

Inclusion: A technological intervention tool to strengthen inclusive processes in the classroom

Inclusion: Una herramienta tecnológica de intervención para fortalecer los procesos incluyentes en el aula

Inclusão: Uma ferramenta de intervenção tecnológica para reforçar os processos inclusivos na sala de aula

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61

Abstract: The general objective of the research is to strengthen inclusive processes in the classroom through "Inclusion" a virtual classroom, aimed at eleven preschool and elementary school teachers of the Francisco Palau y Quer School in the municipality of San Juan del Cesar La Guajira, which compiles and presents a digital tool focused on the promotion and strengthening of inclusive pedagogical processes. Inclusive contents were generated within the curricular development and pedagogical tools to create changes in the school paradigm. The qualitative approach, action research,

gathered information by applying the following instruments. First, an initial survey to identify the inclusive technological processes in the institution and the most recurrent learning barriers. Then, a triangulation was made through direct observation. The main results indicated the lack of teacher training on inclusion issues, gaps and digital illiteracy, and the absence of digital tools to support the inclusive process. Finally, the semi-structured interview instrument was applied after the inclusion virtual classroom intervention to compile the pedagogical scope of the digital tool in the participating teachers. The development and application of inclusion allowed strengthening the teachers' work to apply inclusive didactic strategies in the classroom.

Keywords: mobile application, school performance, mathematics, online modality.

Resumen: El objetivo general de la investigación es fortalecer los procesos incluyentes en el aula por medio de “Inclusión” un aula virtual, dirigida a once docentes del nivel preescolar y primaria del Colegio Francisco Palau y Quer del municipio de San Juan del Cesar La Guajira, la cual compila y presenta una herramienta digital enfocada a la promoción y fortalecimiento de los procesos pedagógicos incluyentes. Se generaron contenidos inclusivos dentro del desarrollo curricular y las herramientas pedagógicas para crear cambios en el paradigma escolar. El enfoque cualitativo, investigación acción, recopiló información aplicando los siguientes instrumentos. Primero, una encuesta inicial para identificar los procesos tecnológicos incluyentes en la institución y las barreras de aprendizaje más recurrentes. Luego, se hizo una triangulación por medio de una observación directa. Los principales resultados indicaron la falta de capacitación docente en temas de inclusión, brechas y analfabetismo digital, y ausencia de

herramientas digitales que apoyen el proceso inclusivo. Finalmente, se aplicó el instrumento de entrevista semiestructurada, después de la intervención del aula virtual inclusion para compilar los alcances pedagógicos de la herramienta digital en los docentes participantes. El desarrollo y aplicación de inclusion permitió fortalecer el trabajo docente para aplicar estrategias didácticas incluyentes en el aula.

Palabras clave: aplicación móvil, desempeño escolar, matemáticas, modalidad en línea.

Resumo: O objectivo geral da investigação é reforçar os processos inclusivos na sala de aula através da "Inclusão" de uma sala de aula virtual, destinada a onze professores do ensino pré-escolar e primário da Escola Francisco Palau y Quer, no município de San Juan del Cesar La Guajira, que compila e apresenta uma ferramenta digital centrada na promoção e reforço dos processos pedagógicos inclusivos. Foram gerados conteúdos inclusivos dentro do desenvolvimento curricular e ferramentas pedagógicas para criar mudanças no paradigma da escola. A abordagem qualitativa, de investigação de acção, recolheu informações através da aplicação dos seguintes instrumentos. Em primeiro lugar, um inquérito inicial para identificar os processos tecnológicos inclusivos na instituição e as barreiras de aprendizagem mais recorrentes. A isto seguiu-se a triangulação através da observação directa. Os principais resultados indicaram a falta de formação de professores sobre questões de inclusão, lacunas e analfabetismo digital, e a ausência de ferramentas digitais para apoiar o processo de inclusão. Finalmente, o instrumento de entrevista semi-estruturada foi aplicado após a intervenção em sala de aula virtual de inclusão para compilar o âmbito pedagógico da ferramenta digital para os professores participantes. O

desenvolvimento e aplicação da inclusão permitiu o reforço do trabalho dos professores a fim de aplicar estratégias de ensino inclusivas na sala de aula.

Palavras-chave: aplicação móvel, desempenho escolar, matemática, modalidade online.

INTRODUCTION

Inclusive education has been the result of the vindication of the universal right to equity and education without any type of restriction (Castillo & Briceño, 2015). Imparting this type of education has been a fairly broad challenge for all educators whose practices have very succinctly been able to integrate the diverse population and therefore urges the call to build new ways of teaching and learning that are generic from the school. The main challenges in the inclusive educational process are the role of teachers trained and updated with the use of technology in the teaching and learning process (Calvo G., 2013). The teaching activity must evolve and become qualified to assume education as a space of inclusion where all populations are welcome. Thanks to the boom and ease of technological resources that increasingly have higher rates of usability in education and by the types of progress achieved in terms of educational inclusion (Alvarez, 2021).

This problem has motivated many researchers to search for the best way to favor the teaching and learning process of students. At the international level, Booth and Ainscow (2011) conducted empirical research developed in Latin American countries, where it was possible to know the perception of teachers regarding the level of competence in which they were located; manifesting to be located at a low level in the development of skills for the competence of inclusive practices. Similarly, in the United States, a learning model integrating ICT in education was proposed, resulting in the conclusion that technology-mediated education is the key to economic growth (U. S,

Department of Education, 2017). Thus, providing quality education to students with learning limitations or barriers has become a relevant issue. In which there is evidence of research aimed at improving educational practices. At the national level, Duran (2017) states that one of the causes of the low appropriation of technologies in educational institutions is the poor training of teachers, and Hernández, Fernández and Baptista (2014) design a Virtual Learning Environment to promote the pedagogical practices of primary school teachers and identify that although teachers have a good perception of inclusive education, they have difficulty in carrying out their pedagogical practices with students with disabilities, due to lack of knowledge and the need for training on the subject. In this way Viñas and Cuenca (2016) state that the teacher must be trained constantly, having a learning attitude, strengthening their strategies, methodologies and didactics, being digitally competent. The government, committed to processes that support and serve as an anchor to achieve quality improvement in the education (MEN, 2016). To meet this challenge, teachers are trained in the pedagogical use of ICT, managing to incorporate them as tools in the development of teaching, it is the duty of the education system to generate training spaces for teachers, in order to provide didactic tools to ensure relevant attention to children, adolescents and young people (NNAJ) in vulnerable conditions (MEN, 2005). In accordance with the above and with the research consulted, it is observed that they have in common the need to implement technology, the creation of didactic materials in each of the disciplines and the continuous training of teachers in order to have better results and achieve that the current teaching-learning processes integrate ICT in the classroom to meet the expectations of quality and efficiency required by the society of the XXI century. To the set of factors mentioned above, which affect the quality of education and have an impact on the performance of children and youth in the inclusion process, the

question was posed: How can digital technologies strengthen inclusive pedagogical processes in the classroom?

This research hopes to comply with the legal parameters at the national level and provided from the Decree 1421 of 2017 for the development of the training proposal to teachers, taking into account the problem that is based on the absence of inclusive formative processes in the classroom, led by teachers and the lack of interaction with digital strategies by teachers to understand and appropriate issues of school inclusion, promoting inclusive practices, enhancing the qualification of educators of the Francisco Palau and Quer School in the municipality of San Juan del Cesar - La Guajira, focusing on eleven teachers (focus group), preschool and elementary school level, with a virtual classroom called "inclusion", a tool of easy access and interaction that had as a priority to strengthen and promote innovative educational practices for the inclusive population.

This is a social and educational research, it was conducted for the interest of supporting the academic preparation of teachers around inclusive education using technology. In the first instance a social motivation is justified understanding that education is a universal right that converges in the economic, social and emotional development contextualized and contemplated in goal four of the 2030 agenda of the (United Nations, 2015) education is the basis for improving life and sustainable development.

This research justifies a professional interest from the educational field to understand and apply the new policies emanated in recent years by the Ministry of National Education, which have a legal support since 1994 with the general law of education and subsequent regulations such as decree 2082, law 361, law 1346 and decree 1421 of 2017 that on paper would guarantee educational inclusion but that really are far from the educational reality. Based on the framework of the Inclusive theory which aims that the entire

population can access the available resources avoiding isolating those who present barriers to learning and participation.

The positions of Miguel López (2011) and Gretel Valenciano Canet (2009). "Teachers should prioritize inclusive strategies and practices in their teaching processes, being very clear that exceptional people should learn the school culture as any student of the center." (López, 2011, p. 41). In turn, Canet (2009) mentions that "to create inclusive schools requires a pertinent educational response to students in terms of their needs, didactic proposals according to the heterogeneous characteristics of their students, considering the interaction between the educational community, the use of resources and educational practices that are integrated in the classroom".

From Inclusive Education, it was supported by Layton, Gómez, Sarmiento and Mejía (2017), who in their study designed the "competences of inclusive practices", articulating with the route of "ICT Competences for Professional Development". Likewise, for Ramírez (2017), inclusive education aims to identify educational needs of each NNAJ, carrying out actions that prevent their social exclusion, in which academic and cultural education is included. Viñas and Cuenca, (2016), expand this concept where they express the importance of teacher training to strengthen their pedagogical practice at a digital level. Regarding technological tools. According to Cabero and Fernández, (2014), they facilitate communication, updating and training processes for teachers, favoring quality education and eliminating barriers to inclusion in the classroom.

ICTs provide ease for social and citizen participation, allow a more participatory and interactive interaction, open the possibility of learning at a distance and in different contexts, composed of an interaction between science, education and technology (Gallego et al., 2004). Therefore, they become a bridge between children, youth and adults (Muñoz-Borja, 2020).

They contribute to innovation, growth as sources of employment, increase productivity, enhance competitiveness, highlight the inclusion of minorities, people with disabilities, social and participatory education.

Consequently, the Ministry of Information and Communication Technologies (MINTIC) establishes in Colombia under Law No. 1341 of 2009 to design, adopt and promote ICT sector policies, plans and projects to promote access, effective use and appropriation of ICTs (MinTIC, 2016). Therefore, it is necessary to reduce the communication gap in the environment in an inclusive manner (Brun, 2011). It is relevant to analyze the contributions of ICTs in the inclusion process, since they are innovative tools for knowledge linked to social learning, generating skills to those who use them, resulting in an education that successfully responds to the permanent changes in the environment (Ramos et al., 2015).

The above supports the importance of inclusive content within the curricular development of all teachers and the tools, pedagogies or methodologies with which inclusive content is articulated to generate a change in the school paradigm.

According to (UNESCO, 2015) education must be accessible to all, without class distinction, under conditions of equal opportunity, with guaranteed regularity and continuity. For Arnaiz (2012). The school of the 21st century is faced with the unavoidable objective of promoting a democratic and inclusive education that guarantees the right of all children and young people to receive a quality education based on the principles of equality, equity and social justice. Then, inclusion means meeting with quality and relevance the common needs of educational contexts, based on ethical conceptions, flexible and innovative strategies oriented to the different learning styles and capabilities of each individual. Echeita (2017), considers it relevant to create the conditions for educational centers to be able to initiate and sustain

processes of improvement and educational innovation in the first place, to recognize the multiple barriers (factors that may limit the presence, learning and participation of students), and to transform such barriers into facilitators of an educational action with the capacity to personalize teaching, adjusting to the diversity of students and responding with equity to their educational needs and aspirations.

According to (Booth and Ainscow 2002) and Fernandez (2013) the fundamental principles of inclusive education are: Presence, participation and progress. From this point of view, inclusive practices carried out by teachers in inclusive education must take into account that all children and youth have the right to be educated together with others, without any discrimination, accepting diversity, identifying particular learning rhythms and applying a flexible system that guarantees the progression of each and every one of their students.

Pedagogical and didactic strategies are the actions performed by the teacher with the purpose of facilitating training and learning in students Monereo (1999) and Rosales (2004). And according to Santos and Portaluppi (2011) didactic strategies are the set of activities that the teacher performs with clear and explicitly pedagogical intentions. These strategies are tools for the correct action of the teaching are the gateway to the full exercise of the rights that all human beings possess (Omaña and Alzolar, 2017). These activities could be through a virtual space and oriented to the use of didactic strategies adapted to the population belonging to the diversity . From the perspective of the authors López (2011) and Canet (2009) within schools it is necessary to stop talking about barriers in the learning of children as some kind of disability, instead strategies and practices that teachers implement in their teaching processes should be prioritized.

Nowadays, the use of information and communication technologies (ICT) is very important for the learning process (Romani, 2009), to achieve meaningful learning, this implies that new ideas, concepts and propositions can be learned meaningfully to the extent that other relevant ideas are adequately clear and available in the cognitive structure of the individual (Ausubel, 1983). With the Universal Design for Learning (UDL), which is a teaching model that takes into account the diversity of the classroom and whose main objective is to achieve effective inclusion, minimizing physical, sensory, cognitive and cultural barriers that may exist, it favors equal opportunities in access to education for all.

It is intended to support the inclusion virtual classroom process with the guide of the Technology Resource Wheel, organized around the three SAD principles and the 9 main guidelines that define the strategies to be followed in each principle.

This research had a qualitative approach, mediated by action research. It was carried out by means of a series of instruments, first of all an initial survey to the focal group of teachers, with the purpose of identifying the inclusive technological processes applied in the institution and the most recurrent learning barriers. A triangulation was made by means of direct observation in the field diary, the semi-structured interview after the intervention and the presentation of inclusion with the purpose of identifying the perception of the teachers participating in the research.

MATERIALS AND METHODS

For the development of this research, the qualitative approach was determined, which according to Herrera (2017), defines it as a process that

allows advancing in the understanding of how social actors live and construct their social reality, from their daily intersubjectivity. Thus, the type of research study was conducted based on action research, which aims to improve the processes of educational transformation based on the collaborative work of the participants, constitutes a rich methodological option, allows the expansion of knowledge and generates concrete answers to problems posed by researchers and co-researchers when they decide to address a question, topic of interest or problematic situation and wish to provide an alternative for change or transformation (Sequera 2014). to strengthen the inclusive pedagogical process in the classroom through the development and implementation of the tool *inclusión*, which compiles, articulates and presents to teachers a virtual classroom with remote access that focuses on the promotion and strengthening of the inclusive teaching-learning process for teachers of the Colegio Francisco Palau y Quer San Juan del Cesar, La Guajira, with the purpose of introducing different technological didactic strategies based on a digital tool according to the needs of the target population.

The population under study is centered on twenty-two teachers, from which the sample for the research is made up of preschool and elementary school teachers, with a total of 11 participating teachers, which is equivalent to 55% of the teachers, 3 men and 7 women, with ages ranging between 30 and 40 years old. The teachers were selected based on the criterion of attendance (100% of classes) at the educational institution, which is important for the development and follow-up of the research activities. Regarding the socioeconomic conditions of the teachers, it is pertinent to indicate that they are in the municipal stratification scale 3 and 4, with easy economic conditions, they have a professional academic training, the highest levels of studies reached by most of them.

For data collection, techniques and tools were implemented and validated by experts. The initial survey, It is characterized by the use of a series of standardized procedures, from which a set of data is collected, processed and analyzed from an estimated representative sample of the population. "The main tool used in survey research is the questionnaire, which we can define as the document that organizes the set of indicators of variables related to the purpose of the survey" (Casas, Repullo & Donado, 2003). It was applied to the target population, using digital technologies for education (Google form) with the objective of identifying the most frequent specific school learning disorders in the institution. With audiovisual materials, which are technological instruments that present information using acoustic and optical systems or a combination of both, and therefore can serve as a complement to the classic means of communication for teaching, photos and videos were used to evidence and record the development of the research project with the teachers of the Francisco Palau y Quer School in the municipality of San Juan del Cesar - La Guajira. Participant observation; in which the researcher participates constantly within the group or sample in which the research is being carried out. This observation is being carried out at all times in the development of the sequences of activities and is noted in the template (field diary), at the same time documentary evidence is collected and information is selected through the reading of documents, books, magazines, recordings, films, newspapers, bibliographies, reports of mass tests and enrollment book, etc. Related to the learning barriers faced by teachers at Colegio Francisco Palau y Quer.

For the development of this research, three phases were taken into account for data collection: diagnostic phase, intervention and evaluation. At the same time, techniques and instruments were used to develop the objectives. Initially, the survey was implemented to the teachers of the focus group, first,

information was provided about the research project to be carried out by applying the survey to identify the competencies and use of Inclusive Pedagogical Strategies in the classroom mediated by ICT to support the teaching-learning processes of students who present barriers to learning, participation and communication. To complement the research, the school's special educator and guidance counselor were interviewed to obtain information on the process carried out at the individual level with children with ID integrated into the classroom.

The data collected through the initial survey were organized in a database according to the type of questions and variables, then we proceeded to cross-check variables, which yielded results in contingency tables, which are described and then allow us to make an analysis and decision making. Once the lowest level of knowledge of Inclusion Strategies in the ICT-mediated classroom was determined, the contents of the Inclusion virtual classroom were structured to be programmed on the platform. These answers allowed us to obtain findings in each category of research analysis, taking into account that the focus of the study is the Inclusive Pedagogical Strategies, taking into account that the focus of the study is the Inclusive Pedagogical Strategies, taking into account that the focus of the study is the Inclusive Pedagogical Strategies. Of the 11 teachers, 30% are men and 70% are women. Another technique is participant observation through direct observation relevant situations were recorded during the research.

To facilitate the process, participant observation was explored and carried out in the real context of the 11 participating teachers on an ongoing basis, where direct observation, interpretative, thematic and personal notes of a relevant nature were recorded.

The analysis of qualitative data is based on four components as defined by Huberman (1994) and quoted by Flores (2012. Pg. 76) and they are: 1. Data

collection; 2. Data reduction; 3. In order to collect suitable, reliable and valid information for the development of the project, the technique of direct observation was used as an instrument of triangulation in the initial stage with the purpose of deepening the facts and realities that occur in the school context.

In the intervention phase, a digital tool was developed, virtual classroom inclusion, which compiles different pedagogical and didactic strategies applied to the needs of inclusive education and/or specific school learning disorders that are present in the educational institution. During the intervention, a synchronous meeting was held to recognize the virtual classroom, allowing the teachers of the focus group to know the route, contents and digital resources available in the digital tool. At the same time, during this intervention, teachers were made aware of the interest in supporting the academic preparation of teachers in inclusive education using technology, thus promoting a first step towards an inclusive and equitable quality education for all.

Finally, the semi-structured interview was applied with the purpose of compiling the perceptions or scope of inclusion in the teachers, determining opportunities or actions for improvement and satisfaction of the preschool and elementary school teachers of the Colegio Francisco Palau y Quer of the municipality of San Juan del Cesar - La Guajira, and recommendations for improvement that can be raised in a subsequent project, and the semi-structured interview instrument was applied in the evaluation phase.

RESULTS

The data collected were based on the categories initially established in the research; information was obtained from these categories in each of the three instruments applied to the actors of the sample population, thus defining a

research panorama of its own; however, categories also emerged that, although not initially proposed, were recurrent in the data obtained and became relevant for the research; thus, interpretations will be proposed based on the research objectives in relation to each category.

According to the results it is concluded that, based on the findings, it was possible to identify and analyze the real need of the Francisco Palau y Quer school in the municipality of San Juan del Cesar - La Guajira, regarding the precarious knowledge of inclusive education processes in the classroom. That is why the first instrument applied was an initial survey administered (via online-Google Forms), previously validated by 2 experts with professional profiles specialized in the area of study who issued their judgment, certifying it with a certificate according to its correspondence in the theoretical context of the variables as well as its clarity, coherence of the wording and relevance to the variables under study. It should be noted that validity is the effectiveness with which the instrument measures what it intends in this case to measure the variables Inclusive Pedagogical Strategies mediated by ICT to apply them through an Inclusion Virtual Classroom as Inclusive Strategies to benefit the teaching-learning process and in turn identify that elementary school teachers apply them in the population they serve with Learning Barriers and/or developmental disorders in the institution.

The category that is first analyzed in this research work was Inclusive Education, since it is another of the central axes of the research process, to know how it was conceived from each of the teachers, from their perspective of work in the classroom, when working with students with Special Educational Needs on a daily basis in the classroom, the processes and conceptions they have about this process influence the assertiveness, in the success of the activities that are planned for these students. The success of inclusive education for children with learning barriers depends on the real

inclusion of the educational institution, of real accompaniments that provide the possibility of supporting the educational processes, through the promotion of the use and appropriation of ICT, as evidenced in the primary school teachers of the institution under study.

Teachers were observed to be more empowered in this process, since they had the support of the Principal, Coordinators and school counselor; this was achieved thanks to the fact that they were made aware of the process before starting the application of the instruments; they were also motivated by sharing new and updated information on learning related to the day to day of inclusive education in order to improve the quality of life of students; respecting their own learning rhythms and styles, and understanding that all human beings are diverse by nature.

It is for this reason that we can mention specific cases of teachers who seemed to have greater clarity in the concepts related to inclusive education, as mentioned by teacher 1: "recognizing inclusion not only with students with disabilities but in understanding the multiplicity of differences in students..." teacher 2 expressing the progress that has been obtained after the action plan: "I feel that we as an institution have taken giant steps, the sensitivity in this regard has made us work more and more in favor of the particular needs of each of our children..."

Inclusive education is related to the didactic-pedagogical strategies that teachers carry out with students with special educational needs, techniques, activities used by teachers to work simultaneously with regular and SEN students. In several teachers, the vocation to help their students was observed, looking for them to give the best of themselves, regardless of the degree of difficulty in their learning or the skills they have, making the most of the situations and the learning they can acquire, for primary school teachers, the didactic-pedagogical strategies are each and every one of the actions they

perform to work in the classroom with students with special educational needs, from simple workshops and guides; Another aspect that comes to light is how important it can be to get to know the students better and establish affective ties with them, so that they are more willing to work in the classroom and are more receptive to the new knowledge that can be provided. In addition, they express the lack of accompaniment and support for training processes in educational inclusion, they see the importance of the virtual classroom Inclusion, which at times doubted its effectiveness, and today they hear them talk about the tool as an innovative didactic-pedagogical strategy that came to the institution to change their way of thinking about inclusion.

The category of inclusive pedagogy for teaching could be considered as an authentic creation or adaptation of the school environment investigated, it evidenced flexible procedures that facilitated the management of the information developed in the learning process. the construction of new knowledge, the participation, capacity and skills of the teachers provided an adequate school environment in the opening of the trainings, of the mentality of many teachers, who before seemed to be hermetic in front of this topic, through activities of the Inclusion virtual classroom, they themselves reviewed, analyzed and applied in their classrooms with the students strategies that were found there, the same that became generators of the search for new inclusive pedagogical strategies on the part of the teachers; This was specifically the case when the math teacher found a visual perception activity that gave her the basis to explain addition to one of her students with ADD, since she used the model of the Stroop Test.

Regarding the access and use of Information and Communication Technologies (ICT), according to the data obtained both in the observation guides and in the interviews with teachers, ICT are immersed in their daily lives, they expressed that ICT have an impact on all areas of human life in

social, cultural, work and training life, optimize the processing of information and the development of communication, allowing the generation of greater knowledge that favors the learning process. To evaluate this category, the semi-structured interview and observation instruments applied to the representative sample of the educational community were used. Teachers mention ICT, they are concerned about looking for elements to make the class meaningful, they apply different elements that enrich the strategies and motivation of students, as stated by teacher 4: "...use resources such as, ICT, nowadays they are used and are at hand and available to everyone", most of them consider that sometimes they use different tools, they expressed that they have the need to acquire more knowledge and skills about educational technologies to apply them in their activity as teachers and continue training in digital competencies and thus reach students with SEN in a more adapted way.

According to UNESCO (2021), the use of ICT must be related to the different pedagogical practices, improving the educational process according to the needs of students with SEN. It is worth noting that primary school teachers have digital competencies, which allowed them to manage the Inclusion virtual classroom platform in a very practical and agile way, of course, they also require at times verifications and monitoring of existing processes in the virtual classroom that are carried out within the academic practices with SEN students, allowing according to the needs to strengthen the teaching and learning process. The formative processes with children who required strategies other than pencil and paper were significantly strengthened, facilitating research, creativity, design and permanent participation of the teachers who were part of this research.

After conducting the survey to 11 teachers who guide the classes in the Elementary School, in the educational institution object of this research, it

can be recognized that within the Inclusive Pedagogical Strategies of class teachers have taken from the Inclusion Virtual Classroom Tool, they include elements of the SAD; In this category, it is worth mentioning something very curious: teachers had little knowledge about the SAD, and once progress was made in the design and content of the Inclusive Teaching Strategies annexed to the Inclusion Virtual Classroom Tool, they began to identify with the components of the SAD, generating great expectations regarding this Pedagogical Approach, if it can be called that way, they realized that by using these applications and/or technological tools offered by the DUA Wheel (the teachers were completely unaware of it), the teachers expressed that they could generate universal strategies for all students in the classroom.

The above shows that the scores in the SAD subcategory have a visibly increased difference in a favorable way for the processes carried out by the teacher in the classroom. Likewise, it is possible to conclude that the decent role has had a positive and significant change in their work, where the answers given by the teachers go from frequently and sometimes to always, evidencing the growth of always as follows.

Finally, when taking a global view, it can be affirmed that the inclusive education process before starting the intervention with respect to these subcategories, had many aspects to be strengthened and the responses of teachers showed in general that the strategies addressed in the classroom did not motivate and did not recognize diversity, the different learning channels and styles.

However, it is necessary to clarify that the application of the initial and final tool had the objective of contributing to the qualitative process of characterizing the results obtained through observation and became an aid for the analysis raised by the present research within the framework of the perceptions and attitudes of teachers towards inclusive education. Finally,

the category of teacher training, here the preschool and elementary school teachers of the educational institution participated through the use of technological strategies of the DUA wheel, which is nothing more than supporting the content that can be developed through applications.

The training and experience of the teachers who participated in the research; this category was one of the central axes of the research process since it is focused on inquiring about teacher training, so we sought to know what is the vision, the position, the perception of the teachers participating in the research on the subject; most of them with professional training, but only one with a Master's degree in Education. In terms of experience, the teachers have extensive practice in education, however, some teachers have more experience than others; these particularities of their training and experience are manifested in their teaching practices and in the emphasis they place on their Inclusive Pedagogical Strategies with the use of ICTs. It is evident in the observation guides and in the interviews with the teachers that they showed a concern for the learning rhythms and the need to understand the variations in the learning of children with learning barriers and/or developmental disorders; the teachers denoted in the interview a specific interest in the difficulty that it represents for most of them, in some occasions, to attend to the particular needs required by this population, due to the number of students in the classroom.

When analyzing the perceptions of teachers, it can be concluded that teacher training is seen as an opportunity to enhance the learning processes that take place in the classroom; it is the way in which new disciplinary knowledge is acquired that will allow the new generations to face the new challenges and soft skills that students need to face today's society.

At the end of the research process, the analysis of the data and the interpretation of the information collected, positive aspects were found that

can be reinforced and strengthened, such as continuous teacher training regarding school inclusion, inclusive teaching strategies, teachers' awareness of their own weaknesses and lack of knowledge in the use of inclusive teaching strategies, technological tools and their pedagogical incorporation in the classroom. Another positive aspect was the discovery that teachers can promote inclusive education processes from their classrooms. Although there are still gaps to be closed such as: professional accompaniment, collaborative work among support professionals, and the pedagogical incorporation of ICT are aspects that should be deepened in future teacher training processes.

When relating the results to the research questions and objectives, in no case are they generic, since the research is covered under the Action Research methodology, its generalization would be very ambitious. However, they can be a starting point to rethink current inclusive practices and continue working towards continuous improvement in order to offer the population with barriers to learning, participation and communication, and the population with disabilities in general, other alternatives that allow them to be effectively included in the knowledge society.

Teachers' teaching practices are not yet geared to the digital inclusion of children with Learning, Participation and Communication Barriers and to the population with disabilities in general. The teaching practices of teachers are anchored in institutional parameters that, although they should be followed as part of the school dynamics, are also a little distant from the needs that, as individuals immersed in the knowledge society, have the NNAJ with Barriers that encompass much more than simple learning with the Inclusion virtual classroom tool or the support of learning with it. Thus, it is necessary to rethink these practices in order to strengthen and expand them towards an equitable panorama. Access and use of ICTs is still restricted for children and youth, who have conditional access to ICTs either by their parents or by their

teachers, i.e., they themselves do not have the determination to use them when they need or want to, unless it is with adult supervision and most of the time for games or recreational activities.

The educational inclusion of students with barriers is carried out through the autonomous work of each of the teachers, thanks to their experience in the classroom; that is to say that they carry out the inclusion processes from their experience as teachers and not from any previous training in learning barriers. This refers to the fact that the activities they carry out with the students are the result of their years of experience in the educational sector, since by detecting the weaknesses and skills of their students they can adapt the actions in the classroom, directing them to achieve learning in their students, despite the fact that they do not have a training oriented to inclusion.

The suitability of the teaching role in the processes of educational inclusion is another aspect that was found during the process. As mentioned by UNESCO (2008), educational inclusion is a process that requires profound transformations, training and dedication on the part of professionals who must work collaboratively in educational institutions, empowerment of those responsible for this process is required, not only teachers but also managers and professionals who must be in charge of the curricular flexibility of students with barriers. On the other hand, when possible alternatives that facilitate educational inclusion are generated, new doors are opened to the possibility of seeking and finding new ways to work with students in the classroom, with the possibility of integrating ICT in the classroom as an alternative to improve student learning, since various resources can be accessed in the Virtual Inclusion classroom to facilitate the processes within the classroom. The risk of teachers not knowing about inclusive education potentially affects their students not only in the academic field, but also in the

social field because they are labeled pejoratively because of their differences, affecting their self-esteem and motivation to attend school.

Finally, specific recommendations for future studies or continuity of the project are attached.

The classroom teachers of the Francisco Palau y Quer School in the municipality of San Juan del Cesar-La Guajira at the preschool and elementary school level are professionals with a lot of pedagogical experience, but they do not have an adequate knowledge of the concept and incidence of Inclusive Education; however, they committed themselves to investigate and to carry out their lesson plans for students in a more inclusive way.

CONCLUSIONS

The research favored the educational community, specifically preschool and elementary school teachers of the Francisco Palau y Quer school in the municipality of San Juan del Cesar - La Guajira. The inclusive processes in the classroom were strengthened by means of "inclusion" a technological tool as an achievement reached by way of innovation in the daily pedagogical practices with accessible, technological and current contents that build inclusive scenarios of participation and communication.

The impact of inclusion is favorable in all educational institutions that wish to implement this tool in their classrooms, the interest of teachers to deepen in topics associated with inclusive education is considered favorable in the process of teacher training, since the institution under study did not have trained professionals to meet the challenges of student diversity. However, it was permanently evidenced in the teachers the accompaniment and willingness to be trained and learn to work collaboratively in order to support the inclusive learning of their diverse students. There is a positive and

interactive attitude of teachers to educational intervention, this benefits the processes of access to inclusive education, since when a teacher is willing to recognize the advantages of the use and application of inclusive pedagogical strategies in the classroom, it facilitates much more the transition from the printed environment (notebook, board, orality) to the digital environment (supported by audio, video, image and animation) and in this way processes such as different learning styles and basic learning devices are favored.

The future lines of work of the research presented can be replicated in educational institutions that lack inclusive training, aimed at teachers, educational contexts that consider pertinent applicability of didactic pedagogical strategies associated with the use of Digital Educational Technologies thanks to the versatility and its digital format that allows it to reach any place in Colombia.

It is recommended to the educational community of the Francisco Palau y Quer School in the municipality of San Juan del Cesar - La Guajira to continue the project by integrating new contents to the Inclusion virtual classroom according to the inclusive needs that may arise, either through a strategic alliance between directors or support teachers and counselors to continue with the line of educational inclusion.

Similarly, for the team working on this research, there remains the commitment to continue improving the technological tool in form and substance, as well as its promotion in other institutions in other regions or other work colleagues to generate a model in which more people interested in linking up can be attracted so that with their contributions they can transform other similar realities remotely.

REFERENCES

- Arnaiz Sánchez, P. (2012). Effective and inclusive schools: how to promote their development. *Education Siglo XXI*, 30(1), 25-44. <https://revistas.um.es/educatio/article/view/149121>.
<https://revistas.um.es/educatio/article/view/149121>
- Ausbel, D. (1983). *David Ausbel's theory of meaningful learning Educational Psychology. Un punto de vista cognoscitivo*. Mexico: Editorial Trillas S.A.
- Booth, T., & Ainscow, M. (2011). *Guía para la inclusión educativa: Desarrollando el Aprendizaje y la participación en las Escuelas* (3rd ed.) (Y. Muñoz, & I. Figueroa, Trads). Santiago de Chile: Chile: Fundación creando futuro.
- Booth, Tony and Ainscow, Mel (2002). *Index for inclusion. Developing learning and participation in schools*. Bristol. CSIE (Centre for Studies on Inclusive Education).
- Brun, M. (2011). *Information and communication technologies in initial teacher training in Latin America*. <https://repositorio.cepal.org/handle/11362/6183>
- Cabero, J. &. (2014). *A look at ICT and Inclusive Education*. Retrieved from.
- Calvo, G. (2013). *La Formación De Docentes Para La Inclusión Educativa*. Scielo. V. 6.1. http://www.scielo.edu.uy/scielo.php?script=sci_arttext&pid=S1688-74682013000100002
- Canet, G. V. (2009). *Constructing a concept of inclusive education: a shared one. Key Aspects of Inclusive Education*, 13. <http://files.educacion-inclusiva-caqueza8.webnode.com.co/200000204experienciaf1136f20c8/ASPECTOS%20%20CLAVE%20DE%20LA%20EDU%20INCLUSIVA.pdf#page=9>.
- Castillo, C. (2013). *Inclusive education: Prospection, analysis and proposals for the training of basic education teachers at the University of Costa Rica* (Doctoral thesis). Complutense University of Madrid. <http://eprints.ucm.es/22958/1/T34770.pdf>
- Castillo-Briceño, C. (2015). *Positioning inclusive education: A different way of looking at the educational horizon*. *Revista Educación*, 39(2). <https://www.redalyc.org/journal/440/44039322008/html/>.
<https://www.redalyc.org/journal/440/44039322008/html/>
- Duran, B. (2017). *ICT training and digital competence in teaching in public higher education institutions*. Guadalajara.
- Echeita, G. (2017). *Inclusive education. Smiles and tears*. *Aula Abierta*, 46, 17-24. <https://reunido.uniovi.es/index.php/AA/issue/view/917>.

- Gallego, R., Pérez, R., Gallego, A. P., & Pascuas, J. F. (2004). Constructivist didactics: contributions and perspectives. *Educere*, 8(25), 257-264. <https://www.redalyc.org/pdf/356/35602515.pdf>
- García, M. G., & Azuaga, R. L. (2012). Exploring, from an inclusive perspective, the use of ICT to address diversity. *Profesorado. Revista de currículum y formación de profesorado*, 16(1), 277-293.
- Hernández Sampieri, R., Fernández, C. and Baptista, P. (2010). *Metodología de la investigación México, 5° D.F., Mexico: McGraw Hill Interamericana.*
- Herrera, J. (2017). *La investigación cualitativa.* Retrieved from [https://www.antonioamarquez.com/os-presento-la-guia-orientaciones-para-el-uso-de-la-tecnologia-](https://www.antonioamarquez.com/os-presento-la-guia-orientaciones-para-el-uso-de-la-tecnologia-orientaciones-para-el-uso-de-la-tecnologia-)
- Laitón, E. V., Gómez, S.E, Sarmiento, R.E, Mejía, C. (June 2017). Inclusive Practice Competencies: ICT and inclusive education in teacher professional development. *Sophia*, 13(2). <https://revistas.ugca.edu.co/index.php/sophia/article/view/502/1266>. <https://revistas.ugca.edu.co/index.php/sophia/article/view/502/1266>
- López Melero, M. (2011). Barriers that prevent inclusive school and some strategies to build a school without exclusions. Available at <https://minerva.usc.es/xmlui/handle/10347/6223>
- Ministry of National Education (MEN). (2006). *Estándares básicos de competencias y orientaciones pedagógicas.* Colombia: MEN.
- Ministry of National Education (1994). Law 115 of February 8, 1994 . Retrieved from https://www.mineduacion.gov.co/1621/articles-85906_archivo_pdf.pdf
- Ministry of National Education (2013). *Competencias TIC Para el Desarrollo Profesional Docente (ICT Competencies for Teacher Professional Development).* https://www.mineduacion.gov.co/1759/articles-339097_archivo_pdf_competencias_tic.pdf
- Ministry of National Education (1991). *Normatividad. Constitución Política de Colombia* 1991. <https://www.mineduacion.gov.co/portal/micrositios-preescolar-basica-y-media/Alfabetizacion/Normatividad-y-documentos/358249:Normatividad>
- Ministry of National Education (2005) *Policy guidelines for the educational attention to vulnerable populations.* https://www.mineduacion.gov.co/1621/articles-90668_archivo_pdf.pdf
- Ministry of National Education (2017). Decree 1421 of August 29, 2017. <https://www.suin-juriscol.gov.co/viewDocument.asp?ruta=Decretos/30033428>

- Ministry of Health. (2013). Statutory Law 1618 of 2013 . Retrieved from <https://www.minsalud.gov.co/sites/rid/Lists/BibliotecaDigital/RIDE/DE/PS/documento-balance-1618-2013-240517.pdf>
- Ministry of Information Technologies and Communications (2016). About MinTIC. El futuro digital es de todos MinTIC. <https://www.mintic.gov.co/portal/inicio/Ministerio/Acerca-del-MinTIC>
- Muñoz-Borja, P. (Ed.) (2020). Disability and ICT: strategies for equity, participation and inclusion. Editorial Universidad Santiago de Cali. <https://repository.usc.edu.co/handle/20.500.12421/3187>
- Omaña, Erika Alzolar, Maikel Educación en Contexto, Vol. III, N° 6, July-December, 2017. ISSN 2477-9296.
- Ramírez Valbuena, W. Á. (2017). *Inclusion: a history of exclusion in the teaching-learning process. Cuadernos de Lingüística Hispánica*, (30), 211-230. doi: <https://doi.org/10.19053/0121053X.n30.0.6195>
- Ramos, R., Moreno, W., Larrondo, M. M., Ting, I. H., Gaona, P., Bello, R., & Burgos, D. (2015). Francisco José de Caldas. <https://imas2011.files.wordpress.com/2011/06/marianakrausejacob.pdf>
- Rosales, A. (2004, August). Estrategias didácticas o de intervención docácticas o de intervención docente en el área de Educación Física. Estrategias didácticas o de intervención docácticas o de intervención docente en el área de Educación Física. <https://www.efdeportes.com/efdeportes/index.php/EFDeportes>
- Santos, M. and Portaluppi, G. (2011). Educación Inclusiva. Quito, Ecuador: Ministry of Education.
- Sequera, M. (2014). Action Research: an Educational research method for today's society. *Arjé Journal*, 10(18), 223-229.
- UNESCO (2008). Inclusive Education: the way of the future. International Conference on Education. http://www.ibe.unesco.org/fileadmin/user_upload/Policy_Dialogue/48th_ICE/CONFINTED_48_Inf_2_Spanish.pdf
- UNESCO (2015) Education for All 2000-2015: Achievements and Challenges.
- UNESCO (2021). ICT in education. <https://es.unesco.org/themes/tic-educacion>
- Viñas B., Cuenca J. (2016). The role of the teacher in the digital era. *Interuniversity Journal of Teacher Education*.;30(2):103-114. ISSN: 0213-8646.