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Coordinative games for the inclusion of students with Down Syndrome in the Physical Education class.

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

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

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ABSTRACT

Coordination games stimulate motor, psychosocial and communicative action in children with disabilities. The research presented here aimed to propose an educational alternative



to promote play as a dynamic element for the inclusion of students with Down Syndrome in the Physical Education class, in the Atahualpa educational unit in the city of Ambato. It has a mixed approach since it is based on collecting, analyzing and integrating both quantitative and qualitative research, for a better understanding of the problem to be study, where theoretical methods such as historical-logical, analysis-synthesis and among the empirical methods the documentary review, observation and the survey were used. The results achieved in the diagnosis demand an urgent solution to the existing problem. Hence, it is proposed an educational alternative to promote play as a dynamic element for the inclusion of students with Down syndrome in physical education classes at the Atahualpa educational unit in the city of Ambato, whose theoretical assessment combined with its implementation led to an improvement in the quality of the inclusion process in physical education classes, through the implementation of a system with systemic, systematic, projective, coordinated and contextualized actions that respond to the growing needs of students with Down syndrome.

Keywords: Inclusive education, coordinative play, Physical Education, Down syndrome

RESUMEN

Los juegos coordinativos estimulan la acción motora, psico-social y comunicativa en los niños con discapacidad. La investigación que se presenta tuvo como objetivo proponer una alternativa educativa para potenciar el juego como elemento dinamizador para la inclusión de estudiantes con Síndrome de Down en la clase de Educación Física, en la unidad educativa Atahualpa de la ciudad de Ambato. Posee un enfoque mixto pues se asienta en recopilar, analizar e integrar tanto la investigación cuantitativa como cualitativa, para una mejor comprensión del problema a investigar, donde se utilizaron métodos teóricos como el histórico-lógico, el análisis-síntesis y entre los métodos empíricos la revisión documental, la observación y la encuesta. Los resultados alcanzados en el diagnóstico exigen una solución urgente a la problemática existente. De ahí que se proponga una alternativa educativa para potenciar el juego como elemento dinamizador para la inclusión de estudiantes con Síndrome de Down en la clase de Educación Física, en la unidad educativa



Atahualpa de la ciudad de Ambato, cuya valoración teórica unida a la puesta en práctica provocó la mejora de la calidad del proceso de inclusión en las clases de EF, a partir de la implementación de un sistema con acciones sistémicas, sistemáticas, proyectivas, coordinadas y contextualizadas, que responden a las necesidades crecientes de los estudiantes con SD.

Palabras clave: Educación inclusiva, el juego coordinativo, Educación Física, Síndrome de Down

RESUMO

Os jogos coordenativos estimulam a ação motora, psicossocial e comunicativa em crianças com deficiência. O objetivo da pesquisa apresentada foi propor uma alternativa educacional para potencializar o jogo como elemento dinâmico para a inclusão de alunos com Síndrome de Down nas aulas de Educação Física, na unidade educacional Atahualpa, na cidade de Ambato. Possui uma abordagem mista, pois se baseia na coleta, análise e integração de pesquisas quantitativas e qualitativas, para uma melhor compreensão do problema a ser investigado, onde métodos teóricos como histórico-lógico, análise-síntese e entre os métodos empíricos o revisão documental, observação e levantamento. Os resultados alcançados no diagnóstico exigem uma solução urgente para o problema existente. Assim, propõe-se uma alternativa educacional para potencializar o jogo como elemento dinâmico para a inclusão de alunos com Síndrome de Down nas aulas de Educação Física, na unidade educacional Atahualpa, na cidade de Ambato, cuja avaliação teórica juntamente com a implementação prática levou a a melhoria da qualidade do processo de inclusão nas aulas de EF, a partir da implementação de um sistema com ações sistémicas, sistemáticas, projetivas, coordenadas e contextualizadas, que respondam às crescentes necessidades dos alunos com SD.

Palavras-chave: Educação inclusiva, jogo coordinativo, Educação Física, Síndrome de Down



INTRODUCTION

UNESCO considers inclusive education as a process that responds to the diversity of all students, ensuring their presence, participation and achievements. This approach pays particular attention to those who, for various reasons, are excluded or at risk of being marginalized. Therefore, it is essential to define educational policies and programs that ensure that education is accessible to all (Delgado, 2022).

Brito et al. (2019) adopt that inclusive education is considered a movement whose purpose is to broaden the view regarding the educational system, which recognizes the undeniable right to education and the value of the diversity of students.

Inclusion in education is of great interest, since school is a context where discrimination and social inequalities that operate in various social spheres tend to amplify. Hence, the teacher plays a very important role, as Campuzano and Cuellar (2021) suggest. At this point, it is convenient to emphasize that the perception and attitude of teachers influences the success of inclusive education, and their social interaction.

Games are one of the key elements for inclusion, as they allow the acquisition of knowledge that facilitates the development of tasks, interaction with others and learning how to relate to each other.

It is a fact that play benefits all children. They benefit from being outdoors, interacting with their environment, learning from nature and their peers, and developing through play. These experiences can be especially powerful for children with disabilities, and inclusive play makes these opportunities available to all children, regardless of their abilities and backgrounds.

A concept that renews inclusion in Ecuadorian early education is important. This concept works on the one hand to include family members in improving early education and on the other, games to find the articulation between development centers and the home. (Alfonso et al., 2019, p.76)



Similarly, for García et al. (2020), teachers also highlight that the game benefits students with difficulties, helping to improve areas that usually pose a barrier to learning.

Therefore, games play such an important role in legislation for the development of motor culture and the promotion of inclusion, it is necessary to evaluate whether future teachers receive adequate training in these sociocultural aspects (Lafuente et al., 2024).

González and Jarrín, (2021) determine the influence of games as a tool for the development of coordination skills in basic and secondary general education students.

There are various types of games. In the case of cooperative games, players do not compete with each other; they encourage camaraderie and respond to a group objective. No one competes, no one wins and no one is eliminated.

Jaramillo et al. (2021) mention that cooperative games influence students' behavior, promoting values such as peace, tolerance, respect, norms, rights, and duties. According to Coronado and Duran (2023), cooperative games generate participation, trust, empathy for their peers, and communication, develop a supportive attitude in students, and foster a sense of participation and collaboration.

In the case of children with Down Syndrome (DS), movement is essential for their development. Walking, jumping, touching and grabbing objects allows them to explore their environment, which in turn contributes to the development of their sensory and spatial memory. Through this movement, they learn to orient themselves in their environment, to identify the direction in which they should go and to maintain their balance every time they stumble and get up. In addition, by incorporating cooperative games in Physical Education, their integration into the educational and social context is encouraged.

Physical Education is a fundamental area to promote inclusive education that allows improving the quality of life of students. To achieve the objectives of the curriculum, it is necessary to design adapted activities that require the planning of strategies that allow access to their training. It is important to consider the limitations of each individual, and thus obtain a comprehensive education (Bennasar , 2022).



The teaching of Physical Education (PE) in Ecuadorian educational institutions has developed over the years from two clearly identified educational models: behaviorism and traditionalism. In the case of Physical Education students, behavior would occur as a response to verbal and visual stimuli emitted by the teaching staff, who explain and demonstrate the exercises or activities to be performed, often focused on sportsmanship and the development of physical abilities. In this context, students only have the possibility of repeating and imitating technical gestures and motor actions (Posso et al., 2020).

To make the most of the potential offered by the context of Physical Education, Ñacato et al. (2020) argue that inclusion is manifested in each intervention of the teacher and in the behavior of the students. This implies discovering and valuing the ideas of others, as well as recognizing the possibilities and contributions from the cognitive, social, affective and motor dimensions. In addition, reflective attitudes are encouraged through co-evaluation and self-evaluation, providing the opportunity to share learning among peers. In this sense, it is important to highlight that inclusion cannot arise without cooperation, and cooperation, in turn, requires the student to adopt a cooperative attitude.

Indarte and Morocho (2020) assert that Ecuador has become a Latin American benchmark in social inclusion policies. This is why there is an improvement in the quality of life of people with different abilities. However, there is currently an obstacle that exists in educational centers.

Among these students with different abilities are those with Down Syndrome (DS); students who require special and specialized guidance because they have limitations in social integration and in the application of knowledge. These students have a genetic condition that can present challenges in terms of motor and social skills, which makes physical education a particularly relevant area to address.

Slow motor development in children with DS is associated with intellectual disability and affects the performance of psychomotor activities. Therefore, in the context of PE, the quality of life and autonomy in the school and family environment can be improved if the specific needs of each student are addressed in a rational and objective manner.



The arguments related up to here demand a transformation from the educational work carried out by PE teachers, for this reason the objective of this research is: To propose an educational alternative to promote play as a dynamic element for the inclusion of students with Down Syndrome in the Physical Education class, in the Atahualpa educational unit in the city of Ambato

MATERIALS AND METHODS

To carry out this study, the population was taken as the 48 children of General Basic Secondary Education (EGBM in Spanish) of the Atahualpa educational unit in the city of Ambato, in the period 2023 - 2024, and as a sample, two children with DS.

Table 1. Population and sample for the study

Population	Sample with DS	Total sample
48 students	2 students	22 students
		3 Physical Education teachers

For this study, descriptive research was used, with a qualitative-quantitative approach. Given the objective, it is defined as a non-experimental research.

According to the source, it is a field research since it is carried out in the same educational unit and at the time where the PE classes take place for the grade, to obtain information in an orderly manner and related to educational inclusion for DS. The study is cross-sectional since it collects the data at a single time and only once, that is, the studies are done around the student with DS in the second period of the 2023 school year.

In the theoretical order, the historical-logical and analysis-synthesis methods were used, and from the empirical order, documentary review, interview and observation were used.

The historical-logical method allowed to identify the important scenarios for the inclusion of students with DS in PE classes which are manifested in the problem found and which can



be solved in the research. The synthesis analysis served to verify the facilities provided by the teaching curriculum to meet the needs and possibilities of the students.

The analysis-synthesis method allowed the object of study to be broken down into its essential parts and qualities, by outlining the fundamental elements that characterize it. This approach revealed the fundamental relationships and general characteristics that exist between these elements, as well as the main relationships that establish the background and guidelines that determine the behavior of the process studied.

The empirical method of document review was used to comprehensively explore all documents related to inclusive education, Physical Education classes and care for students with Down Syndrome. This documentation was analyzed in depth to extract relevant information and obtain a comprehensive understanding of existing practices and theories in these areas.

The observation was carried out in two Physical Education classes with the aim of assessing the motor performance of students with Down Syndrome and their participation in group activities within the educational environment.

In this study, coordination games were defined as an operational variable for the inclusion of students with Down syndrome. These games are conceived as playful activities with a physical focus, designed to enhance motor skills and improve movement coordination. Dimensions considered include body control, spatial-temporal location, as well as the willingness to participate in the programmed activities.

Table 2 List of dimensions and indicators to be observed in the activities of the sample studied

DIMENSIONS		Good	Average	Poor
Motor control	1. Walk in a straight line			
	2. Make turns and movements in different directions according to your abilities			
	3. Perform static and dynamic balance exercises.			



Space-time location	4. Manipulate objects of different shapes, volumes, weights and textures
Provision	5. Participation in scheduled activities with certain basic skills and competencies

In both cases, the value judgments were organized as follows:

I Indicator	G: Fluency and coordination in the motion A: He performs the movement with some lack of coordination. P: No achieves carry out he motion
II Indicator	G: Achieves relate of manner integrated of the tonicity, of the balance, of the laterality and of the notion of the body A: Achieves relate to the less balance, laterality and in some extent the notion of the body P: No achieves relate sayings items.
III Indicator	G: Manages to relate emotions with cognitive experiences, with the final interpretation of the stimulus, its perception and participation A: Relates emotions and other cognitive experiences, their participation, but does not achieve the final interpretation of the stimulus, its perception P: No achieves the relations

RESULTS

In the documentary analysis, the figure of two students with DS is evident, which shows mild intellectual disability, visual disability, as well as motor disability; these elements hinder their correct learning, according to the Report of Progress in the Teaching-Learning Process of students with SEN associated with and not with disability, the record that the Educational Unit has on the sample students of this study is indisputable.

Although 100% of the cases reported progress in the records analyzed, they were recommended training in functional life skills and impulse control training. Situations that can be treated in PE classes.

Thus, the Curriculum of PE for the school level EGBM was assessed, this document designs six blocks made up of skills with performance criteria that bring together a series of knowledge, procedures and attitudes considered basic to be taught, where Block 5 takes



effect for this study. Construction of the body identity, where references to everyday life and the students' immediate environment are integrated into all areas.

It is dignified as the contents examined in the curricular blocks, are tightly related and how they acquire greater depth when advancing in the same levels of the educational system; so, it must be ensured that this complexity is assigned in accordance with the starting points, contexts and progressions. However, there is no evidence of alternatives that, from the curriculum, objectively achieve the needs, odds and opportunities that from the inclusive education is provided to students with DS.

In this regard, it was evident that teachers within the Physical Education program and in their classes lack the projection of specific activities for individual attention to students in the group. It was possible to corroborate the inclusion of games as an element that provides opportunities within the PE class to stimulate the intervention of students, providing elements such as: cooperation, participation, enjoyment, delight and attention.

Paying attention to the items used for observation, to assess the motor control of students with DS, Figure 1 shows that both indicators presented difficulty, but the biggest problem is in the order of making turns and movements in different directions according to their possibilities, since it is difficult for them to remain upright and stable while performing movements or actions that require displacement or movement, as well as without movement.

Both students are rated as average, which reveals motor instability and insecurity.

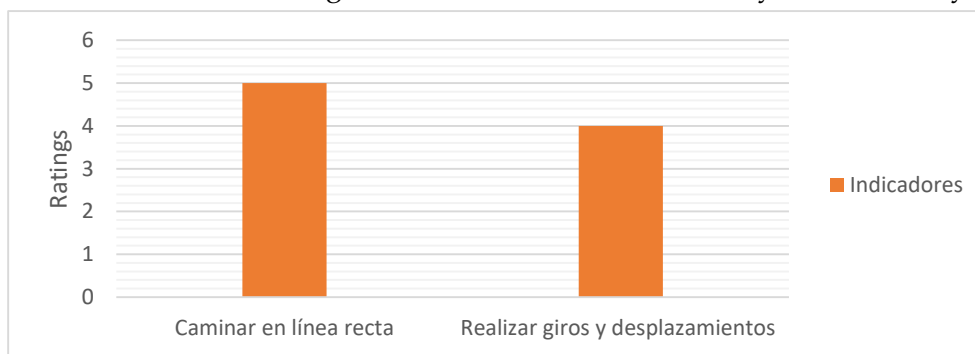


Figure 1. Behavior of the motor control in students with DS



In the case of space-time location, as another dimension to be addressed in this research, it is specified that this situation arises from the motor skills that the students, from the correspondence with the objects located in the established area, from the position relative that occupies the body, in end, of the multiple relations finished with tonicity, balance, laterality and body awareness. In this question the indicator is valued as average

because students do not reach the maximum range established in said item

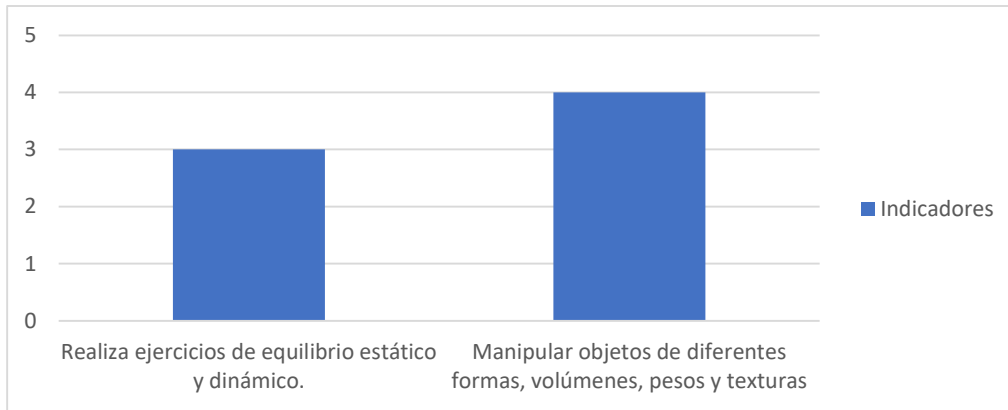


Figure 2 Behavior of temporal space in the students with DS

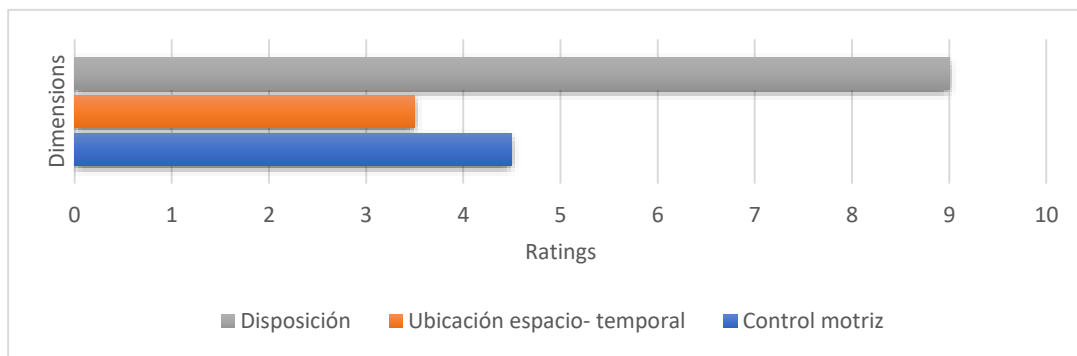


Figure 3 Results of the comparative study between the three dimensions established for the study

The third dimension is the one with the best percentage, since it basically sought to estimate the active participation of students in the activities and it resulted in relating emotions with cognitive experiences, with the final interpretation of the stimulus, its perception and participation; therefore, this was the only item valued as Good. When comparing the three



dimensions, the willingness and desire to socialize shown by students with DS in the PE activities is a reality. As Figure 3 shows, such a result clearly defined that all of them demand a pedagogical transformation from the PE classes of children with DS, where play is an important element to consider for this assignment.

Therefore, the application of the survey allowed find out the comprehension of the three teachers about the inclusion of children with DS and the methodological treatment provided from the PE class, with a total of five consultations that had as a point from the start the identification of the teachers, where he 100% are graduates and are in a average of 9 years of experience in the teaching activity they perform.

In the question #2 it is reflected about assessments to treatment of inclusion in Physical Education classes. It was revealed that 100% of teachers have imperceptible knowledge for face the challenges of the inclusion of students with DS, although the topic is relevant, do not really have all the guidance necessary to face such a challenge.

To investigate with the question #3 if they knew the flexibility offered by the PE curriculum and the benefits it provides in the classroom for participation, motivation, motor activity that it guarantees and how they can be worked on from the different curricular blocks designed for the organization and sequencing of the contents planned for this subject and teaching, only 30% reported having studied this document in its entirety; while the rest, 70%, described having consulted only the objectives of each curricular block for pedagogical development for classes.

In the case of question #4, of the three teachers surveyed, only 30% mentioned the possibility that games provide for the development of students with DS and even other disabilities for inclusion in PE classes and their development for life.

The results achieved showed the lack of experience regarding the important procedures that refer to inclusive education at an international level and in the Ecuadorian context



In question #5, of the three teachers, only 30% could refer to elements related to inclusive education, while 70% needed knowledge about it. Consequently, the results achieved require an urgent solution to the problem existing.

Hence it is proposed an educational alternative to promote play as a dynamic element for the inclusion of students with Down Syndrome in the Physical Education class, in the Atahualpa educational unit in the city of Ambato

Rationale for the proposal:

Sierra and Imbert (2020) argue that pedagogical, educational, didactic, methodological, psychopedagogical intervention and in the area of guidance and counseling, are manifested at the various hierarchical levels of management: institutional, group and individual, among which there are relationships of interdependence, coordination and subordination, highlighting the need to derive a *system of actions* to be able to materialize it, highlighting the contextual nature of its implementation; Here the operational element that every strategy has is defined, in which the alternative is inscribed.

For this study, the criteria of these authors are assumed and an *educational alternative is defined as a product, which has the purpose to improve the socio-educational content, in its process allows the solution of educational problems based on the (formation and development of values, behaviors and attitudes)*; it considers the educator, the student, the family, and the group as subjects and is developed in a socio-educational context.

The proposed educational alternative presents the following structure:

Users and context: It is aimed at students with Down syndrome, in EGBM from the Atahualpa educational unit in the city of Ambato in Ecuador. The proposal will be developed in the usual school environment, PE teachers must arrange appropriate spaces for the development of games in which students can develop skills and abilities.

General objective: To foster play as a dynamic element to promote the full inclusion of students with Down Syndrome in the educational environment of the Physical Education



class, encouraging their active participation, comprehensive development and emotional well-being.

Specific objectives

- Develop specific Physical Education activities, through games, that promote the development of motor skills in students with DS.
- Run games that allow students with DS to understand and manage concepts related to space and time.
- Promote inclusive activities in an environment of cooperation, active participation, enjoyment and care among all students, including those with DS

The proposal has 22 games for the inclusion of students with Down Syndrome in the Physical Education class.

Table 3 Examples of games that make up the proposal

Name of the game	Aim	Inclusive singularities
Throwing balls into the basket	Improve throwing skills	Reduce the distance from the basket or colored box where they must place the thrown ball They can throw the ball from any arm position. In these cases, delivery to the partner can be done by running or walking, depending on his/her abilities.
Attack the pirates	Throwing balls accurately	Decrease the distance of the figure That he makes enough throws to the figure

Duration: 30 minutes

They can be used at any time during class and variations can be applied according to the teacher's creativity:

Starting point (I): To create a climate of trust in students



Development moment (II): The content of the topic to be taken into account for the class (skills and abilities), with active participation and effective communication

Final moment: A space to show levels of satisfaction with the activity carried out.

Some methodological indications to take into account:

- Conducting a comprehensive diagnosis to learn about the health status and educational process of schoolchildren.
- Conceiving spaces and materials, understood as the needs and possibilities of the students
- Games should be selected according to the students' level of development, taking into account their psychomotor characteristics.
- Increase the skills and abilities that students have in accordance with their motor capabilities.
- Allow the discovery of new scenarios.

Evaluation: This will be formative, assessing the development and completion of the activity and its social integration.

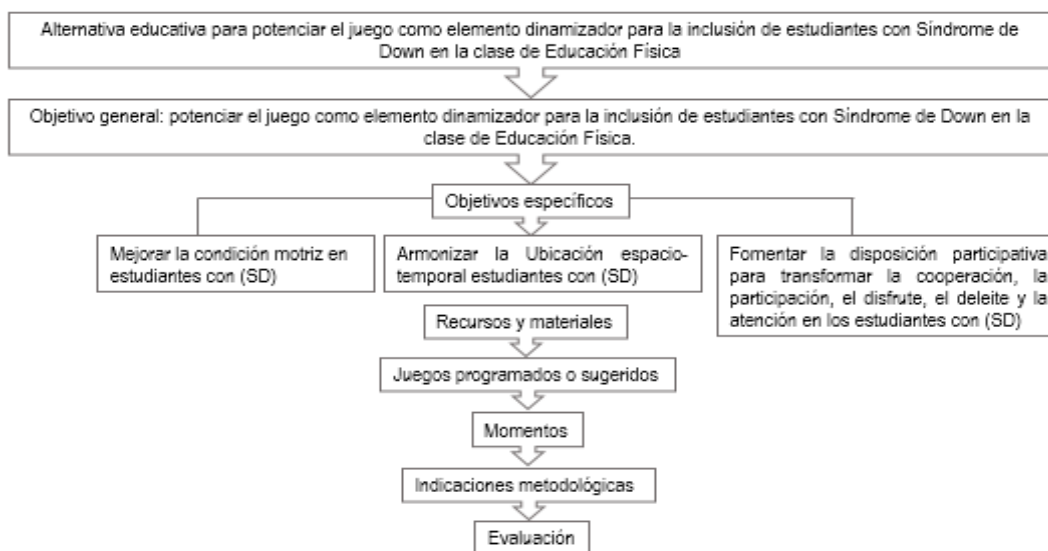


Figure 4 Compliance with each element of the alternative will facilitate the success of the educational alternative.



Alternative educational graphic representation to enhance the game to promote the full inclusion of students with Down Syndrome in the educational environment of the Physical Education class, encouraging their active participation, comprehensive development and emotional well-being.

To validate the relevance and effectiveness of the proposal, a dissemination workshop was held where the elements of the proposal were agreed upon. A validation instrument consisting of 5 indicators was designed in unison, applied to a total of 8 participants; all of them Graduates in Physical Education with experience in caring for people with Special Educational Needs, who guaranteed their experience as specialized validators.

The results obtained by the specialists indicate that the proposal is effective, with a valuable consensus in several aspects where the high percentage of responses that are "Strongly in Agreement" 7 for a (85.7%) stands out, in which the proposal is seen as a viable and functional alternative for the inclusion of students with DS.

For practical validation, the proposal was implemented in eight PE classes, using the pedagogical experience led by the researchers. Curricular block No. 1, "Playful practices," at the EGB. Media level was selected, although the proposal can be applied in any of the curricular blocks due to its characteristics.

Among the results, it can be highlighted that they were dynamic and attractive classes, where both students with DS and their classmates actively participated in the activities during Physical Education classes, positively demonstrating participation in the educational inclusion process.

Finally, a final evaluation of the proposal was carried out by means of interviews with the children of the General Basic Secondary Education of the Atahualpa educational unit in the city of Ambato. The objective was to obtain the opinion of the students about:

- Participation and Enjoyment.
- Difficulties and Challenges.



- Perception of Benefits.
- Suggestions for Improvement.

Interpretation of Results

Participation and Enjoyment:

81.82% of the children indicated that they liked the activities (positive).

90.91% indicated a favorite activity (positive).

Difficulties and Challenges:

18.18% found some activity difficult.

81.82% did not find significant difficulties.

Benefits Perception:

86.36% felt that the activities helped them improve.

95.45% feel more motivated to participate in Physical Education class.

Suggestions for Improvement:

68.18% provided specific suggestions to improve classes.

31.82% had no additional suggestions.

The results of the interviews indicate a high acceptance of the proposal by the children. Most enjoyed the activities, did not encounter significant difficulties, and felt motivated and benefited from them. The suggestions provided can serve for future improvements, but the general acceptance is clearly positive.



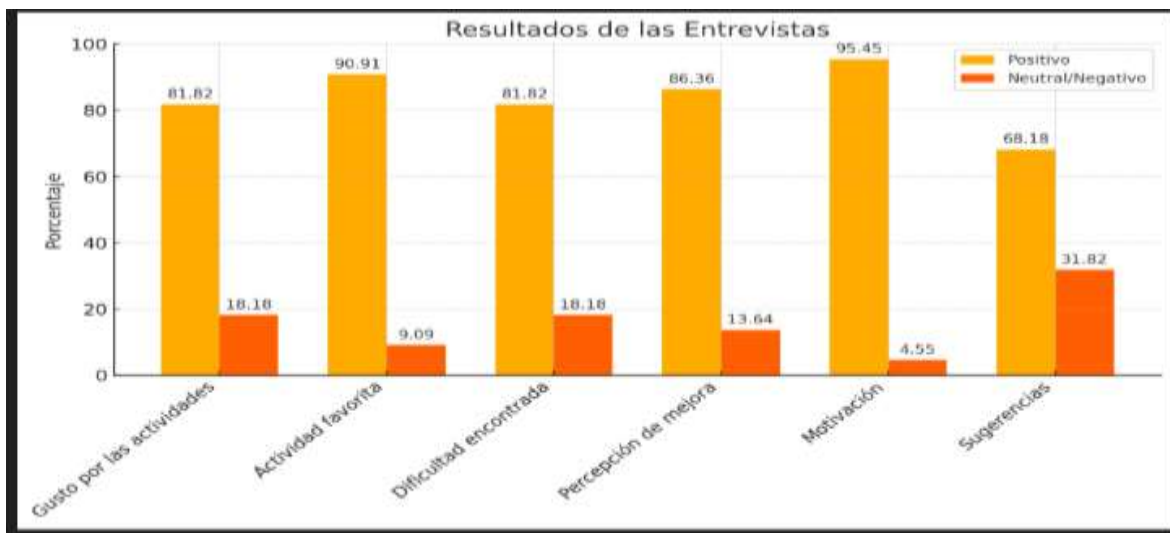


Figure 5 Graphical representation of the interview results.

This graph clearly illustrates the high acceptance and positive perception of the proposal by children, as well as some areas where challenges were identified or suggestions were offered.

These successes reinforce the idea that games effectively increase the inclusion process of students with DS in the Physical Education class. In this context, the developed games provide an invaluable and relevant alternative to facilitate the inclusion processes of students with DS in the educational context.

It was interesting to consider the criteria, experiences and moods of the participating students, who showed that they felt motivated and empathetic towards those with DS. Likewise, it was perceived that students with DS improved their motor control, their spatial-temporal location and, to a greater extent, their willingness to participate in activities.

DISCUSSION

Within the framework of the promotion of inclusive education policies, the incorporation of students with special educational needs, such as those with Down syndrome, in preschools is increasingly common. These cases of inclusion have been poorly documented, which is why Lormendez and Cano (2020) proposed a research whose main objective was to know



the characteristics of the teaching practice of those who work with these students. Such action stands out, just as in the study that is addressing the role played by the teacher-professor and their preparation to face the issue of educational inclusion in any of the areas of knowledge.

For Merizalde et al. (2022), contributing through socialization with an Educational Plan that strengthened the integration of children with Down Syndrome in educational centers in a pleasant and balanced environment, with the use of an appropriate methodology, consolidated affective participation with equal opportunities. This is one of the main efforts of educational inclusion and therefore of the study that is offered today, to make the diverse moments of the lives of these students pleasant.

Talking about inclusion means addressing acceptance and integration in all areas of society, especially in education. It is essential to analyse the support mechanisms that ensure a better quality of life for people with disabilities.

In particular, children with Down syndrome need to be recognized and have the diversity of their individual abilities valued, which allows them to function both in an ordinary classroom and in their daily lives. Each of them understands the world in a unique way, and it is essential to consider the totality of their being in this process (González and Bracho, 2021).

Dealing with the inclusion of students with Down syndrome in the Physical Education class is a complex issue. Such is the case of Torres et al. (2024) who developed a methodological strategy which contains a system of games that contribute to facilitating the teaching-learning process and the inclusion of these students. The proposed methodological strategy contributed favorably to the process of inclusion of students with Down syndrome in the Physical Education class. It coincides with the intention of transforming the educational scenario for students with DS.



CONCLUSIONS

The benchmark study highlights the importance given by international, national and local bodies to the issue of inclusion, with an emphasis on educational settings.

The diagnosis carried out showed physical, cognitive and social limitations, which restrict the integration and general well-being of students with DS in PE classes. In addition, an emotional environment was provided for their participation in the games, recognizing their achievements and progress, which.

The educational alternative exhibited a structure and functionality with a total of 22 games that not only facilitated the participation of students with DS in PE classes, but was also able to considerably improve their motor condition and their spatial-temporal location; it strengthened their self-esteem and self-confidence.

The specialists recognize the relevance of the theoretical positions and the actions assumed in the proposal, and therefore value the level of theoretical feasibility as Very Adequate. The practical experience revealed the improvement in the quality of the inclusion process in the PE classes, starting from the implementation of the alternative, to which were added the criteria, experiences and moods of the participating students who showed that they felt motivated and empathetic to share the environment with the students that presents (SD).

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



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