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Original article

Cooperative games for the inclusion of students with Down Syndrome in the physical education class.

*Juegos cooperativos para la inclusión de los estudiantes con Síndrome de Down en la clase
de Educación Física*

*Jogos cooperativos para inclusão de alunos com síndrome de Down nas aulas de educação
física*

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ABSTRACT

Cooperative games for the inclusion of students with Down Syndrome in Physical Education will not only contribute to the fulfillment of the rights of people with disabilities, but will also enrich the quality of education and promote a more inclusive and diversity-



conscious society. The research presented proposes a system of cooperative games for the inclusion of 8th grade students with Down Syndrome in Physical Education classes, who belong to the San Juan Bosco Specialized Educational Unit. These are established from non-significant curricular adjustments where methods, techniques, teaching and learning strategies, evaluation and scheduled activities were modified. Theoretical methods such as historical-logical, analysis synthesis, as well as the empirical ones such as documentary review, observation, and interview were used, which from a scientific perspective facilitated the creation of guidelines to characterize and assess the possibilities of the 27 8th grade students with Down Syndrome (DS), as well as to modify the curriculum of the program conducted for this grade, based on the use of cooperative games for their enjoyment and improvement of physical-emotional skills and abilities in order to make the lives of students with DS more pleasant, as evidenced by the favorable theoretical assessment and the possibilities of applying the cooperative games system for students with DS, its structuring in components, phases and actions for the execution of this process; stated by the specialists consulted.

Keywords: Inclusive education, Down syndrome, Cooperative games

RESUMEN

Los juegos cooperativos para la inclusión de estudiantes con Síndrome de Down en la Educación Física no solo contribuirán al cumplimiento de los derechos de las personas con discapacidad, sino que también enriquecerá la calidad de la educación y fomentará una sociedad más inclusiva y consciente de la diversidad. La investigación que se presenta propone un sistema de juegos cooperativos para la inclusión de estudiantes de 8vo grado con Síndrome de Down en las clases de Educación Física, que pertenecen a la Unidad Educativa Especializada San Juan Bosco. Estos se establecen a partir de adecuaciones curriculares no significativas donde se modificaron métodos, técnicas, estrategias de enseñanza y aprendizaje, la evaluación y en las actividades programadas. Se utilizaron métodos teóricos como el histórico-lógico, análisis síntesis y empírico revisión documental, la observación, la entrevista que desde la ciencia facilitaron crear las pautas para caracterizar



y valorar las posibilidades de los 27 estudiantes de 8vo grado con Síndrome de Down (SD), así como modificar curricularmente el programa que se conduce para este grado, a partir de la utilización de juegos cooperativos para su disfrute y mejoramiento de competencias y destrezas físico-emocional en aras de hacer más placentera la vida de los estudiantes con (SD), según evidencia la valoración teórica favorable y las posibilidades de aplicación del sistema de juegos cooperativos para los estudiantes con (SD), su estructuración en componentes, fases y acciones para la ejecución de este proceso; manifestada por los especialistas consultados.

Palabras claves: Educación inclusiva, Síndrome de Down, Juegos cooperativos

RESUMO

Os jogos cooperativos para inclusão de alunos com Síndrome de Down na educação física não só contribuirão para o cumprimento dos direitos das pessoas com deficiência, mas também enriquecerão a qualidade da educação e promoverão uma sociedade mais inclusiva e consciente da diversidade. A pesquisa apresentada propõe um sistema de jogos cooperativos para a inclusão de alunos com Síndrome de Down do 8º ano nas aulas de Educação Física, pertencentes à Unidade Educacional Especializada San Juan Boscoso. Estas são estabelecidas a partir de ajustes curriculares não significativos onde foram modificados métodos, técnicas, estratégias de ensino e aprendizagem, avaliação e atividades programadas. Foram utilizados métodos teóricos como histórico-lógico, análise síntese e empírico revisão documental, observação e entrevista, que a partir de uma perspectiva científica facilitaram a criação de diretrizes para caracterizar e avaliar as possibilidades dos 27 alunos do 8º ano com Síndrome de Down (SD), bem como modificar o currículo do programa realizado para esta série, com base na utilização de jogos cooperativos para sua diversão e melhoria das habilidades e capacidades físico-emocionais, a fim de tornar a vida dos alunos com (SD) mais agradável, como evidenciado pela avaliação teórica favorável e as possibilidades de aplicação do sistema de jogos cooperativos para alunos com (SD), sua estruturação em componentes, fases e ações para a execução deste processo; expressas pelos especialistas consultados.



Palavras-chave: Educação inclusiva, Síndrome de Down, Jogos cooperativos

INTRODUCTION

Inclusion in the educational field entails attitudes of deep respect for differences and a responsibility to make them an opportunity for development, participation and learning. (Clavijo and Bautista-Cerro, 2020)

In this environment, the educational systems of the Ecuadorian state, despite being aligned with international inclusion parameters, have not overcome the discrimination gap for people with Special Educational Needs (SEN) (Rojas Avilés et al., 2020).

For Quintero (2020), inclusive education is conceived as a process that aims to recognize and respond to the diversity of needs that students present so that their learning is effective, by minimizing exclusion inside and outside Educational Institutions.

Inclusive education is a fundamental right supported by international laws and treaties, as projected in the United Nations Convention on the Rights of Persons with Disabilities. This convention underlines the need to provide inclusive opportunities and environments that enable persons with disabilities to participate fully in all aspects of society, with a greater emphasis on the education sector.

Hence, the importance of ensuring inclusive and equitable education for all students, regardless of their abilities, as is the case with Down Syndrome, known as a genetic condition that can present challenges in terms of motor and social skills.

In recent years, the global reality of these children has changed considerably with the implementation of early stimulation treatment strategies from birth, which expands opportunities and provides means for their social integration. (Ramos and Mendez, 2020)

In Ecuador, according to the National Council for the Equality of Disabilities (CONADIS, 2022), there are 471,205 people who have some type of disability, of which 108,957 are people



with intellectual disabilities. There are 38,175 people who have a disability percentage of 30% to 49 %. On the other hand, it is estimated that 46,494 people have a percentage of 50% to 74% and 17,301 people have a percentage of 75% to 80%. There are also 6,986 people with a percentage of 85% to 89%. % to 100 % which includes people of all ages.

The 2008 *Constitution of the Republic of Ecuador - Ecuador* | *Urban and Cities Platform*, n.d.) in its article 26, it is stipulated that the Education is a right of people throughout their lives and an unavoidable and essential duty, inexcusable by the State.

In its article 343, it admits that the center of the educational processes is the subject that learns; in this same article it is established that The National Education System will integrate an intercultural vision in line with diversity geographical, cultural and linguistic diversity of the country, and respect for the rights of communities, villages and nationalities.

Hence, the National Directorate of Legal Educational Regulations of the Ministry of Education (2017) guarantees the right of people to a quality and warm education, relevant, adequate, contextualized, updated and articulated throughout the educational process, in its systems, levels, sublevels or modalities; and that include evaluations permanent.

From that moment on, it supports the conception of the student as the center of the educational process, with a flexibility and property of contents, processes and methodologies, that it is adapted to their needs and realities fundamental.

An important role is played by the school curriculum proposed by the administrations, which acquires an open, flexible or adaptable character to the needs or characteristics of the educational community in which the educational centers are immersed. This conception allows the implementation of a curricular adaptation process from the first level of concretion (Decreets of Teachings) until the Adaptation Curriculum Individual.

The curriculum to serve students with Special Educational Needs (SEN) cannot be other than the resume ordinary of the teaching mandatory, in he performs the timely adaptations, more or less specific, to address the differences that Some subjects have (NEE).



In this scope is where it is stated the term of curricular adaptations, such as additional educational resources implemented in schools to enable access and progress of students with special educational needs in the curriculum.

These curricular adjustments promote placing the student in the most suitable place, adapting furniture or spaces, providing specific equipment and resources, incorporating specific aids so that the student can use classroom materials, and adapting commonly used written materials.

To this end, it is important to facilitate access to the information provided in the classroom and provide personal resources, among other necessary resources that allow students to communicate and access full autonomy and integration from their disability.

Curricular adaptations are focused on changes made to the objectives, content, criteria and evaluation procedures, and to the activities and methodology to address individual differences in students. (Hernando, 2000, pp. 207-218)

In this sense for Hernando:

This section would contain the traditional distinction between non-significant adaptations: such as modifications in groupings, methods, techniques, teaching and learning strategies, evaluation and programmed activities; and on the other hand, significant curricular adaptations: understood as modifications in programming and which would imply the elimination of some basic teachings of the Official Curriculum: objectives, content and evaluation criteria. (2000, p. 211)

Although the learning process for children with Down syndrome (DS) will extend beyond the compulsory school period, the educational system must provide all necessary means to try to develop the same abilities in these students as in the rest during this time.



Children with DS are excessively sociable and affectionate with the people around them; from an early age, motivated by simple learning or ideas that they come up with, they act with sympathy and a good sense of humor, although their oral language is limited, they make themselves understood, and they adapt easily to the environment.

Slow motor development in children with DS is associated with intellectual disability and affects the performance of psychomotor activities, therefore, an attempt at intervention is necessary aimed at improving the quality of life and autonomy in the school and family environment, according to the specific needs of the individual.

... the development of prenatal detection methods and the prioritization of specific care for these patients have gradually improved their quality and life expectancy, making it necessary to create programs that meet their health needs according to their life cycle. Psychomotor practice as an instrument of important value in the development of the abilities of students and specifically of students in special education. (Covaleda et al., 2023, p. 112)

This author emphasizes the components of psychomotor education and especially general dynamic coordination and balance, as well as the characteristics of people with DS for proper subsequent intervention.

Fernández (2017) considers that the means used are motor games, sports initiation, educational sports, recreation, etc.

The current trend in physical education is the development of competence that allows the best possible adaptability to environmental situations in the environment and reality. In this way, physical education aims to develop the following competences: the integration, expression and realization of simple and complex motor performances and the mastery and control of motor skills to pose and solve problems.

Among the set of activities and games that can be applied in School Physical Education, there are practice options that involve students quickly and allow them to increase their



participation in the sessions, not only to achieve motor objectives, but also affective, motivational and social objectives. (Velázquez, 2015)

Cooperative games help group cohesion, ensure the participation of all people involved and avoid competitiveness. To achieve a common goal, players give and receive help at the same time. (Calvar et al., 2021)

Rosário et al., (2019) highlight the benefits of cooperative games in the inclusion of students with disabilities in the educational field. Play helps children develop gross and fine motor skills, stimulates creativity and imagination, and increases self-esteem; for people with Down syndrome, games are essential, allowing for proper maturational development that helps achieve cognitive growth.

These arguments point to the effective incorporation of students with Down syndrome into physical education classes as a crucial challenge for educational inclusion. It is important to encourage collaboration, active participation and mutual respect among all students.

This research focuses on proposing a system of cooperative games for the inclusion of 8th grade students with Down Syndrome in Physical Education classes taught at the San Juan Bosco Specialized Educational Unit.

MATERIALS AND METHODS

For this research, the population taken was 27 8th grade students with Down Syndrome (DS) (Trisomy 21 free). All of them belong to the San Juan Bosco Specialized Educational Unit. Of them, 12 are girls and 15 are boys, their average age is 14.2 years and as a source of information, the 3 Physical Education teachers of the Specialized Educational Unit were taken into account.

Mixed research was used, where both quantitative and qualitative research was collected, analyzed and integrated, for a better understanding of the exclusion of students with Down Syndrome in Physical Education classes, as a problem to be solved, so quantitative and qualitative methods were integrated in the same study, gaining breadth and depth in the



understanding of the information, from the triangulation that allowed to identify aspects of a phenomenon with greater precision by approaching it from different points of view.

Theoretical methods such as historical-logical was used to analyze how the inclusion of students with DS has been addressed in Physical Education classes. This includes identifying experiences in successful studies, challenges faced, and lessons learned.

The analysis-synthesis allowed to study the correct way to include factors such as curricular adaptation, active participation, pedagogical strategies and/or interdisciplinary collaboration in these students with DS from the context of the Physical Education class.

The documentary review allowed to identify how the different pedagogical strategies, curricular adaptations and educational approaches have behaved in the educational inclusion of students with DS in Physical Education.

In this same order, observation was applied as an empirical method, where the possible barriers that affect the participation of students with DS in activities were identified. These barriers can be physical, social or emotional and include understanding their needs, abilities and preferences. Table 1.

Table 1. List of items to observe in the motor activity of students with DS

Items	Good	Fair	Poor
A Able to hit, receive, bounce and propel balls of different sizes and shapes, weight and texture, with legs and feet, adapted to individual possibilities and limitations.			
B Make turns and movements in various directions, senses and speeds, according to your abilities.			
C Perform static and dynamic balance exercises.			
D Manipulates objects of different shapes, volumes, weights and textures, adapted to his/her capacity			
E Participate in games by applying basic sports skills			



An interview where the opinions and perceptions of the teachers involved were collected on the importance of inclusion, the benefits appreciated and any concerns they may have, as well as an analysis of the documents that identify the guidelines, policies and regulations that were established at an institutional level to promote the inclusion of students with Down syndrome in Physical Education.

RESULTS & DISCUSSION

The theoretical methods reveal that the educational system is in line with the Constitution of the Republic of Ecuador (2008), regarding the legal considerations surrounding the Prioritized Curriculum, the Organic Law on Intercultural Education (LOEI).

It states in its Art. 2.3, literal ht that the right of people to a quality and warm education, pertinent, adequate, contextualized, updated and articulated throughout the educational process, in its systems, levels, sub-levels or modalities, and that it includes permanent evaluations, must be guaranteed.

It also guarantees the conception of the student as the center of the educational process, with flexibility and ownership of content, processes and methodologies that adapt to their needs and fundamental realities.

It promotes appropriate conditions of respect, tolerance and affection, which generate a school climate conducive to the learning process.

The documentary review accurately declared the existence and updating of the academic records of students with (DS), the associated diseases they present, as shown in Table 2.

Table 2. Associated diseases presented by children with (DS) who were studied.

Heart disease	Visual weakness	Hearing weakness	Epilepsy	Digestive problems	Intellectual disability	Motor disability
11	18	14	9	6	27	27



In this regard, it is important to highlight that there are students who present up to three conditions linked to (DS), but the interesting thing is that they are under control.

It was also found that 17 of the students have mild intellectual disabilities and 10 have moderate intellectual disabilities.

On the other hand, the PE Curriculum applied in the classes of the students estimated for this research was considered and there is a lack of evidence regarding the methodological treatment for inclusion in the PE classes.

According to the items used for observation, when assessing the motor abilities of students with DS, Fig. 1 shows that all items presented difficulty, but those with the greatest problems are in the order of (B), since when making turns and varied movements in direction, senses and according to their abilities, they were unable to maintain balance, they externalize instability, motor insecurity.

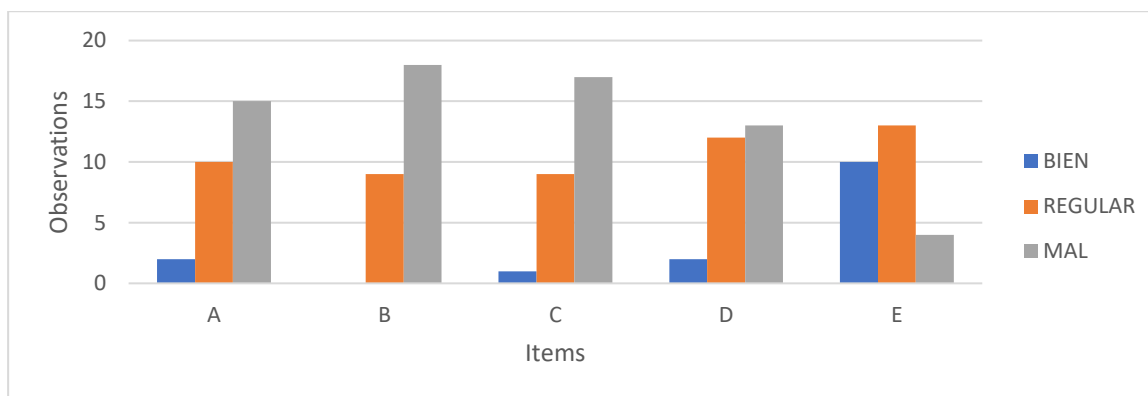


Fig. 1 Results of the observation of motor activity \ Source: Own elaboration

When making an individual assessment per item in the case of A: If the person can hit, receive, bounce and push balls of different sizes and shapes, weight and texture, with the legs and feet, adapted to the individual possibilities and limitations. Fig. 2



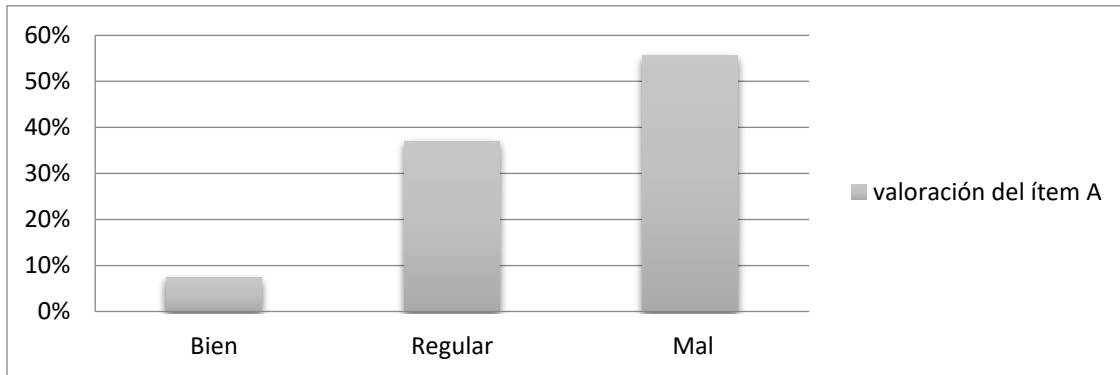


Fig.2 Estimation of item A/ Source: Own elaboration

As shown in Fig. 2, they presented slowness in their motor performance and incorrect coordination in their movements. They also showed little muscle tone that prevented them from holding the implements used in class despite their light weight. Weakness in fine motor skills, as there was exhaustion in the wrists, hands and legs.

In the meantime, B: performs turns and varied movements in direction, sense and speed, according to their abilities. They take time to execute oriented actions, gross motor skills predominate in their movements. Therefore, the results show that 66.66% are evaluated as poor, according to Fig. 3.

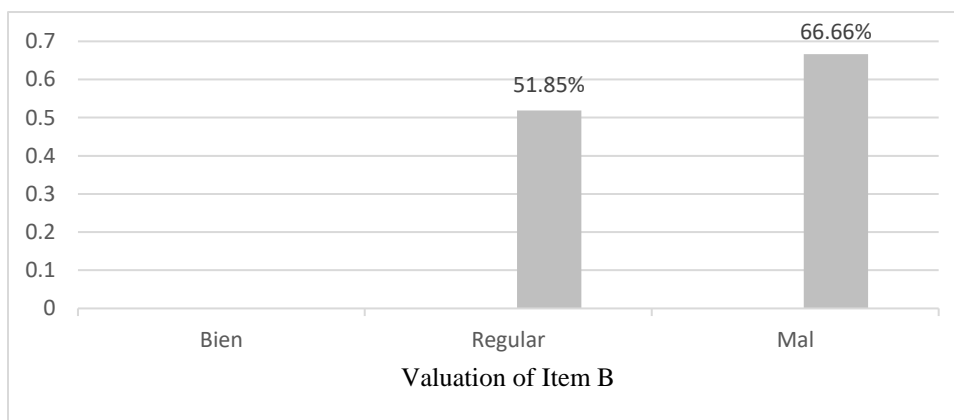


Fig. 3 Estimation of item B/Source: Own elaboration



During the diagnosis, 80% of the students showed a lack of autonomy, a lack of motivation, intermittent distrust of their peers and the environment, and they also needed a long time to respond to the motor action.

The interview applied to teachers to concentrate their opinions and perceptions on the importance of inclusion, the perceived benefits and any concerns they might have, shows the acceptance of the proposal of cooperative games for the inclusion of students with Down syndrome in the Physical Education class.

100% insist that the games be easy to understand and play, that allow the participants to become familiar with them, and that the complicity of the family and teachers involved in the training process of those involved can be appreciated.

They claim that the success of the intervention and stimulation, according to their experience, 100% depends on all the people involved with the child, the patience, support and perseverance throughout this process that will help in their well-being and integral development by avoiding the appearance of secondary problems.

It is important that these students are focused on specific movements, the enjoyment and teaching provided by games, and the family environment. The affective climate will favor the assimilation of content and behaviors because it encourages their learning. "In the development of children, motor skills are of vital importance since they go through different stages that range from spontaneous and uncontrolled movements to mental representation, that is, to true organization" (Moreno and Sarmiento, 2014, p. 16) .

The cooperative game system is intentional, as it is aimed at the progress of students with Down syndrome. It has a referential capacity, as it is dependent on our social system due to the interest it provides in the development of inclusion.

Due to the synergy with which the elements that comprise it are treated, its application is possible at all levels of educational teaching.



According to its characteristics and properties, it is considered an open system, since it is applied to children with (DS) and presents a direct relationship with the environment through inputs and outputs.

Its five elements are distinguished: Environment; input; process; output and feedback, as shown in Figure 4.

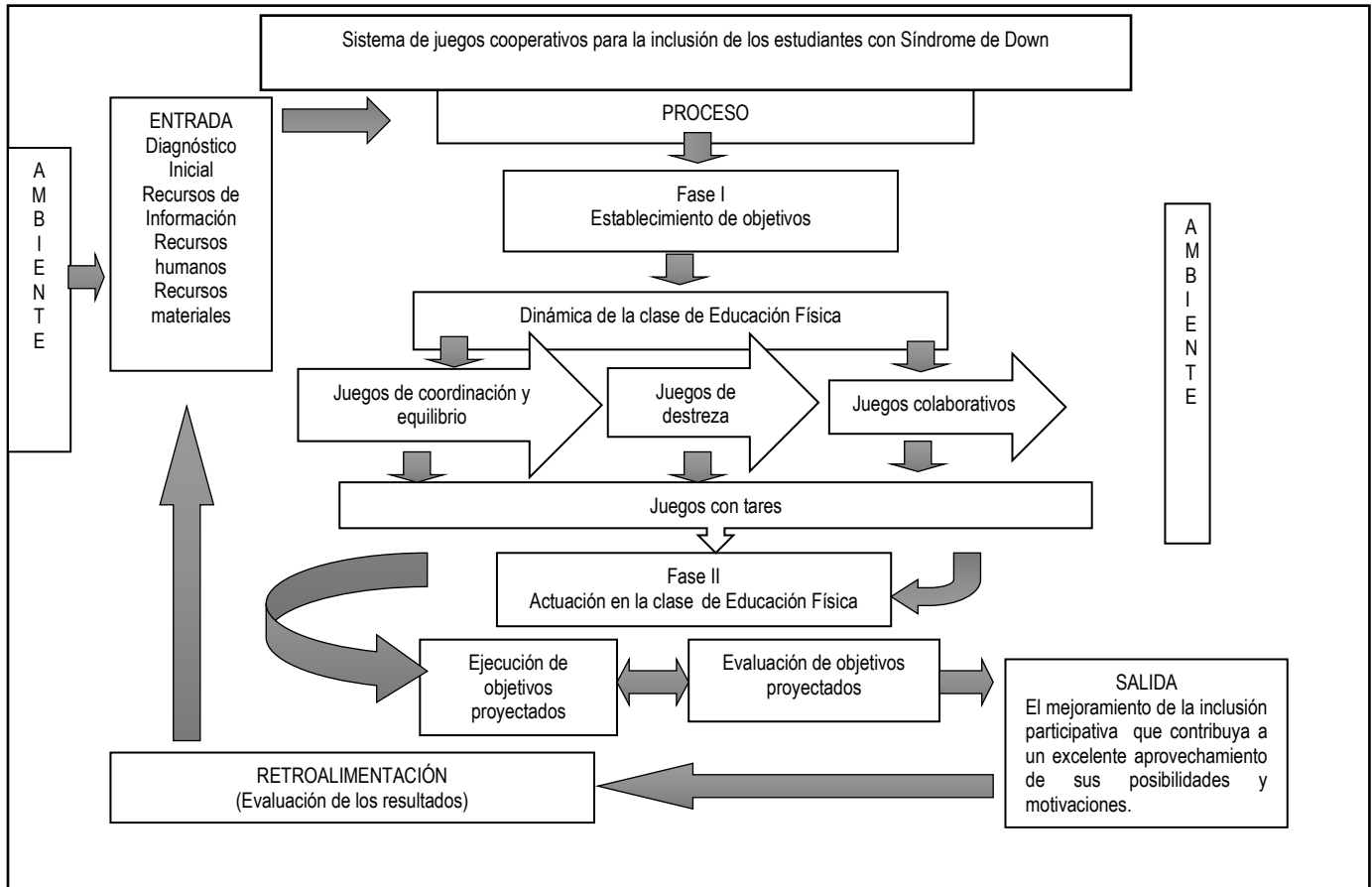


Fig. 4 Graphic representation of the Cooperative Games System for the inclusion of students with Down Syndrome/Source: Own elaboration.

The designed system complies with the basic properties and requirements set forth in the bibliography related to systems theory. It is worth stating that it is not a finished proposal, since it must dialectically adapt to the logical transformations that appear in the



environment for which it was created, without failing to mention the new research and experiences that may make it relevant.

The cooperative games system for inclusion will allow motor and cooperative progress in students with Down Syndrome. The proposal undoubtedly varies the teaching-learning methods, as well as the way of assessing the execution of movements according to their possibilities; it takes advantage of the reality that the student will face, due to non-significant curricular adaptations, such as modifications in methods, techniques, teaching and learning strategies, evaluation and in the programmed activities.

Therefore, it requires a reorganization of the indicators proposed in the CBN (2023), which implies an understanding of the structural elements that allow for an integrated readjustment of the elements necessary for their behavior in the Physical Education class.

In this way, a considerable number of deficiencies found in the diagnosis can be reduced and, at the same time, the quality of the inclusion process in the physical education class can be improved.

This gaming system will allow:

- Carry out recreational activities that stimulate the motor area
- Achieve higher development
- Respect their individuality
- The development of gross motor skills and their abilities
- Perform movements independently inside and outside the institution.
- It will facilitate the planning of physical education classes in an objective manner for this type of disability.
- Possess adequate coordination and synchronization of the structures involved in the movement, and in this way optimize your balance.
- Take into account the needs of the student, since he or she does not have the same work pace as his or her classmates, therefore, the teacher's support becomes important and indispensable for the acquisition of new knowledge.



- Address objectives and tasks, as well as diagnose deficiencies.
- Promoting motivation for teaching-learning from the classroom

Objective: To promote the inclusion of students with Down Syndrome in Physical Education classes through cooperative games, taking into account their needs, possibilities and motivations.

Methodological indications:

- Teachers must have a command of the methodological steps for treating each game as needed.
- It is recommended that games be evaluated based on the actual conditions for their implementation, if possible.
- Emphasize the objective of the game and the motor skill to prioritize, while still valuing the others.
- Pedagogical principles must be respected in physical education classes.
- The pedagogical-methodological nature of the proposal must be taken into account.
- Evaluation system: The indicators referred to in this study will be used to evaluate.

The proposal exhibits running games, games of throwing balls or objects of various colors and sizes, games that involve jumping and moving at different distances and directions, as well as coordination games. There must be a climate of trust and respect to raise the self-esteem of children with DS within the EF class.

Therefore, it was necessary to carry out a theoretical evaluation of the cooperative game system for the inclusion of students with Down Syndrome. The criteria of specialists were used, which obtained a consensus of informed opinions about the proposal, with all its structure.

To this end, 5 specialists were selected, taking into account their willingness to participate in the evaluation of the proposal, professional prestige, self-criticism, analytical capacity, and more than 10 years of experience. All of them were PE teachers and had practices in inclusive education. In the 5 specialists, the value of the competence coefficient ranged



between 0.8 and 1, which was considered high, which confirms that they are competent to issue their opinions about the system.

In this same order, a guide for the evaluation of the proposal by the specialists is prepared and applied at first, with the objective of knowing the opinions on the proposed system. When evaluating the degree of concordance of the specialists, the results of the assessments issued by the specialists were processed using Kendall's coefficient of concordance (W), the result of which was $W=0.83$ with significance $p=0.0001$.

The above reveals the acceptance of the proposal presented by the 5 specialists consulted.

However, the instrument applied requested qualitative assessments about the proposal, which provided important ideas for the restructuring of some elements of the system. The specialists provide the following assessment on the proposal:

- Theoretical-methodological and practical conception of the system that reflects the theoretical principles that support it.
- Greater importance is given to personalized work.
- Novel and feasible for the treatment of students with DS from the EF class.
- It allows for adequate development of motor performance, as well as the improvement of the skills of students with DS.
- Level of practical satisfaction with the system as a solution to the problem and real possibilities of its implementation.
- Structural and methodological conception of the proposal to promote the achievement of the objective for which it was developed.

All items were considered Very Appropriate and the suggestions offered were, in turn, generating other reflections that significantly helped to improve the system in its final version.

The experts also assessed the relevance of the system and its correspondence with the dynamics of inclusive education today.



The references analyzed in this research admit to understanding that children with Down Syndrome have delays in motor skills, so they need help to take care of themselves, dress and wash.

In full agreement with Mirandas et al., (2023), when they state that motor skills, such as 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.

Physical Education PE classes allow for the comprehensive education and training of human beings, allowing students to develop fundamental motor, cognitive and affective skills in their daily lives, as well as promoting inclusion and ensuring that everyone has the same opportunities to participate in and enjoy recreational and leisure physical activities.

It is supported the criterion of Vázquez y Rojas (2024), where they state that recreational games promote psychosocial, motor and cognitive development and promote equal opportunities and active participation of students. When used in Physical Education, they intervene in 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.

It is important to temper the classroom conditions for the personalized treatment provided to students with SD in the context of EF.

In this sense (Hernando, 2000) characterizes the inclusion due to the predominance of theoretical studies and confirms the need to move towards transformative research with and for schools; an intention that is demonstrated by the game system presented.

In the context studied, the figure of the teacher and his teaching work, the transformative role in the student for his social interrelation, are also highlighted.

As Vega and Rivera (2023) point out, the deficiencies that come with an inadequate implementation of inclusive education are not focused exclusively on teaching work, but



also extend to the use of incoherent educational policies, as well as to the sociocultural characteristics of the environment where the teaching staff's functions are carried out.

Likewise, Barahona and Reyes (2022) structured a guide of cooperative games for the inclusion and psychomotor strengthening of children from 8 to 11 years old with Down Syndrome at the Municipal Comprehensive Rehabilitation Center of Durán, where they validated the importance of cooperative games and their positive impact on quality of life, a foundation that enhances the commitment of the proposal presented.

In conclusion, a wide bibliography was consulted, which provided elements to consider in the subject addressed from the current trends in educational inclusion, the use of cooperative games and their impact specifically on the treatment of Down Syndrome, which was very useful for the preparation of the proposal. It was possible to highlight the existing problems in the Educational Unit for the attention to the population studied from the Physical Education class.

The cooperative game system designed for inclusion with a pedagogical character will allow the progress of students with Down Syndrome, flexible because it allows adjustments to be made in the way that its application demands it, creative since the creativity of the children can be taken into account according to their experiences.

The consulted specialists agreed with the qualities that are manifested in the system, guidelines were set in its construction, such as its systemic and participatory nature, its humanistic and interdisciplinary approach and its transformative and integrative vision in inclusive actions from the EF, assigning it the category of very adequate; therefore a favorable theoretical assessment is proven and the possibilities of application of the cooperative games system for students with DS, its structuring in components, phases and actions for the execution of this process.

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



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