n=12) %	p-value
SELF-REGULATION: Regulates attention and inhibits impulsivity.				
Regulates attention and controls impulsivity.	57.1	44.4	67.7	0.230
Requires mild adult intervention.	23.8	44.4	8.3	
Requires significant adult intervention.	19.0	11.2	25.0	
PERSISTENCE: completes the task or activity.				
Finish the task without trying to finish.	28.6	22.2	33.3	0.799
Complete the activity with encouragement.	66.7	77.8	58.3	
He withdraws and does not re-engage in the task.	4.8	0.0	8.3	
FRUSTRATION TOLERANCE: When frustrated, she recovers and continues.				
When she is upset, she calms down and redirects herself to the task	33.3	44.4	25.0	0.473*
When he is upset, he calms down and gets involved again.	4.8	11.1	0.0	
When you are upset, you can't calm down	4.8	0.0	8.3	
FLEXIBILITY: try alternative solutions or approaches.				
Easily change the focus or zoom in and out.	47.6	33.3	58.3	0.681
Alternative attempts, but the new attempt is similar	42.9	55.5	33.3	
Does not make any changes; gets stuck on the initial attempt or approach.	9.52	11.2	8.4	
MOTIVATION: shows an affective, positive response or interest in the activity.				
Shows an enthusiastic response to the activity.	71.4	77.8	66.7	1
Shows a neutral reaction, but proceeds without protesting	23.8	22.2	25.0	
Shows little or negative feedback; may indicate displeasure	4.8	0.0	8.3	
INTERACTIVITY: shows reciprocal social interactions.				
Participates in elaborate turn-taking conversations.	38.1	55.5	25.0	0.616*
Participates in turn-taking conversations with minimal responses.	28.6	22.2	33.3	
Participates in conversations without taking turns.	4.8	0.0	8.3	

RECEPTIVITY: shows openness to learning and teacher influence.				
He is a willing and receptive learner.	76.2	66.6	83.4	
Unconsciously willing and receptive.	19.0	33.4	8.3	0.269
Highly resistant to learning.	4.8	0.0	8.3	

Note. *The missing percentage is due to the fact that this behavior was not observed in some children.

Table 2 shows the analysis for each item of the PIPPS peer interactive play scale. The results showed significant differences only in the item "gossips, rumors, tells secrets" ($p < 0.05$). No differences were found in the rest of the variables ($p > 0.05$). Overall, scores on all items were low for either interaction, disruption or disengagement.

Table 2

Results of the PIPPS peer interactive play scale according to sex. (Data expressed in mean

and standard deviation)

Variables (Items)	Total (n=21) DT	Children (n=9) DT	Girls (n=12) DT	p-value
Help other children.	1.95 (0.86)	2 (1.12)	1.92 (0.67)	0.972
Helps resolve conflicts among peers.	1.14 (0.48)	1.11 (0.33)	1.17 (0.58)	0.972
Properly directs the action of others.	1.81 (0.87)	1.89 (0.93)	1.75 (0.87)	0.754
Encourage others to join the game.	1.52 (0.75)	1.78 (0.83)	1.33 (0.65)	0.247
Comfort others who are hurt or sad.	1(0)	1(0)	1 (0)	1
Verbalizes stories during play.	1.9 (0.89)	2 (1)	1.83 (0.84)	0.754
It is rejected by others.	1.24 (0.54)	1.11 (0.33)	1.33 (0.65)	0.602
Gossips, gossips, rumors, tells secrets	2 (0.84)	2.44 (0.73)	1.67 (0.78)	**0.049**
Take other people's things.	1.05 (0.22)	1.11 (0.33)	1 (0)	0.702
It is physically aggressive.	1.33 (0.58)	1.44 (0.73)	1.25 (0.45)	0.702
He disagrees without a fight.	1.19 (0.51)	1.22 (0.44)	1.17 (0.58)	0.651
Rejects the game ideas of others.	1.14 (0.36)	1.22(0.44)	1.08 (0.29)	0.602
It requires being in charge (being a leader).	1.24(0.54)	1.33 (0.71)	1.17 (0.39)	0.808
Starts fights and arguments.	1.29 (0.64)	1.22 (0.67)	1.33 (0.65)	0.651
You can go with the flow of the rest of your colleagues.	3.52 (0.6)	3.33 (0.5)	3.67 (0.65)	0.169
Shows creativity in inventing games and activities.	1.5 (0.71)	1.63 (0.92)	1.4 (0.52)	0.829
Interrupt the play of others.	1.71 (0.78)	2 (0.71)	1.5 (0.8)	0.148
Destroy other people's things.	1.05 (0.22)	1 (0)	1.08 (0.29)	0.754
Verbally offends others.	1.05 (0.22)	1.11 (0.33)	1(0)	0.702
Cries, complains, shows bad temper.	1.1 (0.44)	1 (0)	1.17 (0.58)	0.754
It moves out of the game group.	1.95 (0.67)	2.22 (0.67)	1. 75 (0.62)	0.169
Quit the game.	1.43 (0.68)	1.44 (0.73)	1.42 (0.67)	0.972
You need help to start playing.	1.67 (0.97)	1.78 (1.09)	1.58 (0.9)	0.808
He is confused in the game.	1.52 (0.75)	1.33 (0.71)	1.67 (0.78)	0.345
Needs direction from teachers.	1.95 (1.02)	2 (1.22)	1.92 (0.9)	0.917
Refuses to play when invited.	1 (0)	1 (0)	1 (0)	1.000
It is ignored by others.	1.29 (0.56)	1.22 (0.44)	1.33 (0.65)	0.862
He looks unhappy.	1.24 (0.62)	1 (0)	1.42 (0.79)	0.345
Wanders aimlessly.	1.57 (0.68)	1.78 (0.67)	1.42 (0.67)	0.247
He does not respect his turn.	1.29 (0.46)	1.33 (0.5)	1.25 (0.45)	0.754
Share toys or materials with other children.	1.19 (0.51)	1.33 (0.71)	1.08 (0.29)	0.602
Has difficulty switching from one activity to another.	1.52 (0.98)	1.44 (1.01)	1.58 (1)	0.702

Discussion and conclusions

The objective of this pilot study is to analyze the play behavior and social interaction of 5 to 6 year old children in a real learning environment, determining the pedagogical characteristics of that learning environment. The main finding of this study was that no significant gender differences were observed in both cognitive functioning and play behavior in this learning environment. In general terms, a closed and semi-directed environment based on a motor circuit, such as the one analyzed in this study, guarantees high scores in motivation, self-regulation, frustration tolerance and responsiveness, but not in interaction and flexibility. Due to its closed nature and individual participation, the results obtained in the PIPPS scale reflect moderate to low values of interactivity. Through the PIPPS scale, playful relationships in the preschool classroom and young children's play strengths can be observed, and the results can serve as a basis for any possible interventions aimed at promoting children's adaptive play skills

Regarding the effect of two different learning environments, one free and one directed on social skills and behavioral problems in children aged 3 to 6 years, in a recent study, no significant differences were found between the two groups in terms of social skills; however, the free play group reported more behavioral problems in two subscales of egocentrism and nervousness (Sahebi et al., 2018). In the same way, Mouratidou. (2016) they subjected preschool children to an eight-week Physical Education program based on physical activities and kinesthetic theatrical play, while the control group was involved in free play activities during the same period. The results revealed that the experimental group showed statistically lower aggression and unsafe social behaviors after the intervention compared to the control group. These findings indicate that appropriate Physical Education class design could support social development in early childhood. In this sense, structured physical education is important for the psychomotor development of preschool children, and impacts on children's interaction with the outside world (Teixeira Costa et al., 2015). In turn, children rated as more cognitively and socially competent engaged in higher levels of different play behaviors (e.g., associative-constructive and cooperative-dramatic), while children identified as less cognitively and socially competent engaged in lower levels of play behaviors (e.g., solitary-functional and spectator) (Farmer-Dougan & Kaszuba., 1999).

During the infancy period, peer interaction activities provide the context where children are socialized to share, take turns, cooperate, consider others' perspectives, and inhibit aggression, so it is essential that children acquire these social skills and be accepted by their peers (Fantuzzo et al., 1998). In particular, Physical Education classes with their informal atmosphere and content constitute an ideal environment in which social skills can be developed, thus, physical and motor play is identified as a form of social behavior, because through it children engage in various social situations such as cooperation, assistance, sharing, and problem solving in appropriate ways (Gregoriadis et al., 2013). Therefore and according to Teixeira Costa et al., (2015) the role of Early Childhood Education is fundamental for the development process of children, so at this stage, quality teaching practices should stimulate children, considering their individual characteristics and needs to help them acquire, during development, essential skills and abilities. Therefore, Physical Education, properly structured and describing the different learning environments, is an essential element in the professional competence to stimulate the motor, social, cognitive and affective development of preschool children.

In addition, it is important to point out that studies at the Early Childhood Education level regarding motor development by adapting the learning environments in the subject of Physical Education are limited, since this is not considered as the main axis of the integral development of children, and the motor contents are left as aspects of enjoyment through free movement in school children (Hernández Martínez et al., 2020).

The main limitation of this study is its pilot nature; moreover, the findings reflect only the experiences of children in a specific sociocultural context. Therefore, it should be repeated in future studies with larger samples in order to validate this observational methodology of children's behavior across different learning environments. In addition, one aspect that may have influenced this study is that the participation of outsiders to perform the observational analysis may have influenced the normal behavior of the participants. In this sense, contact, the creation of bonds of proximity and trust with schoolchildren is essential at an early age (Hernández Martínez et al., 2020).

By way of conclusion, the analysis of the different learning environments of Physical Education with preschool population through an observational methodology by teachers, and in this case by students of the Early Childhood Education Degree, through questionnaires of social interaction and cognitive functioning, may represent an innovative process in the specific training of professional competences when guaranteeing effective educational practices. In this sense, when operationally defined methods of play observation are used, observers can accurately record the level of play exhibited by each child, and these play behaviors reflect the child's current cognitive and social developmental functioning (Farmer-Dougan & Kaszuba., 1999). A learning environment is more than just a classroom: it is a space where learners feel safe and supported in their pursuit of knowledge, as well as inspired by their surroundings.

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