Education Process of Teachers for Inclusive Education subsidized by the Universal Design for Learning[1]

Jacqueline Lidiane de Souza Prais[2]

Celia Regina Vitaliano[3]

ABSTRACT

The improvement of the pedagogical work developed by teachers in common classes represents an essential condition to favor inclusive pedagogical practices. In this sense, the Universal Design for Learning (UDL) consists of a curricular approach to inclusive education. This article aims to describe an education process developed with female teachers working in the early years of elementary school, aiming at the development of inclusive practices subsidized by the guiding principles of UDL, through a collaborative research. Three female teachers took part in the process. The data collection took place during the development of reflective practices, collaborative planning, and the participation of the researcher in the classroom. It was verified that the education process, subsidized by the UDL allied to the procedures of the collaborative research, favored the improvement in the quality of teaching, evidenced in the changes occurred in the lesson plans and in the effective pedagogical practices of the teachers.

KEYWORDS: Teacher education. Inclusive Education. Pedagogical Practice. Universal Design for Learning. Collaborative research.

---

[1] English version by Marilice Zavagli Marson. *Email*: marilicemarson@gmail.com.

[2] Doutora em Educação. Universidade Estadual de Londrina (UEL), Londrina, Paraná, Brasil. Orcid: https://orcid.org/0000-0002-3658-7021. *E-mail*: jacqueline_lidiane@hotmail.com.

[3] Doutora em Educação. Universidade Estadual de Londrina (UEL), Londrina, Paraná, Brasil. Orcid: https://orcid.org/0000-0002-8757-4204. *E-mail*: reginavitaliano@gmail.com.

Processo formativo de professores para a Educação Inclusiva subsidiado pelo Desenho Universal para a Aprendizagem

RESUMO

O aprimoramento do trabalho pedagógico, desenvolvido pelos professores na classe comum, representa uma condição essencial para favorecer práticas pedagógicas inclusivas. Nesse sentido, o Desenho Universal para a Aprendizagem (DUA) consiste em uma abordagem curricular para a educação inclusiva. Este artigo tem o objetivo de descrever um processo formativo desenvolvido junto a professoras atuantes nos anos iniciais do Ensino Fundamental, visando o desenvolvimento de práxis inclusivas subsidiadas nos princípios do DUA, por meio de uma pesquisa colaborativa. Três docentes participaram do processo. A coleta dos dados ocorreu durante o desenvolvimento de práticas reflexivas, planejamentos colaborativos e participações da pesquisadora em sala de aula. Constatou-se que o processo formativo, subsidiado pelo DUA e aliado aos procedimentos da pesquisa colaborativa, favoreceu o aprimoramento na qualidade do ensino, evidenciado nas mudanças ocorridas nos planos de aulas e nas práticas pedagógicas efetivas das docentes.

PALAVRAS-CHAVE: Formação de professores. Educação Inclusiva. Prática Pedagógica. Desenho Universal para a Aprendizagem. Pesquisa colaborativa.

Proceso formativo del profesorado para la educación inclusiva subvencionado por el Diseño Universal para el Aprendizaje

RESUMEN

La mejora del trabajo pedagógico desarrollado por los profesores en el aula común representa una condición esencial para promover las prácticas pedagógicas inclusivas. En este sentido, el Diseño Universal para el Aprendizaje (DUA) consiste en un abordaje curricular para la educación inclusiva. Este artículo pretende describir un proceso formativo desarrollado con profesores que trabajan en los primeros años de la escuela primaria con el objetivo de desarrollar prácticas inclusivas subvencionadas en los principios del DUA a través de una investigación colaborativa. Tres profesores fueron los que participaron en el proceso. La recolección de datos se produjo durante el desarrollo de las prácticas

reflexivas, planificaciones colaborativas y la participación de la investigadora en la sala de clases. Se constató que el proceso formativo, subvencionado por el DUA, combinado con los procedimientos de investigación colaborativa, favoreció la mejora de la calidad de la enseñanza, evidenciada en los cambios que se produjeron en los planes de clase y en las prácticas pedagógicas efectivas de los profesores.

DESCRIPTORES: Formación de profesores. Educación inclusiva. Práctica pedagógica. Diseño Universal para el Aprendizaje. Investigación en colaboración.

* * *

Introduction

The adequacy of the physical structure, the formation of human resources, the development and acquisition of teaching resources and pedagogical practices appropriate to the learning needs of students have been considered the primary aspects for the effectiveness of inclusive education (OMOTE, 2013; VITALIANO, 2019).

Based on the principle of education as a right for all, school inclusion incurs in challenges for the organization of pedagogical work that starts to take as a starting point the diversity in the classroom rather than homogeneity in the learning process (LUSTOSA, 2019).

In this context, the search for improvement in the organization and conduct of pedagogical work, performed by teachers of common classes in regular education, represents an essential condition to favor the development of inclusive pedagogical practices.

Thus, the curriculum approach proposed by the Universal Design for Learning (UDL) is a reference and possibility for didactic action and teacher education in order to develop inclusive praxis (MEYER; ROSE; GORDON, 2002). Commonly, we understand that praxis corresponds to the dialectical movement existing between theory and practice through the investigation of educational action and intervention in it, that is, the process that is

consolidated through a "systematic and continuous action-reflection shuttle made by the teacher" (SÁNCHEZ, 2005, p. 139).

Considering the existence of a body of knowledge developed in the area of Architecture, called Universal Design, which sought to favor the access of a greater number of people to different environments, to communication and to information, the educational researchers Anne Meyer, David Rose and David Gordon, based on that concept, joined a group of researchers in the United States from the Center for Applied Special Technology (CAST) in the 1990's. They proposed curriculum assumptions to support the planning and teaching practice in an inclusive perspective, called Universal Design for Learning (UDL) (MEYER; ROSE; GORDON, 2002; CAST, 2011).

This proposal presents a curricular approach for the implementation of inclusive education that aims to remove possible barriers of access to the school curriculum (PRAIS, 2020). Moreover, it considers that education should be organized based on flexibility and accessibility, so that a greater number of students learn (MEYER; ROSE; GORDON, 2002). Such a conception assumes that, more than intentions, inclusive practices are needed to implement the principles of teaching to ensure student learning, as well as to meet the educational needs of students.

UDL assumes as guiding principles: Principle 1 - to enable multiple forms of presentation of content, action and expression of content by the student, Principle 2 - to provide multiple modes of learning and development organized by the teacher for students, and Principle 3 - to promote participation, interest and engagement, in carrying out educational activities (MEYER; ROSE; GORDON, 2002).

Thus, it is necessary to understand that, in an approach to education subsidized by this perspective, diversity and difference among students are seen as guiding the pedagogical practices, the organization of objectives, materials,

methods, and the teacher's assessment, and aim at the learning and engagement of everyone in the classroom (MEYER; ROSE; GORDON, 2014).

Lustosa (2019) suggests that the UDL is presented as one of the new forms of teaching that can expand the possibilities of learning and participation of students with SEN, from the conception of disability advocated by the social model, understanding the heterogeneity of the student body and the inadequacy of practices based on curriculum standardization.

According to the proposal of UDL, the didactic possibilities for teaching a given content or concept reveal that, commonly, the difficulty is not fixed in the student, but in the ways that are not offered to them to learn and have access to learning (NUNES; MADUREIRA, 2015). In this sense, "the diversification of strategies can contribute to the student's ability to demonstrate the knowledge learned" (ZERBATO; MENDES, 2018, p. 152).

In accordance with Nunes and Madureira (2015, p. 133), the UDL perspective is a curricular approach, as it aims to "minimize barriers to learning and maximize success for all students." Thus, it is up to the teacher to analyze the limitations in managing the curriculum to provide access to it considering the characteristics of all their students (MORNINGSTAR *et al.*, 2015).

Thus, this article aims to describe an education process developed with teachers working in the early years of elementary school, aiming at the development of inclusive practices based on the principles of UDL, through a collaborative research.

Method

This scientific investigation was developed from education procedures indicated by collaborative research, according to Ibiapina (2008). This type of research combines the production of knowledge and the continuous education of teachers through the study of practical and theoretical issues,

triggering processes of studies facing the problems and needs of professional action in the school context (IBIAPINA, 2008).

In addition, the main goal of this type of research is "to deepen the understanding and interpretation of teaching practice with the intention of strengthening, i.e., empowering, these professionals to emancipate themselves" (IBIAPINA, 2008, p. 11).

The collaborative research was developed in a municipal public institution that contained 13 teachers working in the early years of elementary school located in a city in the North of Parana that served, on average, 122 students in the year 2019. The research and its procedures were approved by the Research Ethics Committee by Report No. 3.079.090.

We explain that four education strategies proposed by Ibiapina (2008) were developed with the participating teachers: 1) cycles of theoretical studies with the 13 participants; 2) reflective practices; 3) collaborative planning and; 4) participation of the researcher in the classroom. This article will present the results of the education strategies developed with the three teachers, although the contents studied in the study cycles (collective strategy) were taken up again in the reflective and planning sessions.

After sensitizing the teachers to participate in the research, a survey of their education needs was carried out in relation to the development of inclusive pedagogical practices with students with Special Education Needs (SEN). All the participants were interested in participating in the research. The criterion for selecting the three participants among the 13 was to have the largest number of special education target students (SETS), with the highest level of learning difficulties, in their class. Table 1 below shows the identification of the selected collaborating teachers and the description of the students they served.

Table 1: Table describing the students served by the cooperating teachers

T	Class	No. of students	No. of students with SEN	Students SETS/Diagnosis[4]		Students SEP / School complaint	
2A	2nd grade A	21	**5**	3	SETS1- Attention Deficit Hyperactivity Disorder (ADHD) SETS2 - ADHD, Oppositional Defiant Disorder (ODD) and Mood Disorder.	3	SEP, SEP2 e SEP3 Difficulty in paying attention and retaining content.
2B	2nd grade B	20	**6**	1	SETS3 – ADHD.	5	SEP4, SEP5, SEP6, SEP7 e SEP8 Difficulty in paying attention and retaining content.
4A	4th grade A	21	**6**	3	SETS8 – ADHD associated with dyslexia SETS9 – Intellectual Development Disorder SETS10 – Hearing Impairment (HL).	3	SEP14, SEP15 e SEP16 Difficulty in paying attention and retaining content.

Source: Prepared by the authors (2021)

Data collection took place from April to November 2019, during which the three education strategies developed with T2A, T2B, and T4A were carried out. We use this acronym to refer to T as a teacher followed by the class in which she worked in the regular classroom.

Regarding the education strategies developed with the three participants, a total of 146 lesson plans were developed in collaboration with the researcher: 52 with T2A, 52 with T2B and 42 with T4A, which were implemented in the teachers' classrooms and were part of the moments of collaborative participation of the researcher, which were 25 with T2A, 26 with T2B and 22 with T4A, totaling 73 sessions. Followed by 73 reflective practices and (re)planning, 25 with T2A, 26 with T2B, and 22 with T4A, in which the collaborating teachers reflected on their pedagogical practices in the classroom, in which the researcher participated collaboratively.

---

[4] We used the underline to indicate the students who were enrolled in the Multifunctional Resource Room - Type 1 in the months of February and March 2019.

The following data collection tools were used: field notes, record protocol of classroom observations, script for planning analysis, script for collaborative planning, and tool with guiding questions for reflective practices. For data analysis, we defined as technique the analysis of episodes, according to Moura (2004).

Results and discussion

The results will be presented through the description of the education process developed with each of the collaborating teachers, illustrated by episodes that occurred during the collaborative education process.

(i) Development of education strategies with T2A

T2A had degrees in Pedagogy and History and specializations in Clinical and Institutional Psychopedagogy, Special Education, and Youth and Adult Education. In the year 2019 when the research was developed, she was studying for her Master's in Teaching, was 41 years old and had 12 years of teaching experience, having also worked as a Pedagogue and MRR Teacher - T1 since Kindergarten, early years and final years of elementary and secondary education.

T2A on one occasion reflected that it was common to perform the same activities every school year, such as using the textbook only, but that she considered this insufficient, stating "So what happens every year is the same thing". Then, we thought: I don't know, we could do something else, besides the textbook, you know. Not just the book, but work on something else cool with them". In addition, T2A recognized that the UDL proposal, approached in the study cycles, made it possible to follow up in a better way the students' performance, reflecting that "they were more concentrated, you know, we were doing the activity together. And then everyone kept up, one or another had more difficulty there, but

it was easy". Such assumption is indicated by Sebastian-Heredero (2018) who reaffirms the need for this look at the characteristics of students for the organization of inclusive pedagogical practice.

We selected, among the lesson plans developed and implemented collaboratively with T2A, the one that dealt with the content of legend, floor plan and plane figures involving the teaching of Portuguese language, Geography and Mathematics.

In this teaching plan T2A, initially the teacher held a round of conversation for the survey of elements that make up the classroom and, concomitantly, these data were recorded on a cardboard attached to the board, for better viewing of all students, using colored pens (one color for each item).

Then, the legend for each element that makes up the classroom was collectively elaborated, counting on the participation and help of the students in choosing the color, writing, pasting, checking the elements and reading them collectively, considering that some students were literate and others were in the process of mastering reading.

Later, based on the legend of the elements contained in the classroom, the teacher organized the floor plan on a poster for better viewing by all and also each student received a sketch for their individual record of the classroom (See Figure 1).

After that, the teacher asked each student to identify their position in the classroom on the floor plan by pointing, describing and writing their name on the poster and on their individual record.

Finally, T2A made an oral evaluation by means of guiding questions: What do we register on this poster? How did we do it? What is a floor plan? How were you able to identify your place in this drawing?

Figure 1: Collective floor plan with 2nd grade students and individual floor plan of SETS1
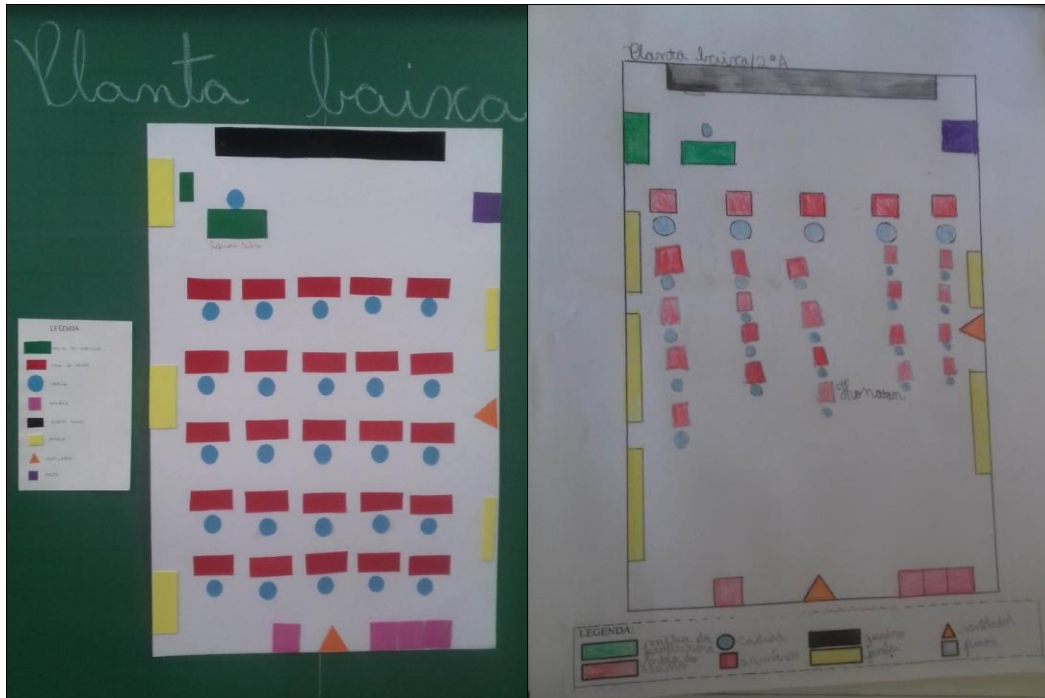
Source: Researcher's field note (2019)

Thus, the aforementioned plan was organized and implemented in meticulously detailed steps in order to provide student participation and learning. In addition, the teacher allowed students to use plane figures and colors to build legends, allowing the application and association of two contents during the explanation and execution of the activity. She also proposed the articulation of individual and collective activities during the classes in which students expressed their learning through written and oral activities, collective poster construction, and individual planning.

In the collaborative participation in the classroom with T2A, we also identified in the application of this plan that the prediction of activities was linked to the need for collective and individual monitoring in the performance of tasks and the promotion of cooperation among students in the activities. We noticed that the teacher, during the class, by promoting strategies of interest and engagement, allowed the students

to collaborate with each other, making it easier for students with SEN to solve their questions with the help of their own classmates or the teacher.

We also emphasize that T2A valued the students' ideas as a starting point for the study and thus paid attention to the singularities of the students with SEN, verifying if they understood the proposal of the activities and performed the tasks together with the class. By favoring the oral evaluation in detriment of only the written form, the teacher contemplated the need of SETS1 and SEP1 that were not literate, but that through oral language they could express what they were learning, including pointing to the didactic resource (individual floor plan) the elements that made up the room and their location in that space.

In addition, at the end of the class, during the synthesis of the study to systematize the learning concept of the class, we observed that the students with SEN in T2A were the ones who participated most in reporting and describing each moment of the class. The other students complemented with their ideas of the concept of floor plan and how the room was organized. The teacher was mediating each point and encouraging the participation of more students by asking questions directed to the activities performed during the class.

Thus, we apprehend that T2A planned and implemented these inclusive pedagogical strategies, based on the recognition of the different learning levels of her students and the needs they presented, as indicated by the UDL curriculum approach (MEYER; ROSE; GORDON, 2014).

We highlight in this lesson plan that accessible resources and possibilities for interaction among students were provided in order to promote the involvement of all and make an active learning. In this way, resources are understood as means that enable and enhance the learning of all students, especially students with SEN (MEYER; ROSE; GORDON, 2014; PRAIS, 2017).

Based on these assumptions, after applying this lesson plan in teaching practice, T2A stated that students with SEN were able to perform

the proposed activities more independently, emphasizing that SETS1 helped classmates to indicate their position in the floor plan, offered to help the teacher during the construction of the legend and the floor plan, and orally presented a concept learning consistent with the objectives set for the class.

> *T2A: This class showed me how important this construction of the concept is throughout the class. It was very good for the whole class, to build step by step, first what is in the room, then the legend, it was very good to build with them, and then assemble the floor plan with them. If I had taken them ready, just to show them what a floor plan is, I bet it wouldn't make sense. And the realization of this activity went beyond what I imagined, them discussing, no, this window is more this way, because the door is more this way. A surprising notion of space, even those with SEN were the most surprising. Their speech is very good, that's why they have multiple forms. Because if it were only written, they wouldn't be able to do it by themselves, and wouldn't understand anything.*

We interpret that T2A indicated that the process of planning the content (materialized in the poster with the ground plan) favored the engagement of students and multiple forms of presentation of the content and of action and expression of learning by the students. In addition, the collaborating teacher indicated that the activity satisfied the SEN presented by her students during the didactic possibilities that were provided.

We evaluate that the education program enabled her to organize differentiated activities based on the needs of her class and enabled the practical experience with the content, as indicated in the UDL principles, both in the presentation of the content and in the representation of learning (MEYER; ROSE; GORDON, 2014).

ii) Development of education strategies with T2B

T2B has a degree in Pedagogy and is specialized in teaching methodologies. At the time of the data collection, she was 52 years old and had 17 years of professional experience as a teacher in a Specialized Care Center for Visual Impairment, early childhood education and elementary school.

We noticed that the main difficulty, reported by the teacher and observed in the classroom, was in relation to teaching strategies and the use of teaching resources. She demonstrated mastery of the curriculum and attention to the learning needs of her students. However, even though she was specialized in the area of teaching methodologies, she lacked knowledge of differentiated strategies and pedagogical materials that could be used in the teaching of certain contents, since she resorted to the organization of traditional classes as observed most of the times when we accompanied her in the classroom during the phase of survey of education needs. In the following episode, T2B demonstrated the concern with the application of the third principle of UDL (multiple forms of engagement).

Table 2: Collaborative Planning Episode with T2B - 10/22/2019

| |
|---|
| *T2B: Here in this activity when I put it like this: hypothesis gathering with the students. Is it possible to understand that I am also trying the third principle?*
 R: Yes, because in the principle of ways to promote interest and engagement it is along with the other two, because it will be the way you present the content and that enables them to present whether they have learned the content.

 T2B: So, that's exactly what I had thought. Because here is still presentation of the content I'm going to ask them a question - why do we have to work? - Then, based on what they say, I will write it down, you know, so that I don't forget the "pearls" that will come out (laughs). While it is a way of introducing the content, I am stimulating their participation. |

Source: Researcher's field notes (2019)

During the elaboration of this planning, we identified that T2B recognized that the application of the third principle (multiple forms of engagement) is articulated to the first two (multiple forms of presentation and multiple forms of action and representation), because it requires the organization of activities that consider the participation of students. Such precept is expounded by Rose, Meyer, and Gordon (2002) clarifying that if the activity does not provide for student participation, all the principles are hampered.

Below, we present the description of a lesson plan developed with T2B contemplating the content of Information Processing, Table and Graph Construction (See Figure 2), Notions of Measurement, using a jelly recipe involving contents from the disciplines of Mathematics and Portuguese language.

Figure 2: Table and graph containing the 2nd grade B students' favorite flavor
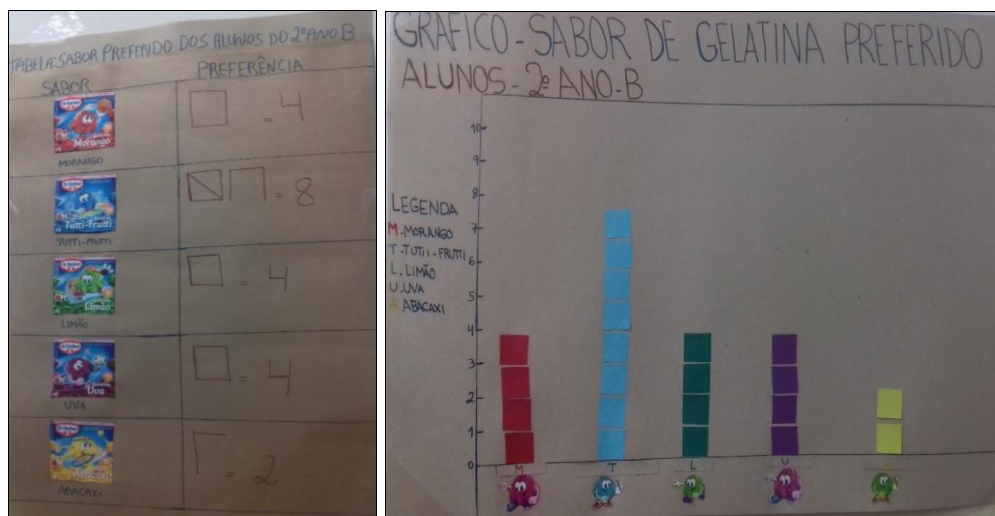
Source: Prepared by T2B and her students (2019)

In this planning, T2B built the following activity proposal: Provided the students with a printed text containing a recipe for jelly starting the class by explaining to the students that it was a recipe and asked the students to read the text in a collective way.

Next, she recognized the structural elements of the recipe genre and its objective, using as visual support the printed text that she had given to the students at the beginning of the class.

Considering the different literacy levels in the class, T2B proposed a collective reading and, thus, she verified with the students with more difficulties some key words in the text and helped them read the words: jelly, spoon, water, glass, among others.

In the next stage of the class, the teacher, together with the students, suggested making five different jelly flavors, with different colors. At this

point, she tried to get the students to identify the units of measurement and utensils to measure water and the amount of jelly (measuring cup in ML).

After this phase and waiting for the jellies to become consistent, the students tasted them and evaluated their taste preferences, associating the color to the chosen flavor. At this moment it was possible to identify the preferences of each one.

After tasting the jelly, T2B proposed the elaboration of a table to record each student's preferred flavor on a poster (white cardboard, jelly packages, colored pens) and each student was given materials to organize their table on a piece of paper on which they would record each data concomitantly with the collective writing of the table on the poster (See Figure 2).

After that, the students were asked to read and analyze the table using interpretive questions, such as: what do we register in this poster? What is in this column? And in the other column? What is the students' favorite flavor? And what flavor did the students least prefer?

Next, she proposed the construction of a graph, using the same strategies used in the construction of the table (See Figure 2). At the end, she proposed a round of conversation about the activities performed, highlighting the structural elements of the textual genre recipe, information processing and construction of tables and graphs.

In this lesson plan, we identified that the teacher applied the principles of UDL in several moments, among them we highlight: the arrangement of the room (in a "U" shape), practical experience with the content (making and tasting the recipe for jelly), activities based on ideas presented by the students (students' preference for the flavor), activities that involved their active participation (participation is essential in each step of the lesson plan), textual construction of a legend with the support of the packaging and colors to represent the flavor to help those who did not read yet and the others with difficulty in reading.

In the class, we observed that the students with SEN tried to rely on the collective accomplishment (poster built and fixed on the board) to make

their record individually (piece of paper), because they showed insecurity in recording the numbers and information requested.

At the end of the activity, orally or in writing, we noticed that all of them, with and without SEN, were able to develop the activity with autonomy, requiring little individualized support and answering adequately the questions about the data.

Among them, we highlight STA6, who, even though he did not dominate reading, got involved in the activities, exposing his ideas whenever the teacher questioned about the data in the table and graph. In addition, he understood and helped in the activities, saying to the teacher: "*Teacher, use this glass because it has the number for how much water you have to put in it. Otherwise, the recipe will be wrong*", "*Teacher, almost no one likes pineapple, because it is sour*".

We emphasize that this lesson plan included the provision of accessible resources and enabled interactions among students in order to promote the involvement of all and make learning active. These data reaffirm the idea advocated by Meyer, Rose Gordon (2014) since the teaching resources used in the lesson were essential for students with SEN and proved adequate for all students. Such assumption can be identified in this lesson of T2A, since it foresaw and provided accessible resources, favoring multiple representations of the content, provided multiple ways for students to express their learning, and also used strategies to engage and involve students during the activities.

After the implementation of this lesson plan, T2B evaluated that the students, especially those with SEN, were able to achieve the objectives due to the opportunities to access the content provided in the activity.

> *T2B: Look, I realized that normally I used to do it like this. I would give them the text to read, some would read, others wouldn't, and then I would read and underline words with them. I would bring some instruments and show them the glass that had been measured, for example, and put water inside so they could see the measurement. But, this way it was very good, you know. For me, mainly, because we start to see*

the connection between the contents, and realize that working with them together makes more sense than working separately. Sometimes we think that mixing Portuguese and Math will become a "fruit salad". But, in this activity, now I don't see them working separately anymore. Strange, isn't it? How we have changed the way we look at our practice after learning about UDL. I really loved this class, and seeing STA6 interested, giving opinions, helping, wanting to understand, all of them. It was very satisfying to lose, in a manner of speaking, so much time in planning and see such a beautiful class, you know. Beautiful because they really learned. It was meaningful for them. I'm very happy with the result.

For T2B, the implementation of the UDL principles favored the organization of activities promoting meaningful learning of the content for students, especially for those with SEN, corroborating ideas advocated by Zerbato and Mendes (2018).

In such a way, Sebastian-Heredero (2018, p. 3) defines that thinking "the planning of an inclusive curriculum starts by offering something that is useful for them and applicable in their daily lives". Thus, according to the UDL proposal at the time of presentation of the content and in the activities, the teacher should seek practices that promote this approach with the usefulness of the class content, i.e., the experience in the student's social practice (CAST, 2011).

iii) Development of education strategies with T4A

T4A, with a degree in Pedagogy, was 23 years old and had been working in early childhood education for 6 years.

During the education process, we observed that T4A, the youngest and least experienced teacher, showed great difficulty in relation to curricular and pedagogical content, that is, she did not demonstrate conceptual domain in relation to the content to be worked on and was unaware of pedagogical strategies for the early years of elementary school. Added to this, the teacher reported that, in her initial education, the contents of inclusive education studied did not enable her to develop

inclusive practices. In the episode below, we present a collaborative participation that illustrates the researcher's guidance and assistance in implementing inclusive practices in her classroom.

Table 3: Episode of collaborative participation with T4A

Date: 05/29/2019
Involved in the situation: Teacher of 4th grade A (T4A) and Researcher (R).
Situation: In the classroom. Content: Addition and subtraction (Mathematics). T4A asks the students, in pairs, to solve the operations registered on the board using their notebooks. While the students perform the activity, T4A records it in the class diary. R walks around the room observing the activity and notices that SETS8 and SETS9 are sitting together and both have great difficulty doing the activity alone. R helps them perform the first operation using colored pencils for addition and subtraction. R turns to T4A and says: "Hi T4A, I was there with the girls and was noticing that they have a lot of difficulty. T4A says: "And how! They really do". R guides: "So, what do you think about organizing other pairs, so that other students can cooperate in doing the activity with them. Who of your students here, do you like to help?" T4A answers, "Yes, I do". S4 and S12 like it. They finish and already run to want to help. And they help well. They explain, you know?" R suggests: "Perfect, great. What do you think? They are together. Separate them and put one with SETS8 and one with SETS9 and have them explain how to do it, help them? What do you think?" T4A says, "I think you can, yes." T4A follows the orientation and reorganizes the pairs. T4A walks around the room observing the activity, helps some pairs. T4A goes to R and describes: "R, I just went over there, how cute S12 is helping me, explaining, you know? And the good thing is that the two are accepting help, because when I go, they want the answer, they stare at my face and do nothing. Between them, they understand each other, right?"

Source: Researcher's field note (2019)

In this collaborative participation with T4A, initially, we noticed that T4A offered the possibility of performing the activity in pairs, however, she did not realize that SETS8 and SETS9 together could not support each other to perform the task, because both presented difficulties. In this case, having as a goal the students' learning, it became necessary to help her provide support conditions for the students, through guidance from collaborative colleagues with a higher learning level.

Thus, the strategies implemented by T4A in this collaborative participation emphasize the application of principle 3 of UDL, from activities that promote the interest and engagement of students during the performance of activities (MEYER; ROSE; GORDON, 2014).

Among the lesson plans developed and applied together with T4A, we selected the planning related to the content of Production of riddles in the subject of Portuguese language containing the following proposal of activities. First, the teacher handed out colored cards containing several handwritten riddles for the students to read and answer the riddle questions "What is what?"

Next, T4A promoted an oral and collective discussion for the students to demonstrate their knowledge about the theme (riddle) based on some questions: Were you able to identify what I gave you? Were you able to figure out what it is? What are these questions? What are they for?

After that, the teacher organized the room and placed on her desk, in the center of the room, a covered box with a place to take an object from the inside without being able to see it before taking it out of the box. T4A selected some school objects that she had in the classroom such as pencil, notebook, eraser, pen, foil, stapler, and put them inside the box. Then she explained the organization of the activity and invited a student and asked him to put his hand inside the box. Holding an object he had to describe, without saying what, for example: it's hard, it's smooth, it's light, it has a point, referring to a pencil. And based on this description the classmates should guess what object the student was talking about.

Throughout the activity, the teacher instigated the students to the details of the objects and problematizing with them how to make this oral description of each object, because the challenge of finding out without seeing what it is. When she noticed that the students were mastering the dynamics of the game and the importance of description, she stressed to them this fundamental aspect in the production of riddles - the description of the characteristics of an object for someone to discover without seeing it.

Later, she proposed the construction, in small groups, of riddles (writing, response and illustration) considering collaborative learning groups and peer instruction. During the activity, the teacher gave support

to each group to organize roles within the group: who would write, what object they would use, who would draw, who would present to the class.

After the production and writing of the poster by each group, a member read it and the class pointed out if the guesses produced by the students were adequate, if the description was pertinent to that object, and gave other suggestions for characteristics that the group did not use.

Considering the adjustments and orientations from the teacher and the class, the groups put together the riddles produced and organized a single poster that was displayed in the school hallway for students from other classes to see (See Figure 3).

We identified that, during the class, SETS8, SETS9 and SETS10 did not need individualized support, because the explanatory support, the presentation of the content, and the instruction between pairs was enough to understand the content and perform the activity. However, we observed that SEP14, SEP15 and SEP16 needed support when the activities were divided, and the teacher's mediation in the groups allowed each student to understand the proposal of the activities (selection of an object, creation of the riddle, writing of the characteristics, illustration by drawing of the object selected by the group). We noticed that the students in the evaluation process were willing to illustrate the riddle created by their group, showing that they had the ability to do so. The teacher took advantage of the opportunity and the willingness of these students to collaborate and invited them to illustrate the riddle of all the groups in the collective poster that was fixed in the schoolyard (See Figure 3).

Figure 3: Poster with riddles produced by the 4th grade A students under the guidance of T4A
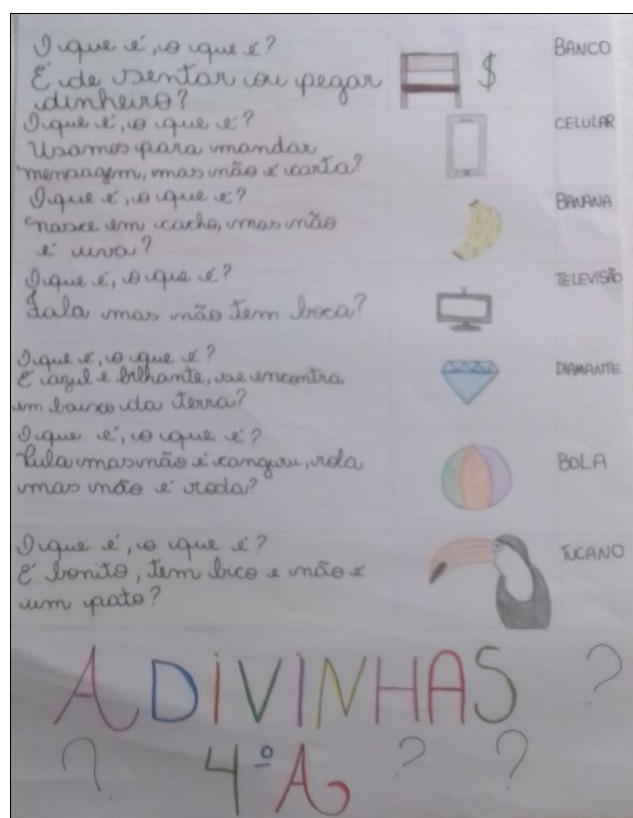
Source: Prepared by 4th grade A students under the guidance of T4A (2019)

During the class, T4A reported to the researcher about this situation that she considered important information about the students, because she had already observed that these three students, who were in the process of evaluating their SEN, had the habit of illustrating characters with caricatures and that this skill she had not been exploring in her activities - drawing. T4A evaluated that, in this class, they were engaged and interested in participating, because they were going to illustrate the riddle created by the group.

The teacher pointed out, during the collaborative planning, that she was having difficulty in understanding the content and how to work it with the students. To this end, the teacher with the collaboration of the researcher studied the content to be worked on with the students

and then looked for teaching resources and strategies considering the SEN identified among her students.

> *T4A: You remember that I didn't even know how to teach the class, right? In fact, I knew this content for myself, but not how to teach it, you know? Then the idea of the box was a good one, because they understood that a riddle is a way of describing something without saying what it is.*

We identified in this lesson plan that T4A planned the three principles of UDL and developed activities that considered the need for the active participation of students. Added to this, we noticed that the teacher enabled different ways of expressing learning through writing, drawing, and the key words of the study performed during the lesson. In this way, she organized moments of collective, group, and individual activities, through possibilities of action for learning by diversifying the students' study strategies.

T4A considered the indication of the didactic proposal of UDL in the construction of didactic materials that planned the learning process of the study concepts, as in the case of the poster made by the students with the riddles created in groups. Thus, we recognize that the teacher identified that her students were different and had different ways of learning a content and, thus, by applying the principles of UDL, she provided different paths for them to choose and achieve the goal set for the class (PRAIS, 2020).

Thus, we emphasize that, unlike the other teachers, with T4A we began the production of lesson plans aimed at implementing the UDL only after developing important requirements for the pedagogical work in the classroom, such as: the mastery of the content and the lesson plan. However, despite the difficulties perceived throughout the education process, we identified that T4A evolved her understanding of the concepts related to inclusive education and, when questioned by the researcher, she presented creative and appropriate suggestions for lesson planning and evaluations.

Final considerations

Considering the objective of this study, which consisted in describing an education process developed with teachers working in the early years of elementary school, aiming at the development of inclusive practices based on the principles of UDL, through a collaborative research, it is evident that the improvement of the pedagogical work developed by the teachers represented an essential condition for them to promote the inclusion process of students with SEN and the learning of all students.

We understand that the development of education strategies with T2A reflected in conceptual changes and in her pedagogical practice. The teacher who, at the beginning of the education process, showed an understanding that inclusion was linked to Special Education services, from diagnosis to the presence of the support teacher in the classroom, began to realize and identify her role in identifying the SEN and the singularities of her students, a fact that led her to develop pedagogical practices aimed at minimizing barriers to access to learning.

We noticed that throughout the education process of T2B, the conditions that were offered to her such as: describing the educational actions; identifying pedagogical information regarding the teaching process such as curriculum content, strategies, and resources used and/or made, as well as the help to reflect on what she planned and what she did, were crucial for her to reconstruct her professional performance and to be able to promote her pedagogical praxis combining the theoretical knowledge acquired throughout the education and the implementation of these studies in her educational practice.

T4A revealed to us throughout her process that the idea that the basic requirements such as content mastery and lesson plan development, when they are not acquired in the initial education, must be revisited in continuing education. And we noticed in this teacher's journey a greater

engagement with the process of educational inclusion, the use of diversified strategies and the planning process foreseen in the construction of didactic resources with students, promoting a significant learning for her students, especially those with SEN.

We found that the cooperating teachers learned to apply the principles of UDL in their pedagogical practice, developed appropriate activities to meet the SEN needs of their students, and used teaching resources that favored the learning of all students. The contributions resulting from the educational process subsidized by UDL and the collaborative research procedures were evidenced through the improvement in the quality of teaching in relation to all students, and the changes that occurred in the lesson plans and in the effective pedagogical practices of the teachers.

We noticed that the methodology used based on the proposal of collaboration between researcher and teacher was appropriate, because the procedures indicated (sensitization of teachers, identification of education needs, collaborative education program - cycles of studies, collaborative participation, reflective practice and collaborative planning, evaluation of the education process) favored the education process allowing the construction of inclusive practices.

We emphasize, therefore, that teacher education subsidized by the principles of UDL allows the construction of inclusive practices in order to realize an education for all students, by promoting access and accessibility to school, curriculum and learning.

References

CAST. *Design for Learning guidelines:* Desenho Universal para a aprendizagem. Estados Unidos: CAST, 2011.

IBIAPINA, I. M. L. M. *Pesquisa colaborativa:* investigação, formação e produção de conhecimentos. Brasília: Líber Livro, 2008.

LUSTOSA, A. V. M. F. A expressão da subjetividade no contexto da educação inclusiva: complexidade e desafios. *Obutchéne:* Revista de Didática e de Psicologia e Pedagogia, Uberlândia, MG, v. 5, n. 1, p. 114-134, jan/abr, 2019.

MEYER, A.; ROSE, D.; GORDON, D. *Universal Design for Learning (UDL).* Estados Unidos: CAST, 2002.

MEYER, A.; ROSE, D.; GORDON, D. *Desenho universal para a aprendizagem:* Teoria e Prática. Wake Field, MA: ELENCO Professional Publishing, 2014.

MORNINGSTAR, M. E.; SHOGREN, K. A.; LEE, H.; BORN, K. Preliminary Lessons about Supporting Participation and Learning in Inclusive Classrooms. *Research and Practice for Persons with Severe Disabilities*, v.40, n. 3, p.192-210, 2015.

MOURA, M. O. Pesquisa colaborativa: um foco na ação formadora. In: BARBOSA, R. L. L. (Org.) *Trajetórias e perspectivas da formação de educadores.* São Paulo: Unesp, 2004. (p. 257-284).

NUNES, C.; MADUREIRA, I. Desenho Universal para a Aprendizagem: Construindo práticas pedagógicas inclusivas. *Da Investigação às Práticas*, v.5, n. 2, p. 126 – 143, 2015.

OMOTE, S. A formação do professor de educação especial na perspectiva da inclusão. In. BARBOSA, R. L. L. (Org.) *Formação de educadores:* desafios e perspectivas. São Paulo: Editora UNESP, 2013. (p.153-169).

PRAIS, J. L. S. *Das intenções à formação docente para a inclusão:* contribuições do Desenho Universal Para a Aprendizagem. Curitiba: Appris, 2017.

PRAIS, J. L. S. *Formação de professores para o desenvolvimento de práxis inclusivas baseadas no Desenho Universal para a Aprendizagem:* uma pesquisa colaborativa. 2020. 300 fls. Tese (Doutorado em educação) – Centro de Educação, Comunicação e Artes, Universidade Estadual de Londrina, Londrina, 2020.

SÁNCHEZ, P. A. A educação inclusiva: um meio de construir escola para todos no século XXI. *Inclusão - Revista da educação especial*, out., p. 7-18, 2005.

SEBASTIAN-HEREDERO, E. Escola inclusiva: um novo olhar para o currículo de uma escola para todos. *Revista Eletrônica de Educação*, v. 1, n. 1, p. 68-77, 2018.

VITALIANO, C. R. Formação de professores de Educação Infantil para inclusão de alunos com necessidades educacionais especiais: uma pesquisa colaborativa. *Revista Pro-Posições*, v.30, Campinas, jul, 2019.

ZERBATO, A. P.; MENDES, E. G. Desenho universal para a aprendizagem como estratégia de inclusão escolar. *Revista Educação*, Unisinos, v. 22, n. 2, 2018.