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Original article

Recreational games for the inclusion of students with Down syndrome in Physical Education classes

Juegos recreativos para la inclusión de estudiantes con Síndrome Down en la clase de Educación Física.

Jogos recreativos para a inclusão de alunos com Síndrome de Down na aula de Educação Física.

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ABSTRACT

The study presented aims to propose a system of recreational games for the inclusion of students with Down syndrome in the Physical Education class of the Ambato Specialized Educational Unit in the province of Tungurahua. The research has a mixed approach and uses a sample of 11 students of Basic Elementary General Education. Methods such as historical-logical, analytical-synthetic, inductive-deductive, and systemic were employed, through these methods it could be analyzed and understood the facts and established logical relationships; empirical methods such as observation, surveys, and the method of expert

judgment were also used to verify the reliability of the proposal. Descriptive statistics were used to process and interpret the data, represented in tables and figures, with percentage calculations. The recreational games proposal showed significant changes in the indicators related to the participation and interaction of students with Down syndrome (DS). The experience presented indicates the potential offered by the recreational games system for students with DS and Physical Education (PE) teachers who carry out the pedagogical task in that context.

Keywords: Inclusive education, Physical education, Down syndrome, recreational games

RESUMEN

El estudio que se presenta tiene como objetivo proponer un sistema de juegos recreativos para la inclusión de estudiantes con Síndrome Down en la clase de Educación Física de la Unidad Educativa especializada Ambato en la provincia de Tungurahua. La investigación tiene un enfoque mixto y se utiliza una muestra de 11 estudiantes de Educación General Básica Elemental. Se emplearon métodos como el histórico-lógico, analítico-sintético, inductivo-deductivo y el sistémico, a través de estos métodos se pudo analizar y comprender los hechos y establecer relaciones lógicas, también se emplearon métodos empíricos, como la observación, la encuesta, el método de juicios de especialistas, para comprobar la fiabilidad de la propuesta. Para el procesamiento e interpretación de los datos, representados en tablas y figuras, se utilizó la estadística descriptiva, con el cálculo porcentual. La propuesta de juegos recreativos mostró cambios significativos en los indicadores relacionados con la participación y la interacción de los estudiantes con Síndrome de Down (SD). La experiencia expuesta, indica la posibilidad que ofrece el sistema de juegos recreativos para los estudiantes con (SD) y profesores de Educación Física (EF) que llevan a cabo la tarea pedagógica en ese contexto.

Palabras clave: Educación inclusiva, Educación Física, Síndrome de Down, juegos recreativos

RESUMO

Este estudo tem como objetivo propor um sistema de jogos recreativos para a inclusão de alunos com síndrome de Down nas aulas de Educação Física da Unidade Educacional Especializada de Ambato, na província de Tungurahua. A pesquisa emprega uma abordagem de métodos mistos e utiliza uma amostra de 11 alunos do ensino fundamental. Métodos como histórico-lógico, analítico-sintético, indutivo-dedutivo e sistêmico foram utilizados para analisar e compreender os fatos e estabelecer relações lógicas. Métodos empíricos, como observação, questionários e avaliação por especialistas, também foram utilizados para verificar a confiabilidade do sistema proposto. Estatísticas descritivas, incluindo cálculos percentuais, foram utilizadas para processar e interpretar os dados, que são apresentados em tabelas e figuras. Os jogos recreativos propostos demonstraram mudanças significativas nos indicadores relacionados à participação e interação dos alunos com síndrome de Down. A experiência descrita indica o potencial dos jogos recreativos para alunos com síndrome de Down e para professores de Educação Física que atuam nesse contexto.

Palavras-chave: Educação inclusiva, Educação Física, Síndrome de Down, Jogos recreativos

INTRODUCTION

In education, the high rates of exclusion, discrimination, and educational inequalities present in most of the world's educational systems have been the subject of great debate and controversy. (Aguirrez and Carangui, 2023 , p. 102)

Inclusive education is understood as the process that helps overcome obstacles that limit students' presence, participation, and achievement, as well as the process of strengthening the capacity of the education system.

For Quintero (2020), inclusive education is conceived as a process that aims to recognize and respond to the diversity of students' needs so that their learning is effective, minimizing exclusion within and outside of educational institutions.

Anchundia (2019) carried out a review of the origins of inclusive education where he pointed out that it provides the real possibility of accessing education in the same way as the rest of the community.

Inclusive education distinguishes the educational needs of each student, as well as their social, intercultural, and/or personal circumstances. Educational needs are never labeled by teachers; they are addressed through various actions. It takes place in a warm environment for teachers, students, and families, and seeks to ensure the presence, participation, and academic success of all students at different educational levels and in different study contexts. (Delgado et al., 2022 , p. 18)

In studies conducted by Aguirre and Carangui (2023), it is stated that in Ecuador, significant progress has been made in inclusive education; however, when comparing the success stories of countries like Chile and Paraguay, improvements are still needed at the institutional level, especially in the education system.

In this regard, Ecuadorian state bodies have developed educational and legal policies aimed at promoting inclusive education based on comprehensiveness and interculturality, respecting the different groups that make up the nation, as well as special needs. Likewise, the Constitution protects the right to education for Ecuadorian citizens, and laws and regulations have been incorporated thereon to guarantee education for all. (Irrazabal et al., 2023)

Among the educational transformations proposed by the Ministry of Education in Ecuador is the orientation toward promoting inclusive education. It considers that education constitutes a space that is built with the participation of all, under a rights-based approach to achieve educational objectives.

Hence, the curriculum reflects the trust that society places in the school to sustain culture, contributing to personal, community and national development implies that, on the part of the State, public policy is developed that rewards trust in institutions (Mina et al., 2023) .

Physical Education PE, for its part, benefits the way of putting inclusive education into practice “because in it the student expresses his motor potential, sports skills, feelings, values and his capacity for empathy and collaboration” (Proenza, 2021).

Torres Paz, L. E. et al., (2023) believe that in PE, the educational curriculum for students is generally open and flexible, giving teachers the opportunity to design their lessons as they see fit. Therefore, it is important to guide them on the need to conduct student assessments to design relevant objectives and convince them that inclusive education for students is one of the best practices for achieving equitable learning.

In the same order, Rodríguez et al., (2023) reason that PE classes are ideal settings for the development of educational inclusion.

In short, PE in its educational function systematically uses physical activities and the influence of agents' environmental factors (climate, physical space, materials) as specific means, and their action through physical exercise; in addition, play, which is considered a privileged educational medium today because it engages the whole person. Hence its potential for serving people with special educational needs (SEN).

Games in PE allow students to develop their abilities in a dynamic way. They learn to **respect game rules and cooperative work,** and they combine different aspects such as physical development, mental stimulation, and competition. Furthermore, games promote personal integration.

For Muñoz et al. (2020), motor play can enhance the development of motor and socio-emotional competencies. They consider that the PE teacher should know that the competition variable associated with the type of relationships in the game influences the experience of positive emotions.

In the same vein, it is highlighted that play is a source of positive emotional experiences, especially recreational games.

In fact, the importance of play in child development has been widely documented. For Zambrano and Mateo (2021), the diversity and experience of the various activities they carry out through play is fundamental, as they develop the abilities of physical movement, social emotion and cognitive movement, which helps them develop better.

The diversity and experience of the various activities they carry out through play is essential, as they develop the skills of physical movement, social emotion and cognitive movement, which helps them develop better (Zambrano and Mateo, 2021) .

For Yáñez et al. (2023), the game provides an opportunity to face imaginary situations with which one practices for real life.

Something similar happens with recreational games, when used as a means in PE, they provide pleasure and fun. They promote relaxation and reduce anxiety; they improve circulation, respiration, digestion, and metabolism; they stimulate concentration, memory, and learning; and they strengthen bones, muscles, the immune system, motor skills, balance, and muscle tone.

It is an eminently playful, fun activity, capable of transmitting emotions, joy, health, stimuli, the desire to win, and it allows for relationships with other people, which is why it becomes a vital and indispensable activity for the development of every human being.

Playing helps our little ones create emotional bonds that foster security and stability, protecting them from stress and helping them build emotional resilience.

Miranda et al. (2024) established that both motor skills and voluntary movements are factors related to quality of life; improving these variables through recreational play can have a positive impact on people with Down syndrome from a psychomotor and cultural perspective.

Various approaches agree on the importance of Physical Education for the development of motor coordination and the inclusion of students with Down syndrome. In this regard, emphasis is placed on the need for contextualized and dynamic guidance that addresses the specific characteristics of each student and the difficulties they may face in the classroom.

Among the main demands accepted for this research, it is noted that in the PE class, the attention given to educational inclusion is weak and, in some cases, lacks objectivity and systematicity in the activity that is carried out shown in the results of the diagnosis of students with SD.

Therefore, the objective is to propose a system of recreational games for the inclusion of students with Down syndrome in the Physical Education class of the Ambato specialized educational unit in the province of Tungurahua.

MATERIALS AND METHODS

The research was contextualized at the Ambato Specialized Education Unit in the city of Ambato, Tungurahua province. It is an Ecuadorian school offering special education in the following educational levels: **Preschool, Basic Education, and high school**.

It is scheduled for the 2023-2024 academic year, in a population of 64 students with DS. The sample consists of 11 students in Elementary General Basic Education, aged between seven and nine. As

Table 1, all have mild DS; 10 are boys and only one is a girl.

Table 1. *Characterization of the sample studied*

Students	Age	Sex	Classification of the disease
1	7	M	Mild
2	7	M	Mild
3	7	M	Mild
4	6	M	Mild
5	6	M	Mild
6	8	M	Mild
7	7	M	Mild
8	8	F	Mild
9	8	M	Mild
10	9	M	Mild
11	9	M	Mild

Source: own elaboration

The research was developed from the combination of qualitative and quantitative methods The historical-logical method was used to understand the historical trajectory of inclusive education for students with Down syndrome, its social and political recognition, and how it has impacted the curriculum and the educational process to promote participation oriented toward justice and social transformation.

The systemic-structural-functional method provided a general orientation for research on educational inclusion for students with DS from the PE class.

Among the empirical methods used were document analysis, where the content of the academic records of students with DS was explored, as well as the PE curriculum at the

elementary basic education level in which the treatment provided to the activities for the inclusion of these students was assessed.

The observation was carried out in four PE classes, to verify the treatment given to the inclusion of students with SD, based on the indicators established in Table 2.

Table 2. *Dimensions and indicators of the dependent variable in this study.*

Dimension	Indicators	Valuation ranges
Educational inclusion of students with Down syndrome in PE classes	Participation in activities	16-12 (Excellent) 11-8 (Good) 7-4 (Regular) -3 (Bad)
	Interaction with peers	+10 (Excellent) 9-6 (Good) 5-3 (Regular) -2 (Bad)
	Independence	Without support 5-4 (B) Support sometimes 3 (R) Total support 2 (M)
	Self-esteem	5-4 (Good) 3 (Regular) 2 (Bad)

Source: own elaboration

The interview was conducted with teachers to learn about the strategies they currently use to include students with Down syndrome in their classes. Regarding parents, this interview was intended to address their concerns and suggestions regarding their children's participation in PE classes.

RESULTS

The research was carried out in the period between 2023-2024 and the diagnosis identifies the inadequacies of the educational inclusion process in PE classes for students with DS.

The analysis of documents is included in the academic record of the 11 students with DS, where 100% reveal a lack of attention by showing greater passivity than usual, they were diagnosed with very low auditory sensitivity so they only distinguish strong stimuli, whether sounds or images. In that same order of clinical assessments, it is found that they present difficulty in harmonizing movements where their body awareness (knowledge of their body) is affected, as well as difficulty in understanding the sensory data they receive, making it difficult for them to generate specific responses.

When exploring the PE curriculum for this grade, it was noted that teachers do not take advantage of the flexible nature of the document to design activities in the context of their classes as appropriate and responsive to the individual and group needs of their students. In this same vein, it was possible to recognize the elements that recreational games provide to stimulate student participation in PE classes, offering relevant aspects such as participation, interaction with peers, independence, enjoyment, delight, and concentration. Observation played a fundamental role in the attendance of students with DS in PE class. The dimension to be observed was educational inclusion, and the established criteria are manifested in participation in activities, interaction with peers, independence, and autonomy in achieving the objective.

Table 3. *Descriptive statistical analysis of educational inclusion according to established criteria*

Descriptive statistics					
	N	Minimum	Maximum	Average	Standard Deviation
Participation	11	3	12	6.09	2,386
Interaction	11	2	15	6.91	4,061
Independence	11	3	5	4.00	,894

When referring to the assessment during the observation of the four program classes, the students had to have at least four participations in each one for a total of 16 participations, in that case it was detected that the participation oscillated in an average of 6.09 participations.

Students were required to interact more than 10 times, resulting in an average of 6.91 interactions in each class.

Independence was estimated by considering the magnitude of support for the execution of each activity by giving a maximum value of five points to those who did not need it, with the average score being 4.00.

When assessing the indicator of participation in PE classes as indicated in table 4, it was determined that only one student reached (E) since he had access to 12 participations, nine students, corresponding to 81.81%, achieved the (R) category with seven participations in classes.

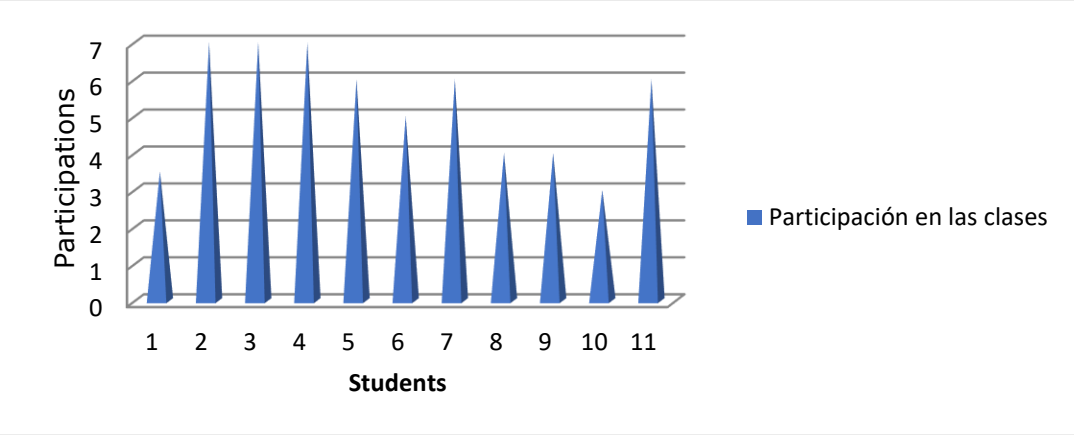

Figure 1. *Successions in student participation (SD) in (EF) classes*

Source: own elaboration

Among the main incidents are:

- Poor response and reaction capacity to activities oriented
- Limited appreciation of activity, objects and companions
- Restricted recall of elements worked on in class

On the indicator Interaction with their peers, according to the values reflected in Fig. 2, three students were in the (E) range because they interacted with their peers more than 10 times during the observed classes. Three students were rated (B) because they interacted between 7-6 times. This means that only 54.54% interacted as a group.

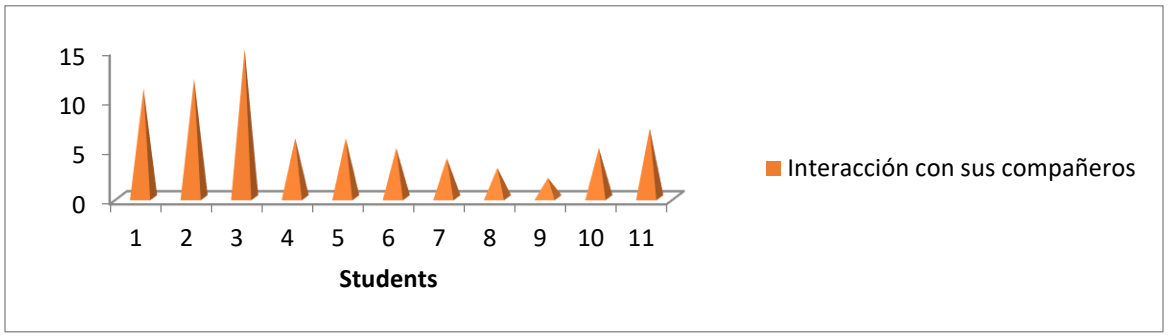

Figure 2. *Regularities in the interaction of students with DS in the PE class*

Source: own elaboration

Events found:

- Limited identification of the learning needs presented by students in the study sample.
- The scheduled activities lack emotional combination.
- Little stimulation when carrying out the activities performed.

Hence, the independence indicator shows gaps in the treatment of students with DS to an equal extent. They externalize isolation and lack of correspondence with the people around them in the classroom in a healthy way, which limits them in developing their social skills and competencies, which prevents them from having good relationships with their family, friends and in general with their entire social environment.

Fig. 3 states how only 18.18% of students articulate with complete independence, without support for carrying out the activities proposed during classes, however, 54.54% need total support for motor execution.

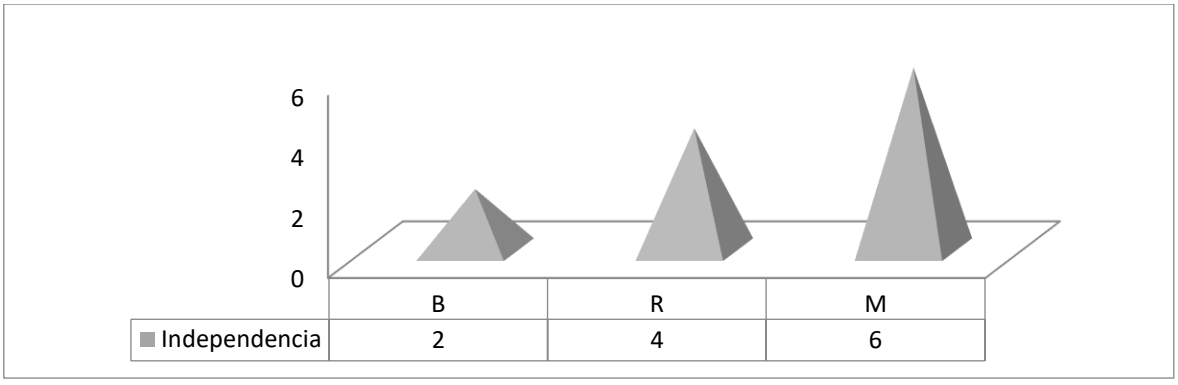

Figure 3. *Details of the independence shown by students with DS in the PE class*

Source: own elaboration

When analyzing the self-esteem indicator, 63.6% of students perceived the classes as imposing, no emotions were seen in the practice, and inappropriate behavior in activities.

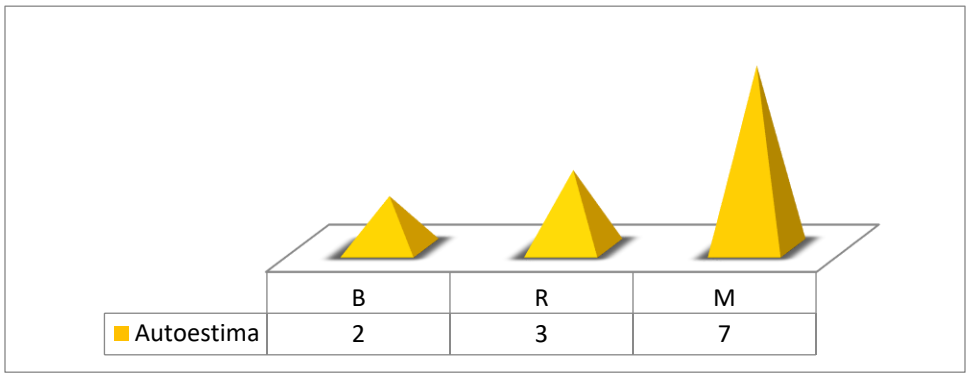

Figure 4. *Manifestations of self-esteem revealed by students with DS in the PE class*

Source: own elaboration

The observations illustrated shortcomings in the four established indicators. As a positive aspect, it was noted that everyone participated in PE classes, but the transformative need in the process of educational inclusion is emphasized; this should be aimed at interaction among students, achieving independence in their motor actions, as well as raising self-esteem levels in students with DS, as shown in Fig. 5.

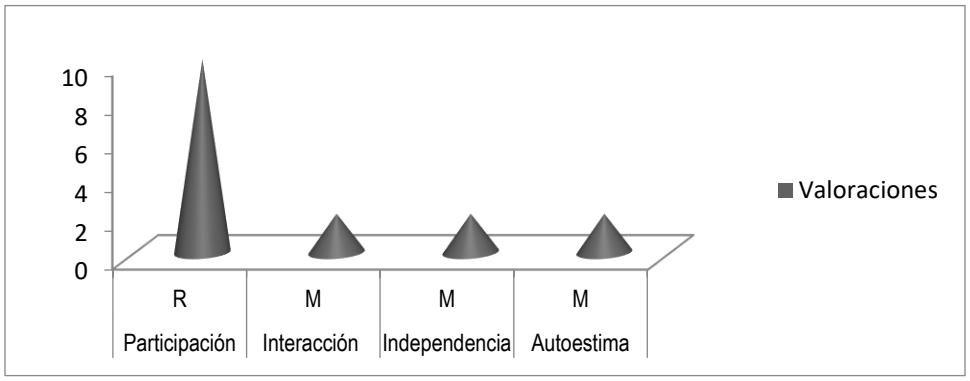

Figure 5. *Performance of students with DS during the PE class.*

Source: own elaboration

The interview was conducted with teachers to learn about the strategies they currently use to include students with Down syndrome in their classes. It was learned that the Educational Unit has a curriculum for PE, and that it should be modeled in its five curricular

blocks, as a guiding document that represents and guides the educational process in the area.

100% also claim that there is a bimonthly meeting schedule where the completion of a set of actions regarding teacher training is analyzed. Administrative issues prevail and there is a lack of thematic discussions about how to address educational inclusion for students with special educational needs.

It is impressive how 100% of teachers recognize the preparation needs of PE teachers and that, among the main deficiencies, it can be mentioned problems with the competencies and skills that students with DS must overcome to face changes, according to the social and group dynamics from the educational environment.

However, 80% explain that the analysis of DS student needs is lacking in depth; in many cases, needs are left unidentified, and lesson planning does not always address all the identified shortcomings.

Within the Educational Unit, they argue 100% that each teacher's performance in their teaching activities should be evaluated; the overall results should be reflected in the students' progress, as well as verified by the quality of the classes and the methodological work carried out by the teachers and the individual results they achieve at each stage.

It is recognized the lack of support provided by other teachers, as they do not participate in the activities planned with the students.

Regarding parents, this interview aimed to understand their concerns and suggestions regarding their children's participation in PE classes. One hundred percent of them considered it appropriate to establish strategies to enhance the development of students with Down syndrome; they believed they could count on their support in PE until the students gained confidence and maturity to carry out their homework.

Methodological triangulation of the results described in the analysis of the applied instruments was carried out as part of the research process and as an expression of the systemic approach method in this area of research.

In the variable educational inclusion for participation of students with DS in PE classes, the need for a transformative intervention is visible due to the results of the dimension, since 84.7% of the indicators showed deficiencies in the instruments applied.

From the triangulation of the results of the instruments applied in the diagnosis, this research conceives an inventory of potentialities and limitations related to the inclusion of students with DS in the PE class.

Potentialities:

- There is a legal framework for PE teachers to meet the requirements necessary to perform their duties
- The teachers are able to communicate knowledge, abilities and ideas, have extensive experience in the specialty, high teaching qualifications, which allows them to develop activities with quality and intentionality.
- They demonstrate their personal and professional presence and, when interacting with other people, demonstrate responsibility, discipline and relevance in their pedagogical performance.

Limitations:

- The projection of activities lacks an inclusive approach.
- There are shortcomings in the derivation and orientation of objectives and in the interrelation with educational inclusion from the PE class.
- Limited participation of teachers in activities, affecting the systematization and understanding of content. Motivation in the learning process is insufficient.
- The interdisciplinary relationship is insufficient, even though the content offers this possibility.
- Insufficient use of methods for productive reflection by teachers.
- Poor programming of recreational activities for the motor performance of students with DS

Consistent with the results achieved, a recreational game system is presented that will provide a solution to the existing problem. The objective is to introduce a recreational game system for the inclusion of students with Down syndrome in Physical Education classes.

This system aimed at teachers, aims to guide them on how to put inclusion into practice from the PE class, as a way to treat students with DS and was implemented in the third academic period established for November/2023 to February/2024. It should be noted that for this study only the first stage will be shown, which consists of six weeks ranging from December to January 2024.

The proposal assumes theoretical and methodological principles of school Physical Education and principles of special pedagogy, which in turn are manifested in the procedure of each of its stages, with their respective actions and methodological orientations, considering the following:

- Principle of awareness and activity: it is manifested by creating a favorable psychological environment in schoolchildren with DS, where a high motivation for recreational games that they carry out during the execution of activities prevails, which suggests an active participation of the student in the PE class.
- Principle of accessibility and individualization: this is manifested in the correspondence between the recreational games proposed by the teacher, the complexity through which the different motor actions must be carried out, and the real possibilities available to the students.
- Principle of systematization: it manifests itself as a successive system, in which the formation of basic motor skills and competencies are integrated together with the development of both conditional physical and coordinative skills in schoolchildren with DS.
- Principle of teaching differentiation: this involves breaking down barriers of non-acceptance of differences and intolerance, which allows for integration, as well as socialization, acceptance of diversity, and mutual respect among students with Down syndrome.

The system describes its structure and functioning, as well as the interrelated actions. Its purpose is to guide PE teachers in organizing and directing inclusive PE classes for children with Down syndrome. It is designed to combine general and specific aspects to address the needs and potential of students with Down syndrome for the desired success.

The mission of the activities is to implement the recreational games system for teachers and students, enabling them to correctly apply the game system.

Vision: Teachers have a system of recreational games to motivate inclusion from the PE class, as a way to treat students with DS based on the socialization of their professional experiences, through the connection of context, organization by phases, individual and group treatment, which allows for action that functions as a system.

Those involved are the teachers of PE, students and family members responsible for the development of these students with DS

The proposal is based on four essential phases: Diagnostic and adaptation stage, action, activity assessment, as shown in Fig. 6

The diagnostic and adaptation stage focuses on characterizing the student with DS, as well as understanding their tastes, preferences, and selecting recreational games that will allow for social participation and inclusion.

The action stage focuses on recreational games that allow for the inclusion of students with Down syndrome. Among the recreational games most favored by students are hopscotch, blind man's bluff, sack walking, and relay games.

Meanwhile, the activity assessment stage will take into account the performance of the action in recreational games and the level of student satisfaction with SD.

E, B and M evaluation will be given based on participation and enjoyment of the games, as well as the inclusion of students with DS.

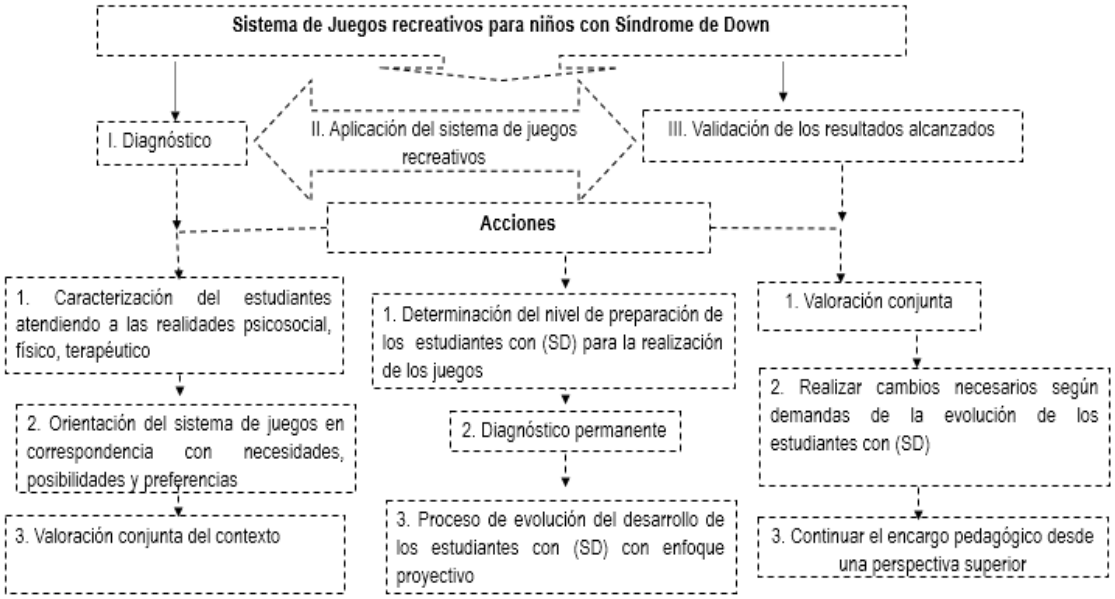

Figure 6. *Graphic representation of the recreational games system for the inclusion of students with Down syndrome in Physical Education classes.*

Source: prepared by the authors

For the theoretical evaluation of the recreational gaming system, expert judgment was used, which yielded a consensus of informed opinions about the proposal, including its entire structure and operation.

To this end, the experts were selected for their willingness to participate in the proposal evaluation, their professional prestige, self-criticism, analytical skills, and over 10 years of experience. A survey was developed and administered, which made it possible to determine the knowledge coefficient (KC) and argumentation coefficient (Ka), as well as the competence coefficient (K).

Among the potential experts, all 10 exhibit a KC between 0.90. The argumentation coefficient, evaluated in the high (A) category, measures the degree of influence of different sources on their knowledge. Among the 10 experts, the competence coefficient ranged from 0.8 to 1, and was therefore considered high.

In this same order, a guide is prepared and applied for the evaluation of the proposal by the experts at first, with the objective to learn opinions about the recreational games system for the inclusion of students with Down syndrome in physical education classes. that is proposed.

For concordance, the results of the experts' assessments were processed using Kendall's coefficient of concordance (W), which resulted in W = 0.83 with a significance level of p = 0.0001. This indicates acceptance of the proposal presented by the 10 experts consulted.

Once the results of the expert judgment method were known and with the objective of verifying its practical feasibility, the recreational games system was implemented for the inclusion of students with Down syndrome in the Physical Education class. An experimental verification was applied, for which the instruments were validated and processed from predetermined dimensions and indicators, which allowed to assess the participation and inclusion in the scheduled recreational games and the results are shown in Fig. 7.

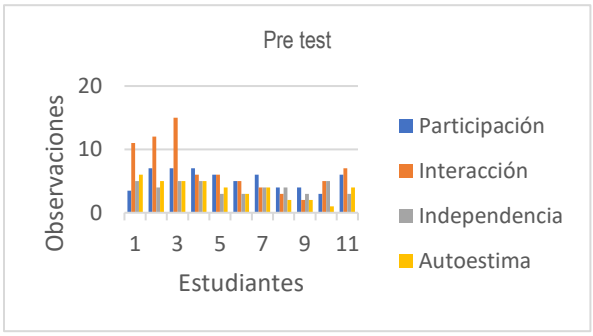

Figure 7. *Comparative results of pre-test*

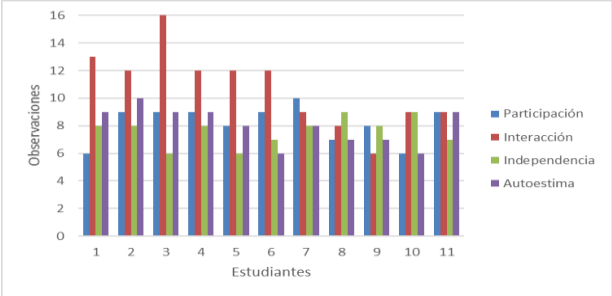

Figure 8. *Comparative results of post-test*

After the quantitative analysis of the methods applied directly to the actions of students with SD, it was possible to appreciate the acceptance of the recreational games system by students and teachers for the orientation of PE classes, towards participation, interaction, independence and self-esteem.

In order to verify the existence of significant changes between the results obtained before and after the proposal was verified, the Wilcoxon signaled-range test was applied, taking into account that the data correspond to an ordinal measurement level, with a reduced range of possible values (Inadequate 2 points, Little Adequate 3, Adequate 4 points, Very Adequate 5 points); in addition to being data from a small sample (n = 12).

Significant differences are considered to exist if the significance of the α 0 test is less than or equal to the predetermined significance level, α = 0.05. The data were processed using the Statistical Package for the Social Sciences, Personal Computers (SPSS version 20) for Windows.

DISCUSSION

Recreational games foster psychosocial, motor, and cognitive development and promote equal opportunities and active student participation. When used in Physical Education, they contribute to comprehensive education and training, as they facilitate the development of skills and abilities in students, promote inclusion, respond to diversity and needs, and increase participation in this context (Vásquez and Rojas, 2024).

In complete agreement with Rodríguez et al. (2023), they argue that traditional games are motivating and easy to implement for schoolchildren with special educational needs because they promote mobility and spatial orientation in children with visual impairments. Although these authors contextualize games with children with visual impairments, studies on games reveal that they are useful for the development of any disability.

Aguilera (2017) emphasizes that physical activity offers countless benefits, not only physical but also values and tools that are essential for society. Therefore, this author emphasizes the importance of sports practices, physical activity, and physical education focused on inclusion, since the benefits they provide cannot be limited to a few. These aspects are considered in the recreational games system proposed for Physical Education classes.

By way of conclusions, it can be stated that the theoretical study carried out supported the importance of an educational inclusion that favors participation, social interaction, independence and high self-esteem in students with DS from the PE class, which reveals the recurring need to channel the search for alternatives that allow benefit, from a successful orientation that is consolidated with social action. The diagnosis revealed inadequacies in the teaching process that is carried out, which prevents the correct organization of the formative process that is carried out. The recreational games system designed is structured in stages, which allow to meet the theoretical, methodological and attitudinal needs of teachers and students with DS. It is contextualized through the implementation of recreational games that are coherently articulated from participatory discussion and intensive and systematic practice in and from the context where it works. In general, significant changes in the dimension and indicators are observed when comparing the results of the pretest and posttest, after the proposal was implemented. The most significant changes are shown in two indicators related to the participation and interaction of students

with disabilities. The experience presented here demonstrates the potential that recreational game systems offer for students with disabilities and PE teachers.

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The author is responsible for writing the work and analyzing the documents.