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Teacher Training for Early Elementary School Years: understanding of inclusive practices in Mathematics classes

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Abstract: The aim of the present article is to discuss Mathematics teachers' understanding of Inclusive Education and inclusive practices in Mathematics classes. This article is part of a qualitative Master's Degree research. The adopted methodology was based on collaborative working team and on registered teachers who were invited through a form to participate in the study. Each group meeting produced a narrative and some excerpts of these narratives are presented in the current article for discussion purposes. Participants' statements make it clear that their understanding of Inclusive Education, mainly of what it really is, extrapolates the target public assisted by Special Education. Collaborators have broadened this perspective by acknowledging the need for inclusion and the search for inclusive practices to overcome different students' difficulties. It must be done to avoid exclusion through Mathematics. Accordingly, these professionals understand the relevance of looking at students' singularities and potential.

Keywords: Inclusive Education. Teacher Training. School Inclusion. Difference.

Formación de Profesores de los Primeros Años de la Educación Primaria: Comprensiones sobre Matemáticas y Prácticas Inclusivas

Resumen: Este artículo presenta un fragmento de una investigación de maestría en fase de finalización que tiene como objetivo comprender de qué manera los profesores que enseñan Matemáticas en los primeros años de la Educación Primaria pueden contribuir a promover prácticas inclusivas y qué entienden por inclusión. Para lograr este objetivo, comenzamos con algunas preguntas y discusiones sobre la inclusión y la formación de docentes de los primeros años. Posteriormente, presentamos la investigación que dio origen a este artículo, detallando el proceso de producción de datos y las características de los profesores colaboradores. Presentamos algunos extractos de sus declaraciones y los analizamos. A través de las palabras de los participantes, se observa una ampliación de la comprensión de lo que implica la Educación Inclusiva, que va más allá del público asistido por la Educación Especial. Los colaboradores amplían aún más esta perspectiva, reconociendo la necesidad de inclusión y buscando prácticas inclusivas que aborden las diversas dificultades que enfrentan los estudiantes. El objetivo es evitar la exclusión en Matemáticas sin tener en cuenta las singularidades y potencialidades de los educandos.

Palabras clave: Educación Inclusiva. Formación Docente. Inclusión Escolar. Diferencia.

Formação de Professores dos Anos Iniciais do Ensino Fundamental: compreensões sobre práticas inclusivas em aulas de Matemática

Resumo: Este artigo objetiva discutir as compreensões que professores que ensinam Matemática possuem em relação à Educação Inclusiva e às práticas inclusivas em aulas de Matemática. Assim, ele é recorte de uma pesquisa de mestrado de cunho qualitativo. Como metodologia, fizemos um grupo de trabalho colaborativo e convidamos professores inscritos por meio de um formulário. Cada encontro realizado no grupo produziu uma narrativa e, aqui, trazemos excertos para discussão. A partir das falas dos participantes, percebe-se que a compreensão no que diz respeito à Educação Inclusiva, principalmente do que ela é, amplia e vai além do público assistido pela Educação Especial. Os colaboradores expandiram ainda mais essa perspectiva, reconhecendo a necessidade de inclusão enquanto buscam por práticas inclusivas que sobreponham as várias dificuldades dos alunos, tendo como intuito não produzir exclusão pela Matemática. Nesse sentido, entende-se a importância de um olhar para as singularidades e as potencialidades dos educandos.

Palavras-chave: Educação Inclusiva. Formação Docente. Inclusão Escolar. Diferença.

1 Introduction

Inclusive Education has been discussed over the years, besides emerging in continuing training provided to teachers. However, are we clear about what inclusion is? As teachers, do we promote inclusive practices or do we only think about it when we assist students with disabilities?

Therefore, currently, it is understood that democratic access to education must be followed by educational policies and practices aimed at promoting inclusion. It is essential to understand that Special Education is part of Inclusive Education, which is a broader concept. Inclusion is not limited to adjusting discipline matrices or materials in order to teach students seen as 'different' in our classrooms - which are often homogeneous (Rosa; Rodrigues, 2019).

Therefore, teaching practices must comply with Inclusive Education propositions from their genesis at teacher training; in other words, it must be based on ideals to value diversity and to enhance practices aimed at differences. These practices must not exclude diversity, on the contrary, they must aim at teachers who understand the need of reasoning on, and of fighting, injustices and/or the distancing likely arising from them in teaching processes, since they can have severe consequences for students, such as school dropout.

The present article brings discussions on Inclusive Education, Mathematics teachers in early Elementary School years and on the concept of inclusive practices. Research development is also introduced in the text.

2 The Inclusion and Education for All paradigm: who matches this whole?

Inclusive Education was not a mainstream topic before the 1990s, since only few legal documents addressed it. The legislation, at that time, only provided on the inclusion of people with disabilities in regular schools[1] through the paradigm of segregation into special classes or integration. Special Education was already in place, but discussion on this topic did not extrapolate this teaching type or the aforementioned models. According to the integration paradigm, students had, somehow, to adapt and fit to the place they were inserted in; i.e, they

[1] Non-specialized schools will be called common schools over the text, because these institutions are called common or regular schools in the Brazilian legislation.

had to adapt to a standard (Rosa, 2013).

From the 1990s onwards, Brazil committed to the 'Education for All' project, as well as to change its educational system to welcome all, under equal and quality conditions. This new position referred to a broader international discussion triggered by United Nations' agenda on Education for All, which was launched through the 1990 Thailand Jomtien Declaration. The 1994 Declaration of Salamanca was the outcome of the Jomtien Declaration and Brazil was one of its signatory members. The country aimed at "recognizing the need and urgency of providing education for children, young people and adults with special educational needs within the regular educational system" (Unesco, 1994, p. 1). According to this agreement, Brazil committed to build an inclusive educational system whose fundamental principle lied on having schools welcoming all children, regardless of their physical, intellectual, social, emotional and linguistic conditions, among others.

According to documents from the United Nations Educational Organization, inclusive schools are the most effective way to fight discriminatory attitudes, since it acknowledges and responds to students' different needs, regardless of any difficulty or difference they may have. Furthermore, it ensured that other education dimensions, in addition to learning, were shared and enjoyed by everyone in schools (Unesco, 1990; 1994; 2005).

According to UNESCO (2005), "inclusion represents moving away from discrimination and prejudice, towards a future that can be adapted to different contexts and realities. Neither the pace nor the specific direction of this transition can be determined" (p. 23). Inclusive Education is often closely linked to the rights of students who have (1) a disability, (2) pervasive developmental disorder (3) or high skills due to these groups' reference in international laws and documents, and to their long and effective fight for their rights. These groups' arrival at school triggered a discussion about teacher training. Therefore, it is worth highlighting that inclusion is intended for everyone who may be excluded because of its social, cultural, historical, territorial, generational, subjective, gender, sexuality, phenotypic and/or physical differences.

Barros (2011) pointed out the paragraphs of Unesco's document (1990) addressing the close association between Inclusive Education and people assisted by Special Education: they "[...] bear the restriction mark of the inclusion concept treated as relative at the time to provide care aimed at subjects seen as different based on a disability (physical or mental)". Accordingly, a difference cannot be based on a limitation or on what a person is missing in comparison to the others. Ross (2019) highlighted that the word 'inclusion' is used to describe what means to be included in society, as well as to describe a teaching practice, according to which, all students are taught in a regular classroom. Therefore, the double use of this word raises questions, misunderstandings and uncertainties, in other words, 'whose inclusion?'.

Inclusion is not only a model, but a process aimed at identifying and ruling out likely barriers, in addition to ensure the effective participation of all, with emphasis on education to people at risk of being marginalized, excluded or of having low performance at school. From this perspective, it helps eradicating inequality and social injustice (Ainscow; Miles, 2013).

Pais (2014) adopted a sociopolitical viewpoint to make it clear that inclusion achieved through social justice and equity is in contrast to exclusion, since "achieving equity means fighting different battles (for groups of people at disadvantage, resource inequality, teacher training, mathematical content for social justice, among others)" (p. 1088, our translation).

Accordingly, it is understood that an inclusive school must provide equitable education for all, whether peasants, *quilombolas*, indigenous people, landless people, women, people with

disabilities, among others, since inclusion is built amidst differences. Inclusion means resisting historical and political exclusion processes still observed in society and in the educational environment. Therefore, it accounts for changes at all times, besides not segregating or accepting exclusion; yet, it is against all forms of apartheid (Orrú, 2017).

Moura (2021) stated that "[...] equity and inclusion are words often related to each other. Cultural diversity growth in [different] societies has shown that practices aiming at differences often become individualized and exclusionary" (p. 4). The sense of equity also means acknowledging the different knowledge students bring along when they get to school and the inequities observed in our society (Faustino, 2018).

Accordingly, it is essential highlighting the uniqueness of each person and the knowledge carried by individuals. This knowledge should not be diminished to stress teaching/learning practices deriving from books or institutionalized practices at initial, or continuing, teacher training.

3 Mathematics Teachers' Training

Early elementary school teachers often have Major Degree in Pedagogy. These professionals are categorized as generalist or multipurpose teachers because they teach all disciplines in the discipline matrix due to their initial training, which includes disciplines aimed at teaching how to teach.

According to Shulman and Shulman (2016), competent teachers must be prepared to teach, in addition to have a clear vision of the teaching and learning process. This preparation involves understanding this process in disciplinary and interdisciplinary terms, as well as knowing how to create and keep a classroom consistent with the desired principles. Therefore, it is essential to engage in continuing learning, in reasoning on teaching practice, in seeking feedback and participating in continuing education to achieve this competence.

Furthermore, willingness to try new approaches and to make adjustments in practices based on students' needs is essential. Carvalho, Santos and Silva (2022), based on Nacarato et al. (2004), highlighted the relevance of including a more understandable approach to mathematical concepts in Pedagogy courses in order to add them to educational theories. According to these authors, Mathematics learning issues are linked to history of school failure; therefore, they suggest to reason about essential concepts and practices in Mathematics teaching.

The aforementioned authors also highlighted the relevance of helping students in Pedagogy courses to build mathematical knowledge, as well as to understand students' errors and their theoretical-methodological basis on Mathematics teaching. This process aims at stimulating reflections on teaching in both early primary school and childhood education years through practical assignments such as internship, which help thinking about students and teachers' learning.

Curi (2004) highlights that

> because multipurpose teachers are responsible for children's "initiation" in this field, since they approach important concepts and procedures for their mathematical thinking construction, these teachers' training, specific for this task, is a priority research topic in the Mathematics Education field. (p. 30)

He also emphasizes that future teachers are expected to finish their training courses

without getting the necessary conceptual and procedural mastery of the mathematical contents they are expected to work on, and the mathematical language they should use in their teaching practices.

Curi and Pires (2008) highlighted that Pedagogy courses aimed at preparing Mathematics teacher to teach children are quite limited, since these disciplines are often scheduled for 36-hour programs (or 72-hour programs, in specific cases). This limitation has significant consequences, among them, lack of deep mathematical knowledge, simplified approach to address this content during training and lack of research basis or support in the Mathematics Education field. Purificação (2019) shared this perspective and stated that "when mathematical knowledge is the target, it is clear that the structure of Pedagogy Courses' discipline matrices minimally works on such content and, in many cases, it limits the knowledge of future teachers in this field" (Purificação, 2019, p. 16680).

From this perspective, the training provided to Mathematics teachers in courses with limited workload is not enough to effectively build the necessary knowledge on this discipline. From the Inclusive Education viewpoint, in case teacher trainings do not prepare these professionals for their overall practice, they also lack Mathematics teaching.

Inclusion in Mathematics teaching is not only about making sure that students with different skills are in the classroom, but also making sure that everyone has access to quality education, regardless of their individual features. If future teachers do not get proper training in Mathematics teaching during their Pedagogy courses, this gap will have straight impact on their ability to adjust teaching practices to match the specific needs of all students. However, assumingly, these professionals also face other issues, such as lack of connection between the learned theory and effective teaching practices.

Ciriaco (2016) emphasized the need of setting environments in schools where educators play more active roles in decision-making processes. He highlighted that educators often face challenges during initial training to integrate undergraduate assignments to public education practices. This statement highlighted lack of connection between theory and practice as significant obstacle in the formation.

Therefore, by sharing this author's ideas, it is possible concluding that training practices often focus on compliance with protocols, rather than on contributing to teachers' professional profile in Brazilian schools. This statement points out concern with teaching as more often guided by bureaucratic processes than by the core aspects of teaching practices.

Yet, by looking at the classroom as diverse environment where peculiarities must be valued and respected, as well as the teacher-student relationship, Carvalho (2015) reinforced that "[...] it is necessary to take into account the plurality and singularity inhabiting this space, and it makes us consider other dimensions that form ourselves and help us think of other paths to what happens in the classroom" (p. 27). Questions and motivation to assess inclusive Mathematics teaching practices arise from plurality in the classroom.

Few reasons motivated the herein mentioned Master's Degree research, among them, the fact that one of its authors worked in a publishing house focused on teacher training in yearly Elementary School years. This publishing house often showed interest in mathematical contents rather than in the generic material used in training. This profile reinforces the deficient training on these contents. At that same time, teachers made questions about the impossibility of assigning certain Mathematics teaching activities to students with disabilities, or with any global developmental disorder. Teachers have reported that students with disabilities are put aside to carry out "different assignments" so they do not "get on the way" of others. In other

words, students who did not match the standards were subjects of exclusion within a so-called inclusive environment. This perception allowed analyzing the actions of teachers that can be designed in this environment, in early school years. In order to do so, it was important analyzing whether the practices of teachers attending the course can be seen as inclusive.

It is important mentioning that inclusive practices are herein understood as the act of planning and taking actions added with pedagogical propositions suitable for each educational context, i.e., accessible classes that meet students' diversity, without any distinction; environment capable of promoting reflections on difference and respect; assessments to achieve the results expected from all students; practices of teachers who collaboratively plan, review and teach, and who are concerned with supporting everyone's learning and participation (Organización de Estados Iberoamericano, 2009).

The aforementioned research is addressed in details in the next section.

4 Mathematics, Teacher Training, Inclusive Practices and Collaborative Work: research-dissertation

The Master's Degree research giving rise to the present article was developed based on the following question: what are the inclusive practices designed/used by Mathematics teachers in early school years?

The will to answer the aforementioned question was the basis for the creation of a collaborative working team essentially aimed at favoring knowledge sharing among different education professionals. It opened room for diversification and enrichment and it allowed creating an environment for teaching-practices' sharing in Mathematics and for reflections on inclusion, based on these very practices.

It is worth saying that collaborative work teams are herein understood as space for voluntary participation for experience, knowledge and practice sharing purposes. They are placed where members feel comfortable to give their opinions, to accept constructive critiques and to work together in defining shared goals and aims. This process promotes trust, mutual respect and opportunities for knowledge development and for learning from each other. Therefore, the working team, although smaller than expected, allowed circulating higher-quality knowledge and experiences (Gama, 2007; Gama and Fiorentini, 2009).

An online form was elaborated on Google Forms to find potential individuals interested in this extension course. The form was sent to groups of teachers in different states. In total, 16 individuals applied for the course. The form focused on surveying what participants understood by Inclusive Education, the content they thought students in early Elementary School years (up to 5th grade) had most difficulty with and the topics they suggested to be addressed in the course.

Therefore, eight synchronous online meetings were held from March to May 2023 to discuss some subjects related to Mathematics. These subjects were presented by teachers as training demands, and the meetings were held on Saturdays and lasted 2h, on average. The 16 participants were invited to join the meetings; however, only seven of them were able to attend them. The following topics were addressed: fractions, multiples, dividers and problem situations, geometry and logical reasoning, and, at last, but not least, concept of number.

The working team comprised nine individuals: seven public-school mathematics teachers from different municipalities in Brazil who were labeled as gemstones (Amethyst, Emerald, Turquoise, Ruby, Sapphire, Tourmaline and Opal) and the two authors of the present data available in the forms.

It is important emphasizing the idea of elaborating the amendments along with the participants. This procedure followed responses in the initial form and demands that had risen in the meetings. This action, itself, resembles insubordination practices aimed at giving a leading role to these answers rather than to contents by understanding the

> school as space-time for discipline matrix production covered by different cultural meanings (such as evaluation and difference) under permanent negotiation/translation, as interesting alternative to disrupt naturalized practices supporting discrimination and exclusion processes. (Ortigão and Oliveira, 2017, p. 102)

As group meetings progressed, the need of diving deeper into the experiences of each participant and of discussing them as collaborative teamwork became clear. It was necessary looking at their practices from the Inclusive Education perspective to bring suggestions and some relief to their anxiety, whenever possible.

Table 1: Team members' basic data

Participants' ID[2]	Qualification	Teaching in classrooms	Age group	State of residence
Emerald	Specialization	Yes	40-44 Years	RJ
Ruby	On-going Master's Degree studies	Yes	25-29 Years	RJ
Sapphire	Specialization	Yes	30-34 Years	RJ
Amethyst	Specialization	Yes	40-44 Years	RJ
Turquoise	Undergraduate in Pedagogy	Yes	30-34 Years	SP
Tourmaline	Undergraduate in Pedagogy	Yes	35-39 Years	RJ
Opal	Undergraduate - Bachelor's degree (others)	No	35-39 Years	BA

Source: Elaborated by the author.

Except for the first meeting, all others began with resuming the previous meeting. These meetings were designed to report on the likely assignments suggested by the participating teachers in their classrooms. The possibility of thinking about Inclusive Education assignments was always on target, and it was based on texts and assignments created by the first author. The aim of these assignments was to trigger discussions about possible adjustments to the educational reality of each student.

Subsequently, the text provides some excerpts from participants' speeches. Thematic analysis (Braun; Clarke, 2006, 2013, 2019) was chosen as methodological approach in the Master's dissertation to identify recurrent patterns in the collected data. It better describes the discussed topics based on conversation and meeting-report descriptions. Therefore, transcription played key role in preserving and detailing the analysis applied to verbal interactions. This procedure contributed to results' richness and accuracy. The same analysis

[2] Participants were identified with nicknames (gemstones) to highlight the preciousness of each participant as true treasure.

type will be herein used and each excerpt will be analyzed along with researchers in the Inclusive Education field (Mathematics) who were asked to join the analysis.

5 Participants' voices

The present section starts with the question: "What do you understand by Inclusive Education?" The following excerpts are a small example of how some students enrolled in the course responded to this question in the application form:

> Turquoise: "Inclusive education is a guarantee of access to learning provided by educational institutions for students regardless of their limitations (whether physical, mental or social) since all of them can interfere with this process."
>
> Ruby: "I understand that Inclusive Education is that not only placing a student, different from the standard, in a social context, but it also helps them to be inserted into society and to have their independence."
>
> Sapphire: "When a student with a disability is seen as a whole, it is able to learn based on its possibilities. Inclusive Education does not need to be just for students with disabilities, but when the teacher considers that the class is heterogeneous and each one is unique, having several ways of absorbing knowledge."

Emerald, Amethyst and Opal gave straight answers, such as "An education that encompasses all". Some of the responses allowed noticing a commonly held idea that Inclusive Education refers to students assisted by Special Education.

Special Education, for example, regards the relevance of understanding Inclusive Education as public policy that should be common practice at all modalities. The first two answers initially pointed out that inclusion applies to 'All', but it is not just to any "All", but to a specific audience that deviates from the standards or from the so socially appreciated 'normal profile'.

However, participants in the first meeting were invited to answer this question again, and some comments showed their new perception about this topic. Emerald and Sapphire mentioned that they changed the way they understood Inclusive Education:

> Emerald: Oh, I think it has changed, because when we think about Inclusive Education, we only think about students who have a learning disorder, an intellectual disability, some basic need, it is more visible this way, right? The target audience for special education and when we talk about Inclusive Education, we are not just referring to that student. I think we are also talking about black and indigenous students, right? Anyway, even the city itself, our perspective, right? Thinking about Inclusive Education changes all concepts we had, already. And, now, I think we've changed the way we see Inclusive Education, right?
>
> Sapphire: I agree with her [...], not just because of skin color, it is a question of conditions, as well. I think I learned about this a lot by working with the special education target audience. I did not think that way. I started thinking about it at the course.

According to participants, inclusion must also aim at ethnic-racial issues, among others, i.e., this change in perception shows that Inclusive Education makes teachers take a better look at students, at their individuality and potential, rather than seeing them as a number in the class

journal, or looking at their limitations or at a ICD[3] written in a report (in some cases).

From this perspective, Emerald broadened the scope of this concept by mentioning the need of taking into consideration students from different ethnicities and social backgrounds and from the community's own perspective. Sapphire agreed with this approach and added that, based on her practical experience, mainly when dealing with the special education audience, it made her reconsider her own biases. This conversation suggested evolution in individual perceptions and highlighted this topic's complexity, as well as the relevance of context to reach a deeper understanding of Inclusive Education.

Another emerging element concerning Inclusive Education is the relationships built within the school environment itself. An example of this statement is Amethyst's speech about perceiving shy students in her classroom as the group to be included:

> Amethyst: "Inclusion starts with that look we talked about. I think that, from the beginning, when you are in line, watching your student, right there. Does it have difficulty socializing? Making new friends? [...] We ask: do you understand? With no doubt, right? Then they all nod, but you can see that, wow, you did not understand anything I said, but they are embarrassed, right? So, when we have this look, it is up to us [to say] no, but although you understand, I am going to explain it once again, right? So, that is what inclusion is, it is not ignoring, it is this careful look at others."

Ruby completed Amethyst's speech,

> Rubi: "Amethyst addressed a point that I often thought of, you know, that Inclusive Education goes beyond the classroom. Starting from experiences, particular to each student, how much the social context students live in influences their learning and how we can include them, at school, in the class itself, right?"

Ruby's speech shows a change in her perception about the need of including students according to what she calls social context. The look at the students extrapolates what appears in tests and exams; it evidences the understanding that this is a beneficial practice for these students at school.

Carrijo (2023) pointed out that the sense of inclusion is questionable and it can be followed by problematic discourses surrounded by different approaches and interpretations. According to Moura (2021), "being inside" school environments can be different from "being part" of it, since students are "included" in the educational system. However, exclusion processes can keep on existing. Overall, this scenario reflects on students' performance in the system.

Finally, Opal brought up a general reflection on her own trajectory:

> Opal: "The meetings really helped changing my understanding of inclusion, you know? Because I saw it as something a little unattainable that changed after each meeting, right? I became more optimistic. [...] I also just have to thank you for the opportunity to participate in the course, to have learned from you. And I also believe that I am now much more qualified than when I started the course."

Leite and Mont'Alverne (2021) pointed out the need of taking a long way to reach what is provided on public policies and on the legislation, "[...] started to be emphasized and

[3] International Classification of Diseases.

demystified as something that seemed to be unattainable, to become effective and to gain credibility from schools, families and other public spaces, as being mandatory to be recognized and accepted [...]" (p. 684).

Opal described her previous understanding of inclusion as something unattainable by highlighting the evolutionary nature of this understanding throughout the course. This progressive change seemed to have had positive impact on her perspective, which was expressed by her optimism towards inclusion. Therefore, Opal's understanding of inclusion shifted from unattainable place to optimistic viewpoint, to the extent of seeing herself as a better teacher and of restating the demystification proposed by the present authors.

Ruby mentioned something that had happened in her class when assignments involving Geometry and Logical Reasoning were discussed in another meeting:

> Ruby: "[...] as crazy it may seem this week a Rubik's Cube was passing around in the class. [...] And the mother of a student talked to me like this: 'Hey, teacher, he has difficulties, because the previous teacher shouted at him, so he is embarrassed to ask'. Then I said: 'look, he is an average student, we do not have any problem with him, but I am going to talk to him', and he was the one with the Rubik's cube, he quickly assembled it, so I thought 'man, this is not normal' [...] I was getting into multiplication and [using the Rubik's cube] I asked the students: 'How many cubes do you think there are in here?' and the answer: 54, 9x6, understand? It is not wrong. [referring to the number of squares on each face of the cube). Yeah, so I drew it on the board, then I explained: 'no, but look, we have to look at this little cube here'. Then, I took a corner with 3 colors, look, we are combining 3 colors into a single element. So I did the math with him, it came out to 27. But it was cool that the cube came up like that, out of nowhere, and I said, let me see what I can do with it. 3 × 3 × 3. Here it goes! [using this resource to work on multiplication]"

Ruby illustrated how exploring individual interests based on students' singularities (Carvalho, 2015) can be an effective inclusive practice in engaging and facilitating learning by using the Rubik's Cube as resource brought in by a student who had supposed history of exclusion. This action turned a toy into an opportunity to teach mathematical concepts, such as multiplication. Ruby showed sensitivity and empathy by creating a welcoming and safe learning environment for all students.

Furthermore, Ruby was surprised to find a solution she had not thought of at the time to teach that subject. This approach has evidenced her adaptability to turn everyday situations into meaningful and relevant learning opportunities for students, in addition to the possibility of building new knowledge. At the same time, there is a student classification, which is pointed out by the teacher to show little abnormalities. Therefore, one can ask: what would normal be? Does the student always learn all the subjects presented in the classroom at the same time and in the same way as other students?

It is important emphasizing that inclusive practices do not only refer to teaching resources or teachers' adaptation, but also to their attitude in the classroom, which, at some point, can be exclusionary. Several teachers explain new topics while writing on the board, without even observing the students. Some others do not think about changing or adopting other ways of explaining new topics or of evaluating students' performance, even if they are aware of students' difficulty. Therefore, Fernandes & Healy (2020) point out that:

> Oftentimes, a "differentiated discipline matrix", a "simpler" evaluation, the use of "adapted materials", approaching the "content in a simplified way", among others, are

> expressions following discourses aimed at students' mathematics learning process applied to special education students. Apparently, and quite often, these students' special education needs are associated with their limitations, which will only be overcome if they are, in fact, considered disabled or limited to carry out the same assignments as their peers. This attitude focuses on what students **cannot** do rather than encouraging their **potential**. (p. 211, emphasis added)

Pedagogical practices must be designed to respect the limitations, potential and differences of each person.

The goal was to find out whether teachers took school inclusion into account in their pedagogical work to think about the teaching practices in place. One of the topics addressed in the two meetings, right at the beginning of the course, lied on how to teach fractions. At some point, it was suggested that concrete resources should be used to make content visualization easier, such as the case of paper folding.

Tourmaline approved a less theoretical approach to teach fractions at the time to implement inclusive educational practices:

> Tourmaline: "[...] I thought it was great and I think it is a way to address this content. When we get our hands dirty, it becomes much easier for children to learn rather than simply sending them to the board."

Her speech highlighted the effectiveness of putting into practice the issues addressed during the meetings. The emphasis given on practical experience and simplicity pointed out the effectiveness of this approach in promoting a more inclusive educational environment.

The aim of the aforementioned practice was to enable the participation of all in Mathematics classes. The exclusion of some in Mathematics classes is sometimes attributed to students' learning issues. However, Valero (2012) disagreed with such a concept by saying that:

> The fact of not being able to deal with, participate or be successful in school's Mathematics demands is not a feature of an individual student, at all, but the very outcome of how all participants turn certain students into a subjective issue in School Mathematics practices and discourses. (p. 370)

The following elements must be taken into account in order to avoid exclusion through Mathematics: (re)thinking practices, planning and assignments to boost students' potential, rather than reinforcing their difficulties. Collaborative teachers felt comfortable to bring up their experiences during another meeting, whose topics were 'problem situations' and 'basic operations'. Emerald shared her reflections on what she noticed when her students presented incorrect results in problem situations:

> Emerald: "It was a question of interpretation, right? The calculation itself. But why did you interpret it the wrong way? In 2019, I was teaching to a third year class in the school I worked in until last year and we created a teaching sequence that was exactly about that, the interpretation and elaboration of mathematical problems. So, what was the focus? It is not that they were not supposed to solve it, but to write down what the problem resolution would be, because we really wanted to work on the interpretation issue, if they could understand what they had to do."

Accordingly, Emerald was concerned with factors that extrapolate the right and wrong

answers. She highlighted that the main issue did not lie on the calculation itself, but on interpreting mathematical problems.

She showed her participation in the process to develop a specific teaching sequence on problem situations by sharing her 2019 experience. This sequence did not only focus on numerical resolution, but also on students' skills to interpret and elaborate problems. Souza and Dourado (2015) reflected on the need of adopting this approach, which is centered on students' experiences:

> The statement that assignments carried out in the classroom should be more connected to the learning context of a given field under study seems to be well stressed, so that discipline matrices must be linked to learning processes that are interconnected to everyday life, in and outside the school. (p. 187)

Furthermore, the reference to the didactic sequence pointed out a structured planning that highlights a systematic approach to address some identified difficulties. This approach is in compliance with the need of rethinking teaching methods and practices applied to mathematical content, mainly in early school years (Silva *et al*., 2021). However, as she reported, she was sorry for not to have applied this practice to the whole school year:

> Emerald: "So, to work on many of these [problem types], for example: "how old is that person?", every time there is the word 'more' they focus on it, so they immediately think it as sum, right? They do not think about subtraction. So we worked on these things with them, it is a shame it was like that, just a didactic sequence. I think it should have been a bigger project, it was very quick, but it was really cool."

The decision to prioritize resolution writing rather than numerical resolution itself pointed towards a reflective approach aimed at encouraging students to articulate and communicate their thinking. This approach not only strengthens the understanding of mathematical concepts but also helps developing essential communication skills.

Sapphire's report on problem situations was disclosed right after Emerald's reflection:

> Sapphire: "This is something I often observed, mainly when I was a student. We were handed out a sheet of paper with some words related to mathematical operations, such as addition and subtraction. This sheet was a summary of the four basic operations, and we were very focused on that. However, when I started teaching I realized the relevance of dealing with practical everyday situations, since it makes it easier for students to understand, rather than just to catch up to specific terms. Overall, by searching on the internet, I noticed that children's difficulties do not lie on lack of knowledge, but on the hard time extrapolating what is presented. They need to develop the skills to seek solutions and to see themselves within a given situation in order to be able to solve the introduced problems. The challenge of working on logical reasoning arose when I dealt with second year classes, in the literacy process. Despite following the BNCC guidelines, it is necessary to adapt teaching practices for the class you are working with, second year class, which can still be getting familiar with the basic skills acquired in previous years."

Sapphire's observation about how students must develop the right skills to seek solutions and to picture themselves within certain situations highlights the relevance of logical reasoning for the mathematical learning process.

Most of all, it evidences the genuine concern with these students' literacy, i.e., it tries to

"enable students to develop their own resolution strategies and to have the right skills to communicate their ideas, in an authentic mathematical assignment" (Galvão and Nacarato, 2013, p. 95). Accordingly, Sapphire focused on making sure that her students had the skills to critically situate themselves in the world. This scenario points out the need of adopting pedagogical strategies in order to develop broader cognitive skills rather than to just memorize concepts.

Sapphire highlighted the complexity of adapting teaching practices to the guidelines in the National Common Curricular Base (BNCC) when she mentioned the challenge of dealing with second-year classes still undergoing the literacy process. This statement highlighted the relevance of flexibility and adaptation to the educational environment by acknowledging that each class has unique features and needs.

Emphasis on problem interpretation and elaboration given by Emerald seemed to be antagonistic to the concept advocated by Purificação (2019), according to whom, teachers who work in the early years of elementary school are inspired by and part of their own previous trajectories as students at the time to teach a given content, as highlighted by Sapphire, shortly thereafter.

It is so because, according to the aforementioned author, these professionals' initial training in mathematical knowledge seems to be deficient; therefore, "[...] they may risk reproducing ideas, concepts, attitudes from the past that no longer match the educational profile in present times" (Purification, 2019, p. 16680). Nevertheless, Sapphire's report brings up an important reflection on how her experience as student made her think about current issues regarding Mathematics teaching in her second-year elementary school class.

Emerald and Sapphire come from different municipal networks, but both look forward to have their students making correct calculations and to develop a deeper understanding of the introduced problems. Even if for the short-run, Emerald and Sapphire adapted the basic guidelines, and their approaches shifted the traditional focus from simply applying algorithms to a richer conceptual understanding in compliance with demands of the Inclusive Mathematics Education.

6 Conclusions

Inclusive Education is initially perceived by some teachers as synonym with Special Education, since these students were the only ones excluded from/in the formal schooling space. Participants' initial responses made it clear that their understanding of this topic was broadened by the course, since they have come to understand that Inclusive Education aims at more than just students assisted by Special Education. However, it is necessary emphasizing that this perception comes up against its likely distancing from reality, as something unattainable.

Participants further expanded this perspective over the course and acknowledged the need for inclusion in ethnic-racial terms and in different social contexts by understanding Inclusive Education as contribution to social transformation. Although the working team was relatively small and only held eight meetings, reports have pointed out that Mathematics teachers from different parts of the country seek inclusive practices to meet students' multiple difficulties. They do so by promoting a deeper understanding of mathematical concepts, as well as by appreciating the profile diversity observed in classrooms. They aim at minimizing differences.

It is necessary to adapt and organize discipline matrices to make them more open and flexible for schools to develop an inclusive educational process, which must respect students'

singularities, their features and learning skills. Therefore, due attention to inclusive educational practices becomes urgent and necessary, and schools and the academic community are accountable for this process, so that exclusion does not result from Mathematics teaching without taking into account students' singularities and potential. The outcomes of the present research will lead to future studies on how educators' teaching training can make their future practices increasingly inclusive.

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