

# The universal design for learning in teacher training: from investigation to inclusive practices\*

Ana Paula Zerbato<sup>1</sup>

ORCID: 0000-0002-9624-2148

Enicéia Gonçalves Mendes<sup>2</sup>

ORCID: 0000-0003-3673-0681

## Abstract

The pedagogical practices carried out in the schooling of students who are the target audience of Special Education in regular classes are designed through individualized adaptations of the curriculum and flexibility. The Universal Design for Learning (UDL), however, allows for the creation of accessible means of teaching for barrier-free learning. Thus, this study consisted of investigating whether a teacher training program based on this theme would result in practices that achieve greater participation and learning of the target public student of Special Education in the regular class. As a methodology, the collaborative research was chosen to produce knowledge and provide teacher training. Ten basic education teachers and seven teaching undergraduate students participated in the study. The program resulted in eleven meetings, involving various training tools, such as fictional and real teaching cases, case discussion scripts and preparation of lesson plans based on the UDL. The collected data were organized, synthesized and presented in order to illustrate the results of the training program, based on three cases, selected by the in-service teachers and due to the difficulty they had to promote the participation and learning of a particular student. The classes were collectively designed, implemented by the teachers and recorded in a field diary. The results pointed to convergent and divergent elements between the findings of this investigation and theoretical studies on the subject. It was concluded that the training strategies based on the assumptions of the UDL and collaboration proved to be potentiating tools in the development of teaching actions consistent with diversity, as well as in the initial and continuing education of the participants.

## Keywords

Special education – Universal design for learning – School inclusion – Teacher training – Collaborative research.

\* The author take full responsibility for the translation of the text, including titles of books/articles and the quotations originally published in Portuguese.

**1-** Universidade de São Paulo, São Paulo, SP, Brasil. Contact: apzerbato@gmail.com

**2-** Universidade Federal de São Carlos, São Carlos, SP, Brasil. Contact: eniceia.mendes@gmail.com



<https://doi.org/10.1590/S1678-4634202147233730>

This content is licensed under a Creative Commons attribution-type BY-NC.

## Introduction

As a result of a school inclusion policy<sup>3</sup> which has been adopted since 2003, there was a growing increase in schooling of the target students of Special Education<sup>4</sup> in regular schools. The number of students enrolled in regular classes had a tenfold increase in the last 17 years, from 110,536 in 2002 to 1,090,805 in 2019 (INEP, 2002, 2019). As these students entered regular classes, new challenges arose for teachers to ensure education for all in increasingly heterogeneous classes.

At first, the education of the target students of Special Education was carried out differently from the teaching planned for the other students. The strategy adopted was to try, through adaptations, accommodations or flexibilizations, to reconcile, as far as possible, their specific educational needs with the demands of the common core curriculum. However, these attempts were virtually ineffective because the emphasis was still on a deficit-based curriculum and its compensation. Meanwhile, the common curriculum still seemed inaccessible to many, challenging the benefits of regular classroom schooling.

Over time, more than acting on the different student, research in Special Education began to show that inclusive policies should aim at restructuring educational systems and schools, taking into account the diversity of students. More than guaranteeing admission, it would be necessary to invest in the training of educators, in material, human and technological resources, in changes in pedagogical practices and in the organization of support services, in order to ensure the entry and permanence of all children and young people in school (STAINBACK; STAINBACK, 1999; AINSCOW; BOOTH; DYSON, 2006).

It is also worth noting that, in countries with low quality indicators for basic education, such as Brazil, it would be utopian to consider that the success of inclusive policies would come down to ensuring that children enter a school that has one of the worst performances. Therefore, policies are needed to improve education for all, without distinction, and not just for those with special educational needs.

In the case of target students of Special Education, the policy of schooling in regular classes of regular schools also showed that a large part of these students - an estimated 80% of them - require only a model of a good school, while only a minority would need differentiated or specialized methodologies, not contemplated in regular education (WANG; REYNOLDS; WALBERG, 1995). Thus, the direction of research on school inclusion became more focused on the development of the so-called universal pedagogical practices, or those that prove to be effective for everyone than on specialized strategies. Once teaching in the regular class improves for everyone, it is possible to have the exact dimension of which students would need additional support, for which the class curriculum is not sufficient.

---

**3-** In this work, the concept of school inclusion will be used, understood at various levels (philosophical, political and practical, normative, investigative and so on), but with a single focus: the schooling process of students from the target audience of Special Education in the context of regular classes of regular schools. The term inclusive education, on the other hand, refers to the population of students historically excluded from school and, although it involves the target students of Special Education, it is not limited to them.

**4-** The Special Education Policy from the Perspective of Inclusive Education 2008 (BRASIL, 2008) defines as the target students of Special Education the one with disabilities (intellectual, sensory and motor), pervasive developmental disorders and giftedness.

From that moment on, the logic in organizing the support system for inclusive educational environments is no longer based on remedial proposals, centered on students with disabilities, as unfortunately is the case of the extra-class specialized educational service proposed in the Special Education policy in Brazil (BRASIL, 2008). What the scientific literature has pointed out is the need to invest in a Multi-Tier Systems of Support (MTSS), in which teaching and interventions are provided to students at varying levels of intensity (layers), based on their needs. The first level would be that of universal interventions, which aim to improve education for all in the context of the regular class. When such improved teaching in the regular class is not satisfactory, targeted supplemental interventions are added. If, in turn, this level of support is not enough, the third level is used: intensive interventions (increased time and reduced focus) for individuals or small groups (KOVALESKI; BLACK, 2010).

From the perspective of Special Education, which historically sought to respond to the teaching process for small groups and focused on differentiated needs based on deficits, the challenge has been to develop more universal pedagogical approaches that improve teaching in the regular class for all. Considering that, in the end, if the teacher cannot cope with the variety of students in the classroom, all the good intentions behind inclusive policies and practices will be useless. That said, it is worth investigating how to prepare teachers to deal with diversity in schools (WANG; FITCH, 2010).

In this sense, the Universal Design for Learning (UDL) has been pointed out as a promising approach by the literature on school inclusion, but little explored in the national context. Thus, the aim of this study was to investigate whether a teacher training program based on this theme could result in practices that achieve greater participation and learning of the target student of Special Education in the context of the regular class.

## **Universal Design for Learning (UDL)**

The teaching proposal based on the UDL aims to plan teaching and access to knowledge for all students. It considers the individual specifics of learning, assumes that all individuals are different and have varying paces and styles of learning. The approach provides a framework for teachers and other professionals specialized in developing practices and strategies that focus on accessibility, both in physical terms and in terms of services, in the search for educational paths for barrier-free learning (CAST UDL BOOK BUILDER, 2013).

Thus, instead of thinking about the usual practices of curriculum adaptation, or about some specific activity for certain students that are the target audience of Special Education, different and varied ways of teaching the curriculum are planned for all students (ALVES; RIBEIRO; SIMÕES, 2013). When developing materials for learning curriculum content in view of the target students of Special Education, for example, such resources are usually thought of as being for the exclusive use of a specific student. From the perspective of UDL, the proposal is to build universal practices, making the same material available to all students as a way to contribute to the learning of other students.

According to Alves, Ribeiro and Simões (2013), this teaching perspective is based on three principles: i) the recognition of information to be learned (the principle of

representation); ii) the strategies to operate in the information processing (principle of action and expression); and iii) the student's motivation (principle of engagement). In this way, its structure intends to support the teaching planning to offer learning opportunities for all, through the use of diversified strategies and materials, which support varied learning styles and rhythms. The challenge for the research was to investigate how to provide training for teachers to plan teaching based on the structure of the UDL.

## **Teacher training on UDL**

School inclusion increasingly demands that teachers of regular education and specialist teachers be prepared in their training process to serve students from the target audience of Special Education (BUENO, 2008). Therefore, it emphasizes the need for investments in initial and continuing education programs which focus on reflection on everyday school life, the possibility of exchanging experiences and collective construction of new pedagogical knowledge (BEAUCHAMP, 2002).

In addition, it is essential to value and implement a collaborative work culture, as even if regular school teachers have good quality initial training to respond to the demands of the school inclusion process of the target students of Special Education, they will need the specialized support of Special Education teachers or other professionals for the development of strategies and materials, use of low and high technology resources, among others (VITALIANO; MANZINI, 2010). According to Lopes (1997, p. 574), it is essential to "train teachers to reflect on their own practice, as well as for the use of reflection as an instrument for the development of thought and action". Given this context, in this study, it was decided to develop a teacher training program in a collaborative perspective, since:

In collaborative groups, teachers debate the progress of the process, critically reflect upon teaching, share a language to refer to concepts, build and reconstruct together knowledge about teaching, thus proceeding to self-regulate their learning and their practices. Training in a collaborative context requires shared decision making by everyone involved, who end up taking responsibility for joint production, according to their needs, possibilities and interests [...]. (BASTOS; HENRIQUE, 2016, p. 305).

In this sense, it is promising to develop research with a focus, at the same time, on the production of knowledge and on the training of teachers and professionals from the perspective of collaboration, in order to contribute to the process of universalizing access and improving the teaching offered to target students of Special Education (CAPELLINI, 2004; RABELO, 2012; VILARONGA, 2014).

When thinking about a training model that dealt with inclusive pedagogical practices carried out at school, the reflection on them and the construction of new knowledge, the perspective of research and collaborative training, based on the concept and principles of the UDL, was chosen because it considers that if the teacher, in partnership with specialized professionals, plans, implements and evaluates their pedagogical practices based on the principles of the UDL, they will be able to promote the participation and

learning of everyone in their classroom, including the student of the target audience of Special Education:

Ensuring access to regular school is the easiest dimension to achieve in the inclusion process, as it depends on, above all, political decisions. Ensuring learning and learning success, on the other hand, involves significant changes in the ways of conceiving the role of the school and the role of the teacher in the teaching and learning process. It is, therefore, about equating inclusive pedagogical processes that allow the effective involvement of children and young people with special educational needs in learning [...]. This need is associated with the emergence of the Universal Design for Learning (UDL) concept in the 1990s [...]. (NUNES; MADUREIRA, 2015, p. 7).

According to Toledo and Vitaliano (2012), in recent years, many studies have been produced that contemplate the characteristics required to carry out scientific research and, at the same time, provide for the training of teachers. To the authors, collaborative research refers to “[...] a proposal for educational investigation, capable of articulating research and professional development through approximations between universities and schools” (TOLEDO; VITALIANO, 2012, p. 323). Mizukami *et al.* (2003) point out that collaborative research can enhance the improvement of professional development through opportunities for reflection on practices, shared criticism and supported changes. In collaborative research, we seek to progress through reflection and joint practice between the researched and the researcher to produce new knowledge.

Thus, in view of the advantages of collaborative research to produce knowledge and provide training, an investigation<sup>5</sup> was carried out with the aim of developing, implementing and evaluating a training program, considering the challenges of school inclusion and the UDL framework (ZERBATO, 2018). The program’s goal was to gradually lead participants to apply this knowledge in planning an actual lesson.

### **School inclusion and universal design for learning: knowing in order to implement**

In view of the need to maintain coherence between theory and practice, the training program was organized and implemented based on the three principles of the UDL, that is, instruments and strategies based on the principles of Engagement, Representation and Action and Expression were adopted and are summarized below:

A) Engagement strategies: carrying out activities to identify the participants’ pre-existing knowledge, reflection on issues related to school inclusion and the context in which they worked, survey of demands and doubts, activities in small groups and individuals on pedagogical practices already used, survey knowledge about UDL and sharing the educational challenges experienced by them. Strategies used: dialogue in the group, dynamics, written and oral reports on the teaching case experienced by the participants at the time of training.

---

**5-** Research submitted and approved by *Plataforma Brasil* (Opinion n.: 1.041.571).

B) Representation strategies: (presentation of the programmatic content of the training): it took place through debates during the meetings, reading of the written text, presentation of a synthesis of the topics covered, examples of strategies based on the UDL and analysis of teaching cases, both fictional and real. The resources used were presentations in slides, videos, images, texts, concrete materials for the preparation of teaching materials proposed in the planning of classes based on the UDL, expert lectures, dialogue and exchanges.

c) Action and expression strategies: (strategies for collecting data on the learning of the participants during training): readings and collective discussions of the didactic-formative texts organized by the researcher and presented by the participants, in pairs, through the use of slides, video, images, dynamics. Written activities for reflection on the texts, debates on the topics covered were also used, in addition to the practical activity of collaboratively elaborating a lesson plan based on the UDL, application of the elaborated activity, presentation of the activity through images, photos, written records in the field diary and oral reports.

Each meeting of the training program was designed and re-elaborated with the participants according to the demands and progress of eleven training meetings. As the meetings were held, an assessment of the training activities and replanning for the next meeting were carried out, in order to meet the group's demands, but without losing sight of the training objectives. All theoretical-didactic materials developed were based on international studies on UDL (NELSON, 2014; ALVES; RIBEIRO; SIMÕES, 2013; NUNES; MADUREIRA, 2015).

In view of the goal of providing a collaborative training environment, a mixed sample of participants was adopted, which included in-service teachers and undergraduate students (future teachers), aiming at the exchange of theoretical and practical experience among the participants who sought the program as ongoing education and those in initial education.

Altogether, ten teachers of regular teaching classes participated in the program, who worked in the Basic Education network at different levels of education: five in Early Childhood Education, three in the early grades of Elementary School and two in the final grades of Elementary School (teachers of Portuguese language). All of them had already worked in classes with students from the target audience of Special Education. Seven teaching undergraduate students also participated, namely: four from the Special Education teaching degree, a Pedagogy student, a Biological Sciences student and a Physics student. A large part had already performed the supervised internship in classes containing the target students of Special Education.

Throughout the program, participants should collectively plan a class based on the UDL principles. The activity was developed through the exchange of information between the group during the meetings preceding the elaboration of the lesson plan. Participating students brought contributions related to knowledge acquired in undergraduate courses and knowledge learned from the literature on UDL available. There was also the collaboration of university specialists who gave some lectures to participants on strategies and materials that could be used for teaching in classes with and without students from the Special Education target audience.



The construction of these plans was based on international research on UDL, such as that by Nunes and Madureira (2015, p. 37), who presented in their study a planning model based on UDL principles and contemplated as essential components of the curriculum: “i) objectives, ii) teaching strategies, iii) materials and resources and iv) evaluation”.

The protocol for preparing the lesson plan was organized in two parts. The first part contained the identification of the teacher, class, information about the target student of Special Education and the context of the regular classroom/school. Teachers should include as much information as they have about the student, the family, the relationship with the school, the services offered, the potential and difficulties, learning styles and relevant characteristics of the context in which the teaching took place. The second part dealt specifically with the very act of teaching, so they should record the area covered in the lesson plan, the objectives, the methodology, the necessary resources and the assessment. They would also need to contemplate the three principles of the UDL: engagement strategies, content presentation and, finally, action and expression strategies of the content learned by the students.

In the end, ten lesson plans were produced, built in collaboration with regular school teachers, researchers and undergraduate students. Of the total lesson plans prepared, nine were actually put into practice and only one teacher was unable to carry out the activity, as she was in the role of pedagogical coordinator of the school where she worked.

The analyzed data came from the collection carried out by different sources, such as recorded footage of the meetings, task productions, records and participants' reports. However, the particular interest of analysis focused on in this study were the lesson plans collectively elaborated and applied by the acting teachers, as well as their field diaries in which they recorded the implementation of the planned activity.

Due to the need for delimitation and the impossibility of describing and analyzing all nine plans and the results of these implementations, three cases were selected to illustrate how the participants, in collaboration, planned and implemented their teaching plans based on the UDL. The selection criterion was intentional to exemplify the possibilities of teaching based on the UDL in classes of different levels of education, being one case of Early Childhood Education, the second of the Initial Grades (4th grade) and the third of the Final Grades (6th grade) of the Elementary School.

## **Results and discussions: from the comfort zone to the potentialization of practices**

The results were organized in the form of case reports, in order to synthesize the information collected from the lesson plan and from the field diary. Each case reported contains a brief description of the teacher's challenge in the regular class with teaching to a target student of Special Education, an explanation of how teaching happened to the whole class, what changed in the planning and the repercussions of the UDL based class. The results represent, therefore, a synthesized description, illustrated with verbal reports or contained in field diaries of the participating teachers.

## **Case 1: engagement and participation in teacher Fátima's Early Childhood Education activities**

One of the concerns of teacher Fátima, in relation to her target student, was the little or no interaction with other children, his lack of attention, difficulty in communication and aggressiveness at certain times. The teacher had already referred the child for psychological evaluation, but there was still no conclusive diagnosis. As one of her routine tasks was storytelling, she aimed to promote student participation in this activity. She reported that, normally, after the narration, she called the student to her desk to tell him the story already told, however, the other students wanted to tell the story to the teacher, making the activity a long and dispersive task. In this context, teacher Fátima decided to prepare her lesson plan based on the UDL, in order to promote the socialization and communication of the target student, as well as the organization of the sequence of a story already known to him and other colleagues: "The three Little Pigs".

The lesson plan included three stages based on UDL principles: i) Engagement and motivation strategies: handling the book, the characters and the scenario that the teacher built during the training program; ii) Representation strategies: narration of the story by the teacher first, using the book and the material produced and then the narration with the help of the class; and iii) Action and expression strategies: presentation of a video about the same story and conversation circle. In her field diary and in the filmed reports of the presentation of the activity, Fátima narrated that the activity did not go completely as planned and that she was surprised by her students:

On the second day, nothing went as I had planned. It was better and more spontaneous because they took the lead at almost every moment! When I started to tell the story, I asked the students for help. D. (the target student) got up and also wanted to tell the story using the book. I was very surprised by his reaction. (Teacher Fátima – Field Diary of November 10, 2015).

The strategy used by the teacher was to divide the class into two groups to retell the story. Each student chose a character or a scenario. The teacher took the role of narrator and a member of the group was responsible for showing the book so that others could support in the dramatization. However, during the task, the students felt so comfortable in carrying out the activity that they themselves narrated and dramatized the story without needing support any longer. The target student actively participated in the activity without the need for individualized support, something the teacher usually gave him during the tasks.

Returning to the planning, in the third stage of the activity, the class watched a video about the story and a conversation was held. According to her field diary, while they were talking about the story and how the role play activity had gone, one of the students who had missed the day before started crying because he hadn't participated in the activity. At this point:

[...] the students asked us to do it again for the friend to participate. So I gave them the material and let them do the staging, one was guiding the other and everyone participated. I think this



was the best feedback I could have! (Teacher Fátima – Early Childhood Education – Field Diary – November 10, 2015).

The teacher's first reports revealed an understanding that her target student would continually need individualized care or a different strategy from the rest. At first, she assumed that he was not able to participate in the same activity and that, therefore, she should always think about a specific or differentiated activity. When carrying out strategies with all students, the teacher was surprised with the results and, when the activity was presented at the training program meeting, one of the students questioned her:

Student Aline: Even with all this work, would you do this kind of activity again?

Teacher Fatima: Oh, absolutely! [...] The activities through stories were because of him (target student). I even put it on more times a week. (Meeting 9 - November 11, 2015).

## **Case 2: engagement and participation of teacher Alda's 4th grade Elementary School class**

At the time of training, teacher Alda acted as a supply teacher at a state school, thus, she did not have a fixed class and replaced the main teachers when they were absent. The activity based on UDL was designed for a 4th grade class of Elementary School, in which the teacher identified a student with learning difficulties, very shy and with little interaction with peers. Therefore, her objective, in addition to the retelling of the fable by the class, was to encourage socialization and oral expression in students.

To engage students, the teacher allowed the free handling of characters and scenarios that she had built in collaboration with the group of participants during the training program. In addition, she introduced the proposal for the students to present the fable to another class at the school. The students got excited and agreed to do the activity. As a strategy for presenting the content, the teacher narrated the fable "*O Rato do Campo e da Cidade*" [The Field and the City Mouse], with the support of the story book. As a strategy for action, expression and evaluation of the knowledge learned by the class, she performed the retelling of the fable with the support of the characters for another class at the school.

According to the teacher's reports and the records presented, it can be inferred that the activity was carried out with the involvement and excitement of all students. An activity that would commonly be carried out in an expository way and with only the support of the book, was carried out in a more playful way, with the use of low-cost materials and through different strategies that enabled the participation of the class in general through the staging. During the presentation of the activity at the training meeting, the teacher reported that many students, who were normally not interested in the proposed activities, committed to the task that day. The data indicated that carrying out the activity in a different way stimulated greater involvement by all and opened up possibilities for these students who were less involved to learn.

### **Case 3: changes in the forms of representation and expression in the activity of teacher Marília (6th grade of Elementary School)**

The activity carried out by teacher Marília involved the Portuguese Language course and the Elements of Narrative content. After an expository class to present the theme, each group of students should write a text involving the elements of time, space, characters and conflicts. According to the specifics of the target student of Special Education, the teacher evaluated and planned a group activity that involved the engagement of students in the production of a collective written text to express their learning. Afterwards, the groups presented their texts orally. There was no need for specific adaptations, only the registration material of the target public student of Special Education was different from the others, that is, instead of using a notebook and pen, he used a computer to write.

Regarding the development of the teacher's pedagogical practices, her initial report during the first meetings stands out: "I will finish the year with the certainty that I will not contribute in anything to this student's teaching and learning process" (teacher Marília, - September 23, 2015). At the tenth training meeting, when presenting the UDL-based activity, the teacher narrated:

J. has a laptop that is adapted for him. He has a table, also adapted, that fits on him. Then the mouse is brought to a distance that he can handle it and the keyboard is bigger so he can select the letters on his own. Since he can read, I call the caregiver, she sits with him and I give her the text. Sometimes she shows him, other times she reads to him and he performs the activity on the computer. So I have a pen drive that I've already shared with him: J. This pen drive is yours and mine. Then I go there, I give him the pen drive with the activity, he does his activity and brings me back the pen drive. (teacher Marília's report - 6<sup>th</sup> grade - activity based on the UDL - November 25, 2015).

The detail of the description of the resources used by the student, the establishment of partnerships and the risk of developing strategies for accessing the curriculum demonstrated the potentialization of their act of teaching and the progress in the learning of the target student, without the teacher's demand of the planning of individualized curriculum activities. The difference in teaching was only in the way in which the student received the activity, that is, the computer. The contribution of the target student to his work group was the participation in the collective construction of the text, in which everyone would first discuss the textual production and, at the end, a student would register it in writing. The oral presentation of the final product prepared by the work groups took place in the next class, however, the target student was not present.

### **From idealization to possibilities**

According to Nunes and Madureira (2015, p. 40), the UDL perspective refers to the need and relevance of professionals to develop pedagogical intervention plans that "provide diversified forms of motivation and involvement of students, which equate

multiple processes of presentation of content to learn and, finally, that enable the use of different forms of action and expression”, according to the abilities and potential of each learning subject. The instrument developed during the research for planning a class based on the UDL principles sought to meet these requirements, constituting a joint planning proposal, integrating the UDL elements in the practices already developed by the teachers to enhance their teaching and enable the access and participation of all.

The presentation of each teaching case, the educational context and the characteristics of the students, the target audience of Special Education that the participating teachers attended and would be targeted in the lesson plan structured by the UDL, fostered relevant elements for the development of the collective and collaborative planning activity. It also provided an environment with the potential for exchanging information and experience among participants who thought together about activities and strategies, based on theoretical and practical knowledge, for accessibility and learning for the whole class. Thus, the assumptions of collaboration, in conjunction with the UDL principles, proved to be powerful tools for planning more inclusive activities.

In this sense, collaboration needs to be seen by professionals as a “work philosophy among education professionals with differentiated knowledge and experiences” (RABELO, 2012, p. 53). This means having a “philosophical and critical attitude of looking at a co-worker as a partner and building a joint experience of pedagogical work in the school and classroom context” (RABELO, 2012, p. 53).

It was observed, during the training meetings, that dialogue and the exchange of knowledge took place, the teachers accepted the group’s suggestions and were motivated to increase innovations in the practices already developed by them, producing low-cost material, changing representation and expression strategies, encouraging engagement, aiming at enhancing activities for the participation and learning of all. The fact that the group took the lead in the action during the training program on UDL made the activities stimulating, as they shared their experiences, conceptions and decision-making about their actions.

The group’s involvement with the challenges raised, collectively or individually, about what was unknown to them was noted and presented through a theme that was not the domain of most participants, in this case, the UDL concept. However, all were committed to trying to share the learning acquired through the practices developed in accordance with the proposal of the training program.

To King-Sears (2014), the principles and strategies of the UDL enable professionals to delimit their goals, the activities and teaching practices that will be used and the means of assessment appropriate to each student, in order to allow access to the curriculum and the learning from everyone. Recognizing that her students have different learning styles and paces, teacher Fátima, for example, understood the need to develop multiple means for everyone’s involvement and learning.

According to Johnson-Harris and Mundschenk (2014), this teacher used her time and energy expanding the classroom dynamics. In addition to making the activity occur more naturally, the additional benefit of teaching planning based on the UDL principles was that the target students of Special Education were able to engage with the material

in a more motivated way, thus allowing their development through their skills while support can be provided. The analysis of the results of the activity of the Early Childhood Education teacher showed that the theoretical knowledge about UDL, presented in the training program, enabled the innovation of her practice, in order to engage all students to learn.

I really enjoyed the activity and especially the way it was conducted by the students. And the best thing was to see how the target student was comfortable with the activity, because at no time did he show shyness, frustration or aggressiveness with the peers who were next to him (Excerpt from the Field Diary of teacher Fátima – Early Childhood Education).

The activity developed and carried out by teacher Fátima (Early Childhood Education) seemed to have exceeded her expectations regarding the involvement and learning of students. In this sense, it can be seen that the objective of the activity was reached, as everyone's engagement occurred, the interaction of the target student with the others, orality was promoted and the students demonstrated knowledge in relation to the story and sequence of facts at the time of the retelling. According to Nunes and Madureira (2015), UDL consists of a curricular approach that helps teachers to identify and remove barriers to learning, allowing students different ways to engage and learn and, above all, reduces the need for individual curricular adaptations, favoring the development of more inclusive pedagogical practices. Thus, instead of planning two different classes, one for the target audience and the other for the class, UDL proposes a single lesson plan that is accessible to everyone.

Study participants also reflected on the importance of the school creating an environment for sharing materials and activities, a space built for this purpose, an environment for collaboration and exchange of experienced practices that could reduce the need for each teacher to build new material for each class and for each teaching situation, stimulating a collaborative work, exchanging information and ideas between them. Material built by a teacher could be used by another with different objectives, as long as virtual or real collections were developed.

Although the school environment is a collective space, it is observed that the culture of solitary work among teachers is still strong, as well as habits of storing resources and materials in locked cabinets so as not to spoil them, for example, or even the disposal of books in libraries or other school materials in places that make it impossible for students to handle them, on the grounds that it would be damaged. These habits often make it difficult to find answers to most of the difficulties presented by teachers in the act of teaching and make it impossible to implement real learning processes for students with difficulties.

Considering the challenge of this change in school culture, continuing education was seen in this study as a potential strategy for inviting experimentation with new practices in the school environment. This is what can be observed in relation to teacher Marília (6th grade), who showed resistance and a feeling of unpreparedness to teach the target student, even pointing out that she would not contribute to his learning. During the training program, she ventured into some strategies and established a partnership with the

caregiver who accompanied her. Her target student had no movements that would allow her to carry out the activities alone, so she often had the support of the caregiver.

Despite her more specific functions related to the student's mobility, hygiene and nutrition, the professional also collaborated in supporting school activities, for example, to position the text for the student's reading or in carrying out an assessment using his computer, positioning the mouse and keyboard for the best performance for the test. Teaching was provided by teacher Marília (6th grade of Elementary School), but this assistance for accessibility to the performance of activities was done by the caregiver. The effectiveness of the work in partnership carried out by the teacher and caregiver for the student's participation in school activities is perceived. Contrary to the success in the partnership reported in this experience, there is not always clarity in the roles of those involved in the schooling process of the target student of Special Education, a factor that hinders the implementation of an inclusive support service.

According to Stelmachuk and Mazzotta (2012), the performance of education support professionals in school inclusion could be improved through the implementation of public policies, actions linked to the education departments, such as the elaboration of norms for the hiring of assistants, determination of their attributions in accordance with the needs configured by the school context in which the student with disabilities is inserted and continuity in the offer of continuous and in-service training. In the context of school units, the authors suggest the role of education managers in the "systematization of guidelines for assistants, periodic evaluation of the results of their performance, guaranteeing access for teachers to student assessments and diagnoses, and systematization of the interaction between professionals in the regular teaching and specialized educational service" (STELMACHUK; MAZZOTTA, 2012, p. 200).

Focusing the educational difficulties of the target student of Special Education on the individual him/herself and labeling him/her as incapable because of his/her disability can result in the development of individualized interventions that contribute little or nothing to the student's learning and prevent the elimination of barriers in all other aspects: environmental, attitudinal, physical, among others (BOOTH; AINSCOW, 2012, p. 40), while "obscuring the difficulties experienced by children without this label. This encourages children to be seen through the lens of 'disability' rather than people as a whole".

The focus on individualized responses rather than the option to remove barriers and implement resources for the development of more inclusive practices can generate more work for the teacher and exhaustion among the professionals, which in no way contributes to the construction of an inclusive culture in school. To Nelson (2014), when teachers make an instructionally focused decision, they must focus their attention on the results for everyone. Thus, when their instructional objective is guided by the UDL, they direct the decision-making process to how to design the activities, learning instructions, and the resources needed to achieve the expected results for all students.

It was found that the activity of teacher Marília (6th grade of Elementary School) was enhanced by the UDL, as a subject that would commonly be addressed only in an expository manner involved other strategies for everyone's learning, such as the use of the orality channel and the group work, enabling the participation and development

of different tasks by everyone, according to their skills and learning styles. It is also considered that the inclusion of a Special Education teacher, acting in the co-teaching model with the teacher in the regular classroom, would allow even more activities in the classroom, as it would contribute with specific knowledge related to the target student and the strategies of accessibility to the curriculum.

Nonetheless, it was observed that the work contexts of the participants to continue the preparation and execution of lesson plans based on the UDL presented unfavorable practical aspects, such as the difficulty of partnering with other teachers at the school, the absence of Special Education professionals, precarious conditions and lack of wage appreciation for work, lack of time and space for discussion, planning in the school environment, lack of management support, among others. However, the training program fostered favorable elements, in line with most of the practices developed by them, as an opportunity to experience collaborative work during continuing education, potentialization of teaching practices already carried out, exchange and acquisition of knowledge, breaking resistance and teaching and learning barriers, the attitude of taking risks in new practices and the possibility of reflecting on practice. The encouragement of innovation in lesson plans is highlighted, which was enhanced by a variety of strategies based on theoretical knowledge about UDL, finding more viable alternatives for all students, as well as the sharing of successful and unsuccessful actions with the group of participants.

The presentation of the results of activities based on the UDL did not have the evaluative character of ascertaining whether or not the teachers were able to successfully carry out the lesson plans, but had the objective of contributing to the training process of the participants. It was observed that the training model based on the collaborative perspective allowed the teachers to detach themselves from their usual routine and comfort zone and to explore new ways of teaching, expanding their possibilities of achieving the goals with the whole class.

## **Final considerations**

The training strategies based on the theoretical assumptions of UDL and collaboration proved to be potentiating tools in the initial and continuing education of the participants. They assume the need to invest in new training models that allow professionals to experience these aspects during their training process, so that they have a framework that supports the development of teaching actions that are more consistent with the challenges that diversity implies.

In the absence of an inclusive culture at school, even if the teachers have acquired new knowledge to improve their pedagogical practice, the results showed that they often do not feel sufficiently motivated to change their practice, plan and do something different, because working conditions and school culture do not always encourage them or demand results from target students of Special Education. In this context, while an inclusive culture is not inserted in the school, a change in practices is not guaranteed, a factor that continuing education programs sometimes achieve. Although the training program does not guarantee the sustainability of teaching practices as initially envisioned,



it is important to point out the efforts of the participants in guaranteeing the schooling of target students of Special Education.

With the presentation of this study, the intention conceived was to contribute and encourage reflections on how to make viable new models of teacher education, which dialogue more closely with existing and such diverse school contexts. The training program on UDL made it possible to experience the entire process of elaboration, implementation and evaluation of a collaborative training carried out through the very principles presented to the participants.

It was highlighted that, as this is a first time experience for the participants both in carrying out an activity based on the UDL, as in building a collaborative planning, it would probably be necessary to elaborate other activities and other moments of follow-up for the teachers to confirm the permanence of these actions, which would indicate the need for more prolonged further studies. In any case, it can be affirmed that the training process and the results arising from practical and theoretical experiences enabled the learning of new knowledge and new alternatives for teaching that is intended to become increasingly inclusive.

## References

- AINSCOW, Mel; BOOTH, Tony; DYSON, Alan. **Improving schools, developing inclusion**. London: Routledge, 2006.
- ALVES, Maria Manuela; RIBEIRO, Jaime; SIMÕES, Fátima. Universal design for learning (UDL): contributos para uma escola de todos. **Indagatio Didactica**, Aveiro, v. 5, n. 4, p. 121-146, 2013.
- BASTOS, Fabio Bernardo; HENRIQUE, Jose. Pesquisa colaborativa: do isolamento docente a partilha entre pares. *In*: IBIAPINA, Ivana Maria Lopes de Melo; BANDEIRA, Hilda Maria Martins; ARAUJO, Francisco Antonio Machado (org.). **Pesquisa colaborativa: multirreferenciais e práticas convergentes**. Teresina: UFPI, 2016. p. 301- 319.
- BEAUCHAMP, Jeanete. Educação especial: relato de experiência. *In*: PALHARES, Marina Silveira; MARINS, Simone Cristina (org.). **Escola inclusiva**. São Carlos: UFSCar, 2002. p. 99-104.
- BOOTH, Tony; AINSCOW, Mel. **Index para a inclusão: desenvolvendo a aprendizagem e a participação nas escolas**. Rio de Janeiro: Lapeade, 2012.
- BRASIL. Grupo de trabalho da política nacional da educação especial. **Política de educação especial na perspectiva da educação inclusiva**. Brasília, DF: MEC/SEESP, 2008.
- BUENO, José Geraldo Silveira. As políticas de inclusão escolar: uma prerrogativa de educação especial? *In*: BUENO, José Geraldo Silveira; MENDES, Geovana Mendonça Lunardi; SANTOS, Roseli Albino (org.). **Deficiência e escolarização: novas perspectivas de análise**. Araraquara: Junqueira & Marin, 2008. p. 43-63.
- CAPELLINI, Vera Lúcia Messias Fialho. **Avaliação das possibilidades do ensino colaborativo no processo de inclusão escolar do aluno com deficiência mental**. 2004. Tese (Doutorado em Educação Especial) – Centro de Educação e Ciências Humanas, Universidade Federal de São Carlos, São Carlos, 2004.

CAST UDL BOOK BUILDER. Book Builder, 2013. **Homepage**. Disponível em: <http://bookbuilder.cast.org/>. Acesso em: 16 mar. 2019.

INEP. Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira. **Sinopses estatísticas da educação básica**. Brasília, DF: INEP, 2002. Disponível em: <http://portal.inep.gov.br/web/guest/sinopses-estatisticas-da-educacao-basica>. Acesso em: 20 maio 2020.

INEP. Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira. **Sinopses estatísticas da educação básica**. Brasília, DF: INEP, 2019. Disponível em: <http://portal.inep.gov.br/web/guest/sinopses-estatisticas-da-educacao-basica>. Acesso em: 20 maio 2020.

JOHNSON-HARRIS, Kimberly; MUNDSCHENK, Nancy. Working effectively with students with BD in a general education classroom: the case for universal design for learning. **The Clearing House**, London, v. 87, n. 4, p. 168-174, 2014.

KING-SEARS, Peggy. Introduction to learning disability quarterly special series on universal design for learning: part one of two. **Learning Disability Quarterly**, Thousand Oaks, v. 37, n. 2, p. 68-70, 2014.

KOVALESKI, Joseph; BLACK, Lynanne. Multi-tier service delivery: current status and future directions. *In*: GLOVER, Todd; VAUGHN, Sharon (ed.). **The promise of response to intervention: evaluating current science and practice**. New York: Guilford, 2010. p. 23-56.

LOPES, Alice Ribeiro Casimiro. Pluralismo cultural: preconizando o consenso ou assumindo o conflito? **Espaço**, Rio de Janeiro, n. 8, p. 31-37, 1997.

MIZUKAMI, Maria da Graça Nicoletti *et al.* **Escola e aprendizagem da docência**: processos de investigação e formação. São Carlos: UFSCar, 2003.

NELSON, Loui Lord. **Design and deliver**: planning and teaching using universal design for learning. Baltimore: Brookes Publishing Company, 2014.

NUNES, Clarisse; MADUREIRA, Isabel Pizarro. Desenho universal para a aprendizagem: construindo práticas pedagógicas inclusivas. **Da Investigação às Práticas**, Lisboa, v. 5, n. 2, p. 126-143, 2015.

RABELO, Lucélia Cardoso Cavalcante. **Ensino colaborativo como estratégia de formação continuada de professores para favorecer a inclusão escolar**. 2012. Tese (Mestrado em Educação Especial) – Centro de Educação e Ciências Humanas, Universidade Federal de São Carlos, São Carlos, 2012.

STAINBACK; Susan; STAINBACK, William. **Inclusão**: um guia para educadores. Porto Alegre: Artmed, 1999.

STELMACHUK, Aná Cristina da Luz; MAZZOTTA, Marcos José da Silveira. Atuação de profissionais da educação na inclusão escolar do aluno com deficiência intelectual. **Educação Especial**, Santa Maria, v. 25, n. 43, p. 185-202, 2012.

TOLEDO, Elizabete Humai; VITALIANO, Célia Regina. Formação de professores por meio de pesquisa colaborativa com vistas à inclusão de alunos com deficiência intelectual. **Revista Brasileira de Educação Especial**, Marília, v. 18, n. 2, p. 319-336, 2012.

VILARONGA, Carla Ariela Rios. **Colaboração da educação especial em sala de aula:** formação nas práticas pedagógicas do coensino. 2014. Tese (Doutorado em Educação Especial) – Centro de Educação e Ciências Humanas, Universidade Federal de São Carlos, São Carlos, 2014.

VITALIANO, Célia Regina; MANZINI, Eduardo José. A formação inicial de professores para inclusão de alunos com necessidades educacionais especiais. *In:* VITALIANO, Célia Regina. **Formação de professores para a inclusão de alunos com necessidades educacionais especiais.** Londrina: UEL, 2010. p. 49-112.

WANG, Margaret; REYNOLDS, Maynard; WALBERG, Herbert. **Handbook of special and remedial education:** research and practice. Oxford: Pergamon, 1995.

WANG, Mian; FITCH, Paul. Preparing pre-service teachers for effective co-teaching in inclusive classrooms. *In:* FORLIN, Chris (org.). **Teacher education for inclusion:** changing paradigms and innovative approaches. London: Routledge, 2010. p. 113-119.

ZERBATO, Ana Paula. **Desenho universal para a aprendizagem na perspectiva da inclusão escolar:** potencialidades e limites de uma formação colaborativa. 2018. Tese (Doutorado em Educação Especial) – Centro de Educação e Ciências Humanas, Universidade Federal de São Carlos, São Carlos, 2018.

*Received on February 05, 2020*

*Reviewed on May 14, 2020*

*Approved on June 30, 2020*

**Ana Paula Zerbato** is a professor at the Faculty of Education at the University of São Paulo (FEUSP), at the Department of Teaching Methodology and Comparative Education, in the area of Special Education. Master's and PhD in Special Education from the Federal University of São Carlos.

**Enicéia Gonçalves Mendes** is a professor at the Federal University of São Carlos, at the Department of Psychology, at the Postgraduate Program in Special Education. She is the coordinator of the National Observatory for Special Education (ONEESP), leader of the Research Group on Human Resources Training in Special Education (GP-FOREESP).