

# Inclusive Special Education and Science Teaching: teachers' perception

Educação Especial Inclusiva e o Ensino de Ciências: percepção de professores

Educación especial inclusiva y enseñanza de las ciencias: percepciones de los profesores

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## Highlights

The importance of contextualized teacher training for the development of skills in the provision of inclusive science teaching.

Gamification methodology as a strategy used by teachers to offer inclusive and diverse science teaching.

The social and educational importance of inclusive science teaching for the integral development of students with disabilities.

## Abstract

The study aims to investigate and describe teachers' perceptions of the challenges and possibilities of teaching science to students with disabilities. The study has exploratory, descriptive and qualitative characteristics, with subjects being 26 science teachers from the municipal network of a city on the Western Border of Rio Grande do Sul. For data collection, a questionnaire was used with questions related to the profile, training and perceptions about Inclusive Special Education and its implementation in science teaching. As for the results, it was evident that in the teachers' perception, continuing education is often promoted with themes decontextualized from the school reality, not considering the demands for inclusion. Furthermore, feelings of unpreparedness were reported, which create difficulties in planning and applying pedagogical proposals that meet the educational needs of students with disabilities.

[Resumo](#) | [Resumen](#)

## Keywords

Teaching Profession. Science teaching. Inclusion.

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## **| Introduction**

In the current school context, education is understood to bring students closer together so that they learn to deal with what is different with respect and affection. According to Campbell (2009), inclusive education is understood to be a comprehensive educational movement and not just focused on special education audiences. Inclusive Education is an alternative to meet students' educational difficulties in their learning development. Regarding the precepts of an inclusive school, Henriques (2012, p. 9) states that "it is one that guarantees the quality of teaching for each of its students, recognizing and respecting diversity and responding to each one according to their potential and needs".

Science teaching from an inclusive perspective must be based on a pedagogical practice that understands the diversity found in classrooms, respecting the singularities of each student and significantly enhancing the process of scientific literacy and reading of the world. Faced with this perspective, Benite et al. (2015, p. 88) explain that "scientific knowledge should not be presented to any student as ready and finished." It is necessary to develop skills so that students understand everyday situations and that they are contextualized within the scientific concept. Corroborating this, Chassot (2018, p. 28) states that "proposals for teaching science can no longer be conceived without including components in the curricula that are oriented towards students' social and personal aspects".

Thus, based on an understanding of these issues, the aim of this study is to investigate and describe the perception of teachers in the final grades of elementary school about the challenges and possibilities of teaching science to students with disabilities. The study's justification is based on the relevance of discussions on inclusive special education in the Brazilian educational scenario. It is a fundamental principle that aims to guarantee access and participation for all students, regardless of their abilities or needs. With the growing diversity in classrooms, it is imperative to understand how science teachers perceive the issue as a whole and how they implement their inclusive teaching practices. To achieve quality, inclusive science teaching, it is essential to offer all students meaningful learning opportunities, with differentiated and contextualized strategies and flexible methodologies to meet their needs and singularities.

## **| Methodology**

This is an exploratory and descriptive study with a qualitative approach. According to Gil (2010), exploratory research aims to make the problem explicit in order to form hypotheses. The same author characterizes the descriptive approach as "the description of the characteristics of a given population or phenomenon, or the establishment of relationships between variables" (Gil, 2010, p. 42). Stake (2016) also explains that qualitative research has a bias where reasoning and data analysis tend to be based mainly on human perceptions and understanding.

The participants in this study were 26 science teachers from the final years of elementary school in a municipality on the western border of Rio Grande do Sul. A digitally developed questionnaire was used as a data collection tool, widely disseminated by the Municipal Department of Education to all science teachers in the city. It was available to fill in for two months (June and July/2022). The final teacher sample consisted of those who answered the questionnaire, which gave the total number of subjects in the survey. As shown in Table 1, the teachers had to answer questions related to their professional profile and continuing education in relation to Inclusive Special Education (ISS), as well as their perceptions and their implementation in science teaching throughout their educational practices.

**Table 1**

Questions from the data collection instrument.

Category	Questions
Professional profile	This section researched aspects of each participant's profile (e.g., age, sex, length of time teaching, workload, initial training, highest degree).
Conceptual Issues for EEI	In this section, the perceptions of the participating teachers on the process of school inclusion were researched, as well as some characteristics of the teacher profile on this subject (e.g., the concept of school inclusion and curricular flexibilization, teaching experiences involving students with disabilities, etc.).
Teaching Questions	This section asked questions about teaching practice in the classroom and the resources used for the inclusive process of students with disabilities.
Reflective questions	This section will raise questions about your feelings as a teacher within the inclusion process.

Source: the authors.

The purpose of using this instrument to collect data was that it was accessible to the group of teachers, that it could be disseminated via a link, and that, based on the data from this instrument, it would be possible to draw up an initial profile of the public that would take part in training activities in the future. The quality of the data provided allowed the authors to organize the training intervention better so that it would contribute directly to their local demands.

For the analysis, we used the content analysis proposed by Bardin (2016) and followed the stages established by the author: initial treatment of the material, pre-analysis, exploration of the material, and treatment of the results. We sought to identify the teachers' profiles, perceptions, and realities in relation to Inclusive Special Education. After the floating reading of the material, analysis codes (units of meaning: parts of sentences that explain feelings or perceptions) were identified during the exploration of the material. In some questions, participants could list more than one factor/perception, so the units of meaning were grouped into categories according to the semantic context, explaining why the total percentage sometimes exceeded 100%. To preserve the identity of the participants, they have been identified throughout the results according to the following example: Teacher1, Teacher2, and so on.

It should be emphasized that this study is a cross-section and supports the development of a thesis project, already approved by the Research Ethics Committee under No. 5.177.579. In this sense, it met the requirements set out in Resolution 510 (Brazil, 2016) regarding research in the humanities.

## **Reflections on the results**

The profile of the science teachers working in the municipal school system's final elementary school grades is initially presented. The majority are women (81%), with an average age between 30 and 50. They have approximately 15 years of teaching experience (42%) and a workload of 40 hours a week (62%), 20 of which are spent teaching science (54%). Regarding their professional training, 81% of the teachers have initial training in Biological Sciences, with specialization as the highest level of training (62%). The teachers' specialized areas are the most diverse, all related to education, with the greatest concentration in science teaching methodology (27%). It should be noted that only 8% of teachers specialize in Inclusive Special Education.

Regarding continuing training, 81% of the teachers have already taken part in activities on the subject of inclusion, the vast majority of which were the teachers' own personal choice (54%) and were offered by the school's principal (42%). It is also worth noting that 19% of the teachers had never taken part in continuing education on the subject of school inclusion. The authors considered the number of teachers in this category high, a fact that reinforced the need to consider those who had not yet learned about the subject in question when proposing training actions in the future.

When asked about their perceptions of the relevance of teachers participating in teacher training (continuing or pedagogical) on the subject of school inclusion, 81% said they considered it very relevant. One of the teachers (Teacher5, 36 years old, science teacher in the final grades of basic education) said that participation in training "[...] makes it possible to improve classroom management and create inclusive planning". Still, 11.53% considered that it depends on the proposal and the format of the training courses. Another teacher (Teacher10, 42 years old, science teacher in the final grades of basic education) explains that "[...] when I took part, it was very theoretical, nothing practical, playful, and it's always geared more towards the initial years and not the final years".

Professional teacher training aims to constantly reflect on the teacher's identity, in a critical way that impacts on actions in the context of the school environment, promoting a process of teacher (re)construction (Nóvoa, 1995; 2001). The same author also stresses the importance of contextualized training activities, based on the reality and the school environment in which the teacher is inserted, so they are truly meaningful.

Based on their findings, Engers et al. (2022, p. 75) state that:

Faced with the various training needs that arise today, it is difficult to meet this demand in a one-off training course, so it is necessary to provide ongoing training that is consistent with reality and takes into account the real training needs of that audience.

Thus, for continuing training to be truly effective and benefit the educational context, the themes must be in line with the reality experienced by each group of teachers. Several authors defend the idea that training should encourage teachers to reflect and work in a contextualized way, according to their realities, understanding teaching as an educational action that is part of the pedagogical process (Dourado, 2015; Engers et al., 2022). From this perspective, teacher training activities will only be beneficial for teachers and students if the themes developed are in line with the realities they experience.

In the second section of the instrument, teachers were asked whether they considered themselves knowledgeable about the meaning of school inclusion, and all teachers responded affirmatively. Table 2 shows the three categories that emerged from the teachers' responses regarding what they understand by school inclusion.

**Table 2**

What is school inclusion?

Category	Description	Excerpt	Frequency
Respect for differences	Respect the singularities of each student, understanding that differences must be valued from an educational perspective.	"School inclusion occurs when students have their physical/cognitive characteristics respected and the whole learning process is designed to include them [...]." (Teacher1, 39, science teacher in the final grades of elementary school)	41%
Socialization	School inclusion is understood as providing opportunities for socialization and interaction between students.	"Making it possible for everyone to live together on an equal footing". (Teacher17, 43, science teacher in the final grades of elementary school)	32%
Access to schooling	Provide access to education for all students, without distinction or exclusion.	"A form of education that is accessible to all students, thinking about the characteristics and differences of each one." (Teacher4, 41, science teacher in the final grades of elementary school)	28%

Source: the authors.

The categories that emerged from the data analysis present contradictory conceptual data, because although a large percentage associated the concept of school inclusion with respect for students' differences and singularities from an

educational perspective, many associated it with the simple retrograde idea of socialization.

According to Bergamo (2012), school inclusion is an educational movement that respects human beings regardless of their limitations. Nozu et al. (2018) explain that the term inclusion is directly linked to human rights issues and ideological, cultural, and social influences. According to Campbell (2009, p. 139), the meaning of inclusion in education is "to learn, to reorganize groups and classes, to promote interaction between students in another way where we share the same whole, although eventually in different positions due to the complementarity provided by diversity".

On the other hand, many teachers still associate school inclusion only with the socialization of students with disabilities with other students, an erroneous concept that tends to restrict the teaching-learning process from the perspective of Inclusive Special Education (Martins, 2007; Gomes & Mendes, 2010). To this end, Sassaki (1998, p. 8) conceptualizes inclusive education and school inclusion in a very clear way:

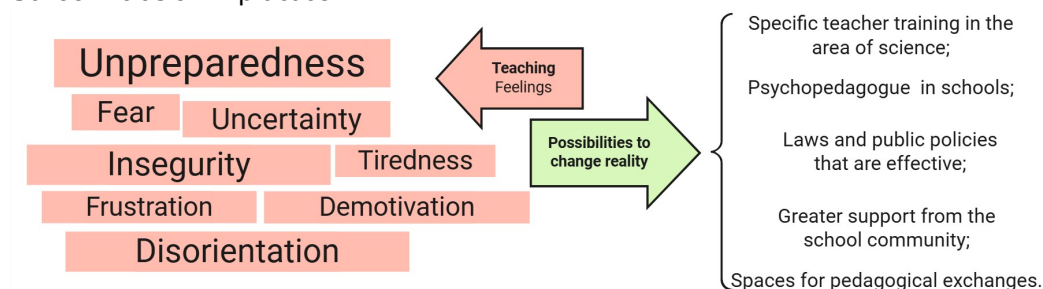
Inclusive education is the process that takes place in schools at any level that are prepared to provide quality education to all students regardless of their personal attributes, intelligences, learning styles, and common or special needs. School inclusion is a form of insertion in which the traditional ordinary school is modified to be able to welcome any student unconditionally and provide them with a quality education.

In addition to welcoming students, the aim of inclusive education is to promote learning for all without distinction. When we think of democratic education, we mean a school for all students that seeks to break the exclusion of any minority (Oliveira et al., 2020). Nevertheless, Campbell (2009) states that inclusive education consists of a school that includes everyone, celebrates differences, responds to students' individual educational needs, and supports learning, understanding that everyone can learn.

Next, the teachers were asked about the process of school inclusion in the reality of the schools in which they work, whether it actually happens in practice. Figure 1 shows an organization of teachers' perceptions.

**Picture 1**

School inclusion in practice



Source: the authors.

Figure 1, drawn up from the analysis of teachers' responses on how the inclusion process takes place in practice, shows that we find a diverse reality based on the contexts experienced. Teachers' perceptions show that inclusion happens when schools organize themselves and teachers reinvent themselves. This inclusion depends on factors such as the preparation of the school and teachers, the uniqueness of each case, and ongoing training and pedagogical support for teachers. Still, some teachers feel that school inclusion does not happen in practice, due to a lack of commitment from the school community, specific teacher training, and effective public policies.

Authors such as Salend (2008) and Silva (2012) believe that effective school inclusion requires equal educational opportunities for all students, with access to creative and flexible curricula with "educational proposals that are consistent with their abilities and needs" (Silva, 2012, p. 101). It is well known that for the inclusive process to be successful, a series of actions are needed, ranging from the school structure to the effective implementation of public policies. Campbell (2009) points out that factors such as school organization, curriculum, pedagogical methods and human resources are determining factors in whether there is inclusion, integration or segregation of students with disabilities.

The preparation of the school as a whole is extremely important for the success of the inclusive process, from the administrative and pedagogical departments to the school community. Santos (2012) states that the school should be an inclusive space covering various areas, where teachers and students participate in activities that integrate knowledge, with the participation of the school community from different perspectives, encompassing the valorization of experiences. Silva Neto et al. (2018, p. 87) point out that "school plays an essential role in the lives of students, it plays an important role in providing cultural, social, intellectual and physical development for students".

Extending this concept of school, the same authors (Silva Neto et al., 2018) state that inclusive schools have specific characteristics that help those students who have difficulties due to their disability to overcome their limits. From this perspective, Campbell (2009, p. 151) explains that "the school needs to establish pedagogical practices that value diversity and do not assess to exclude or categorize students". But how do you do that without the proper knowledge? It is known that teachers must accept diversity and look for ways to promote inclusion in their classrooms (Silveira, 2020). Still, the issue to be discussed and reflected on is the overload that hangs over teachers, who need to reinvent themselves and search, often alone, for teaching strategies and methods. Without support, schools and teachers are ultimately responsible for the success or failure of school inclusion (Coelho et al., 2022).

Regarding public policies aimed at inclusive special education, Fernandes (2013) points out that there may be relevant contradictions from discourse to practice, revealing that these laws are not implemented in school environments. On this issue, Coelho et al. (2022) state from their findings that:



[...] public policies have ensured many benefits and proposed many resources to enable effective inclusion in schools. However, the reality found in schools often fails to deliver these benefits. The reality is that schools lack the human resources, training, and accessible infrastructure to receive students with disabilities and promote inclusion on the school floor.

After analyzing Figure 1, it can be seen that, in the perception of the teachers taking part in the research, the success of the inclusive process requires the interweaving of a triad formed by policies, structure, and training. For inclusive education to be effective in regular schools, the organizational structure of educational institutions is essential, involving teacher qualification and pedagogical proposals that consider curricula, methods, and resources linked to the inclusive perspective (Mendes & Reis, 2021). This requires that laws and decrees are effectively applied and enforced at school, supporting teachers, truly benefiting students with disabilities, and consolidating the proposal for inclusive special education (Coelho et al., 2022).

The third section of the instrument asked questions about teaching science from the perspective of inclusive special education. Tables 3 and 4 categorize teachers' perceptions of the difficulties encountered in teaching science to students with disabilities and the strategies used to promote effective inclusive science teaching.

**Table 3**

Difficulties in teaching science to students with disabilities.

Category	Description	Frequency
Nomenclatures	Scientific terminology that makes communication and understanding between teacher and student difficult, both in reading and pronunciation.	33%
Contents	Highly complex curricular content.	30%
Training	Lack of training and guidance for teachers.	23%
Experimentation	Lack of adapted resources and materials for practical classes.	13%

Source: the authors.

There are some specificities in science teaching that are characterized as barriers in the development of curricular components for students with disabilities. Two significant barriers discussed in papers and research are: the lack of understanding of the nature of scientific knowledge and, to a greater extent, the transposition of scientific language, i.e., the terminology and nomenclature used in certain cases (Benite et al., 2011; Procópio et al., 2010). According to Benite et al. (2011), the difference between scientific knowledge and other knowledge is precisely the scientific language used. This has become a difficulty in teaching science not only to students with disabilities but also to realize a truly inclusive education in general. On the other hand, Hodson (2009, p. 152) states that "scientific knowledge is what the scientist says it is, and for this reason it is subject to change", thus highlighting the importance of recognizing the symbolic nature of language and scientific knowledge itself.

Scientific language is much denser than colloquial language, because the words used have meaning within the body of theory that supports them.



Science also uses everyday words, but it uses them within a specialized context, i.e., the scientific context. (Benite et al., 2015, p. 86)

In addition, the authors Benite et al. (2015, p. 88) understand that teaching science to students with disabilities means "admitting that scientific knowledge is not linear, rigid and infallible", and is therefore subject to curricular flexibility so that it can be easily understood and accessed by citizens in general. Regarding curricular flexibility, Santos and Braun (2017, p.18) characterize it as a "set of measures and modifications that seek the learning and development of students who are faced with some impasses regarding the way teaching is structured". Nevertheless, Coelho (2020) states that curriculum flexibilities are redesigns in material and communication elements that facilitate the development of school curricula for students with disabilities.

Adjustments to the curriculum can help to respect the singularities of PAEE students, offering relevant responses to the different conditions and characteristics of the students. The responses, considered within the scope of this work as modalities of adjustments, include the flexibilities, adaptations, and adjustments necessary to balance the students' difficulties in the teaching and learning process. (Fonseca et al., 2020, p. 43)

From the above, it can be seen that making curricula more flexible is a key factor in making the inclusion process effective at school and is essential for the development of learning by students with disabilities. Thus, the importance of using diversified methodologies is emphasized to meet the students' singularities and thus strengthen their potential (Coelho, 2020).

Table 4 shows the strategies used by science teachers in the search for more inclusive teaching. In the spotlight, practical lessons, individualized planning, and pedagogical proposals involving games and playfulness tend to be the resources most used by teachers. There was a high rate of teachers who didn't know or didn't want to answer this question.

**Table 4**  
Strategies for promoting inclusive science teaching.

Category	Description	Frequency
Practical classes	Practical lessons in the classroom, laboratory or field.	24%
Games application	Application of interactive activities such as educational games or gamification.	17%
Individualized Planning	Planning aimed at the student, understanding their needs and valuing their potential.	14%
Playfulness	Use of playful activities and alternatives such as visual appeals, models, textures, etc.	12%
Training	Specific training for science teachers.	10%
Collective Activities	Activities that provide interaction between students and encourage collectivity and cooperation.	10%
Technology	Use of digital technologies for communication and knowledge exploration.	2%
No answer	They didn't know or didn't want to answer.	12%

Source: the authors.

Coelho (2020) clarifies that, from an inclusive special education perspective, science teaching needs to take on a diverse pedagogical practice that meets classroom diversity. Always respecting the limitations of each student to enhance the teaching process in a meaningful way. Silva (2012, p. 101), based on his studies, points out that "traditional pedagogical practice, based solely on the transmission of knowledge, is ineffective for teaching most students." Thus, it is inefficient in meeting the educational needs of students from an inclusive special education perspective. Oliveira et al. (2020, p. 82) corroborate this when they state that it is pertinent to offer, in the school environment, "pedagogical practices that enable effective learning conditions and the development of the potential of children with disabilities, so that they interact actively in the teaching-learning process with other children."

Inclusion in schools is the result of many studies and practices that ensure students' right to build their knowledge together. To guarantee this right, the school must provide didactic-pedagogical means for this inclusive process to occur, seeking to value heterogeneity and treat everyone with the principle of equity. (Guntzel & Coelho, 2021, p. 858)

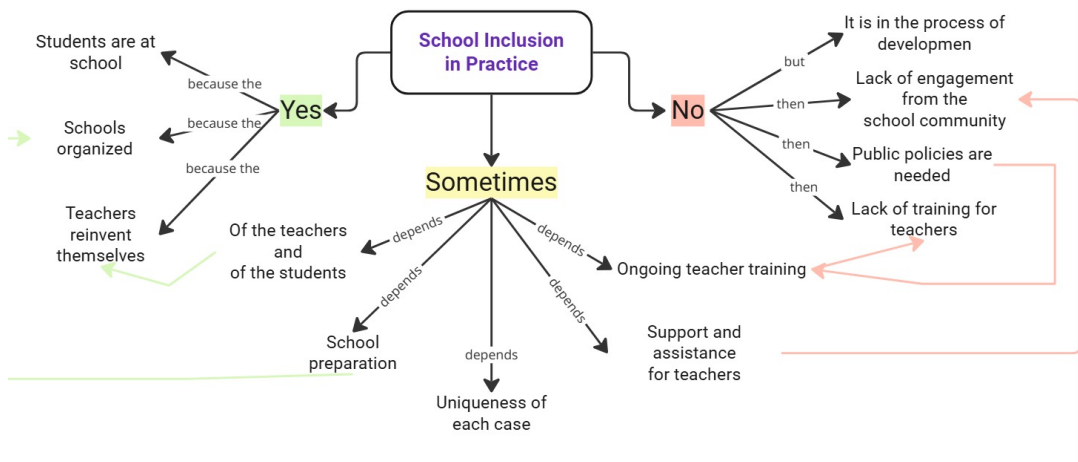
The perspective of curricular flexibility within the context of inclusive special education tends to propose pedagogical strategies that prioritize equity and accessibility, where students work collaboratively, respecting the diversity found in the classroom. The ideal is a variation of teaching intervention methods (Mendes, 2010). Thus, as a way of stimulating the student's role in the teaching and learning process, proposals have emerged to use active methodologies for inclusive special education (Coelho et al., 2022).

Based on the analysis, the teachers most frequently cited practical lessons, the use of games, individualized planning, and playfulness as strategies for promoting inclusive science teaching. It can be said that this set is very close to the active gamification methodology. Teixeira et al. (2022, p. 36) highlight "active methodologies as a strategy for overcoming barriers in the schooling process for all students", especially for students with disabilities. Regarding the gamification methodology, Coelho, Soares & Roehrs (2022) explain that the development of creativity, engagement, and motivation, unique characteristics of gamification, are factors that enhance the use of this methodology for students with disabilities. Nevertheless, Busarello (2016) points out that gamification promotes playful educational contexts, favoring the relationship with knowledge.

In the fourth and final section of the data collection instrument, the intention was to understand the feelings of the science teacher immersed in the school inclusion process. Thus, 84.6% of teachers said they did not feel prepared to work with students with disabilities. As Figure 2 shows, many feelings emerged from the analysis, and the teachers themselves pointed out some possibilities for changing this reality.

**Figure 2**

School inclusion as perceived by science teachers: feelings versus possibilities for empowerment.



Source: the authors.

Based on the analysis of the answers given by the teachers taking part in the survey, we can see, as shown in Figure 2, that teachers' predominant feelings about school inclusion are negative, demonstrating their discomfort with this reality. Most frequently: unpreparedness, insecurity, and disorientation, followed by fear and uncertainty. The teachers themselves pointed out some possibilities for strengthening to change this reality, actions such as specific and contextualized training in the area, implementation of public policies already in place and greater professional support and the school community in general, could contribute to the success of the inclusive process in science teaching and strengthen teachers by bringing greater security in pedagogical practice.

The analysis carried out in this research is in line with publications by authors such as Sagrilo and Paim (2009), Rena et al. (2010), Costa (2007), Krug et al. (2019), and Weizenmann et al. (2020). Weizenmann et al. (2020) point out in their studies that the first feelings that prevail among teachers when they receive a student with a disability in the classroom are fear and insecurity. One of the main factors that leads to teacher insecurity when dealing with students with disabilities or disorders is the lack of knowledge, preparation, and training, which leads to insecurity and unpreparedness for pedagogical planning, fear, and anguish for teachers (Souza, 2015; Krug et al., 2019). Sagrilo and Paim (2009) point out that the origin of these feelings is linked to the sense that the teacher won't be able to fulfill their role and achieve the pedagogical objectives because they don't know how to interact with the students. To remedy these difficulties, factors tend to favor the teacher's pedagogical practice, one of which is linked to training. Knowing the students' diagnoses and characteristics is essential for understanding the educational needs that should be prioritized (Faria et al., 2018).

Another situation pointed out as a possibility for strengthening was the issue of psychopedagogues working in schools. The authors Teixeira et al. (2022, p. 60)

state that "the lack of articulation between the Specialized Educational Assistance (AEE) teacher and the regular classroom teacher may be one of the main factors that make it impossible to achieve the inclusive process within the school environment". In this sense, Krug et al. (2016) explain that the lack of specialized technical support leads to difficulties in the inclusive education process, reflecting on teachers' feelings in the face of this reality.

In the context of public policies aimed at Inclusive Special Education, many guarantees are enshrined in laws and decrees, but very little is put into practice in school reality. In this sense, Coelho et al. (2022) point out that, without proper legal backing, "the guarantee of inclusion falls on schools and teachers, who, overwhelmed by the various demands, end up alone in the classroom, looking for alternatives to meet the various educational needs of the students," a factor that also reflects the negative feelings reported by the teachers.

Some teachers pointed to greater support from the school community as a way of empowering teachers to change these feelings. According to Rena et al. (2010, p. 10), they point out that "professionals report that they know that inclusion students require special attention, but they recognize that it is impossible to dedicate themselves to these students because they are alone in the face of so many students". This situation shows how fragile and lonely teachers feel in the process of inclusion.

Regarding the possibility of spaces for exchanges (pedagogical or experiential), Costa (2007, p. 6) explains that the lack of moments for exchanges and spaces to listen to teachers about their difficulties and feelings are factors that hinder the inclusion process. It is understood that strengthening takes place in relationships where experiences are exchanged and in training that qualifies teachers' work.

The analysis shows that the feelings that permeate science teachers about inclusive special education reflect the anguish they feel in the classroom. It was also possible to see that the possibilities for changing this reality, which they listed, are not difficult to achieve. Still, they depend on a structure ranging from the readjustment of the school structure as a whole to government management strategies, and this dependence ends up holding back the inclusion process.

## **| Conclusions**

At the end of the discussions, which were based on the central objective of investigating and describing science teachers' perceptions of the challenges and possibilities in teaching science to students with disabilities, it was possible to see some important issues. The first concerns continuing education, which is often promoted with themes that are out of context with the reality experienced, and often does not take into account the demands of teaching science to students with disabilities, making the challenge increasingly lonely for the teacher.

Linked to the lack of training, feelings of unpreparedness emerge, which generate fears and difficulties in planning and managing pedagogical proposals that meet the

educational needs of students with disabilities. In this way, they often make science teaching non-inclusive. We can highlight the lack of enforcement of public policies in inclusive special education. These policies ensure teacher training and qualification to make the inclusive process effective in schools, but they are only written in legislative documents and not put into practice.

To overcome these difficulties, teachers reinvent themselves, looking for strategies on their own to meet their students' demands and promote, in addition to the students' learning, possibilities for interaction and socialization among all. In this field, strategies such as the application of games and active methodologies such as gamification are emerging. These proposals tend to motivate students, encourage autonomy in the teaching and learning process, and promote collaborative work between everyone.

We understand the importance of teaching science to all students, since science involves many everyday issues that are also necessary for social and civic life. Scientific literacy, in general, contributes to the integral formation of the individual. However, some of the content, its terminology, and complexity make it difficult to develop from an inclusive perspective, which is why it is important to make the curriculum more flexible in order to truly include all students. Today, we are returning to the importance of specific teacher training to enable science teachers to plan proposals that are also effective in special and inclusive education.

At the end of this study, it can be considered that science teaching, from an inclusive special education perspective, is of paramount importance for students' educational and social development, but there is a lack of teaching mastery to plan inclusive pedagogical proposals. This lack of mastery is justified by the lack of specific training, which results in classes that are often not inclusive or in a solitary teaching process in search of alternatives.

Science teachers' perceptions of the challenges and possibilities of teaching science to students with disabilities permeate issues such as lack of training, inefficient legislation, and difficulties in developing complex content. However, in contrast to this negative view, teachers manage, even if alone, to find pedagogical alternatives to meet their students' educational needs and promote real inclusion in the classroom. Understanding the importance of Science Teaching and Scientific Literacy for citizens' academic and social formation, regardless of whether or not they have a disability.

Possible limiting factors in this study include the difficulty of collecting data due to some participants' resistance to sharing their perceptions and experiences, which may be due to the way in which the data was collected (online questionnaire) or the teachers' lack of time to describe their answers and take part in the research. Another possible limiting factor is external factors and influences, such as changing educational policies, lack of resources, and pressure for academic results, which can impact how teachers perceive and implement inclusive processes.

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## **| Resumo**

O estudo visa investigar e descrever a percepção de professores sobre os desafios e possibilidades do ensino de ciências para alunos com deficiência. O estudo tem características exploratórias, descritivas e qualitativas, sendo sujeitos 26 professores de ciências da rede municipal de uma cidade da Fronteira Oeste do Rio Grande do Sul. Para coleta de dados, utilizou-se um questionário com indagações relacionadas ao perfil, formações e percepções sobre a Educação Especial Inclusiva e sua efetivação no ensino de ciências. Quanto aos resultados, evidenciou-se que, na percepção dos professores, as formações continuadas, muitas vezes são promovidas com temáticas descontextualizadas da realidade escolar, não contemplando as demandas de inclusão. Ainda, foram relatados sentimentos de despreparo, que geram dificuldades no planejamento e na aplicação das propostas pedagógicas que atendam às necessidades educativas dos alunos com deficiência.

**Palavras-chave:** Docência. Educação em Ciências. Inclusão.

## **| Resumen**

El estudio tiene como objetivo investigar y describir las percepciones de los profesores sobre los desafíos y las posibilidades de enseñar ciencias a estudiantes con discapacidad. El estudio tiene características exploratorias, descriptivas y cualitativas. Los sujetos fueron 26 profesores de ciencias de la red municipal de una ciudad en la frontera oeste de Rio Grande do Sul. Para recoger los datos, se utilizó un cuestionario con preguntas relacionadas con su perfil, formación y percepciones sobre la Educación Especial Inclusiva y su implementación en la enseñanza de las ciencias. Los resultados mostraron que, en la percepción de los profesores, los cursos de formación continua a menudo se promueven con temas que están fuera de contexto con la realidad escolar y no tienen en cuenta las exigencias de la inclusión. También manifestaron sentirse poco preparados, lo que genera dificultades para planificar e implementar propuestas pedagógicas que atiendan las necesidades educativas de los alumnos con discapacidad.

**Palabras clave:** Enseñanza. Enseñanza de las ciencias. Inclusión.

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