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Use of Graphic Systems in the Routine of a Regular Classroom With a Disabled Student

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Use of Graphic Systems in the Routine of a Regular Classroom with a Disabled Student
Abstract: The school environment adapted to the diversity of students is an important goal, but it is a challenge when it comes to the diversity of students with disabilities. The aim of this study was to describe the use of graphic systems in the routine of a preschool classroom through a collaborative program. The study included a teacher, 22 children of a preschool classroom in a school located in a

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large city southeastern Brazil, the mother of a child with disabilities and a special education teacher. A program of collaborative action was carried out among the researcher, the teacher and the students to insert the graphic system in the routine of educational activities for four months. The activities were recorded through a log book, filming and digital recording of interviews. The results obtained from the analysis of the themes identified that the children used the graphic system in the routine of the school tasks, the graphic system helped children in reading the words, the teacher facilitated the insertion of the graphic system from the mediation of the researcher, and the routine of educational activities planned by the teacher facilitated the insertion of the graphic system in the classroom among the students. The study reinforced the need for a training program aimed at school partners to include students with disabilities.
Keywords: special education; inclusion; augmentative and alternative communication; teacher training

El uso de Sistemas Gráficos en la Rutina de la Clase Regular con un Estudiante Discapacitado

Resumen: El ambiente escolar adaptado a la diversidad de los estudiantes es una meta importante, pero es un reto cuando se trata de la diversidad de los estudiantes con discapacidades. El objetivo de este estudio fue describir el uso de sistemas gráficos en la rutina de una clase de alumnos preescolares a través de un programa de colaboración. El estudio incluyó a un maestro, a 22 niños de una clase de preescolar en una escuela de una gran ciudad en el sureste de Brasil, la madre de un niño con discapacidad, y un maestro de educación especial. Un programa de acción de colaboración fue realizado entre el investigador, el profesor y los estudiantes para insertar el sistema gráfico en la rutina de actividades educativas durante cuatro meses. Las actividades fueron registradas a través de un libro de registro, filmación y grabación digital de entrevistas. Los resultados obtenidos a partir del análisis de los temas identificaron que los niños usan el sistema gráfico en la rutina de las tareas de la escuela, el sistema gráfico ayudó a los niños en la lectura de las palabras, el maestro facilitó la inserción del sistema gráfico a partir de la mediación de la investigadora, y la rutina de las actividades educativas programadas por el profesor facilitó la inserción del sistema gráfico en la clase entre los estudiantes. El estudio ha reforzado la necesidad de un programa de formación dirigido a los interlocutores de la escuela para incluir a los estudiantes con discapacidades.
Palabras-clave: educación especial; inclusión; comunicación aumentativa y alternativa; formación del profesorado

Uso de Sistemas Gráficos na Rotina da Sala de Aula Regular com Aluno com Deficiência

Resumo: Adequar o contexto escolar para a diversidade de alunos é uma meta importante, mas é um desafio frente à diversidade de alunos com deficiência. O objetivo deste trabalho foi descrever o uso de sistemas gráficos na rotina de uma sala da educação infantil por meio de um trabalho colaborativo. Participaram do estudo uma professora, 22 alunos de uma sala de aula da educação infantil de uma escola de uma cidade de grande porte na região sudeste do Brasil, uma mãe de uma criança com deficiência e um professor de apoio. Foi realizado um programa de ações colaborativas entre a pesquisadora, professora e os alunos da sala para inserir o sistema gráfico na rotina de atividades pedagógicas durante quatro meses. As atividades foram registradas por meio do diário de campo, filmagens e gravação das entrevistas realizadas por meio do protocolo. Os resultados obtidos por meio da análise de temas mostraram que as crianças usaram o sistema gráfico na rotina de atividades, o sistema gráfico auxiliou as crianças na leitura das palavras, o professor inseriu o sstema gráfico a partir da mediação da pesquisadora e, a rotina das atividades pedagógicas planejada pelo professor facilitou a inserção do sistema gráfico na sala de aula entre os alunos. O trabalho reforçou

a necessidade de um programa de capacitação dos interlocutores da escola para incluir o aluno com deficiência.
Palavras-chave: educação especial; inclusão; comunicação ampliada e alternativa; formação de professores

Introduction

Since the 1960s, researchers have argued that augmentative and alternative communication systems (AAC) could turn into supports, alternative or even replace the spoken language to facilitate and promote the acquisition and the development of language in children with motor disorders, language disorders, autism, and learning disorders (Nunes, Quiterio, Walter, Schirmer, & Braun, 2011; Von Tetzchner & Grove, 2003). The authors have also emphasized that although the augmentative and alternative communication (AAC) systems could promote access to the different meanings of shared and constructed ideas, they would enable to identify difficulties in their use. The barriers could be related to modifying or expanding the understanding of AAC users on a communication system which is not always shared by the linguistic community, and how to work the attitudes considering the values offered to alternative possibilities of communication before the ability to speak (Delgado 2011; Deliberato, 2013).

Nonspeaking children and youth do not find other AAC competent users or partners in the environment to provide them with support to the alternative communication forms in daily situations. The communicative interactions often occur during the therapeutic intervention sessions or during the programmed educational situations (Alves, 2006; Binger & Light, 2007; Light & McNaughton, 2013; Sameshima, 2006).

The successful start of expressive possibilities, i.e., expressive language, is dependent on the professional knowledge and attitudes of the people working with nonspeaking children and youth. These children and young adults can develop, with their family members, forms of communication, such as gestures, gaze direction, vocalizations and facial expressions, but they all rely on intervention programs to learn the linguistic systems.

The early intervention with augmentative and alternative communication may be critical for the development of language and the development of communication and social skills. Children and youth with disabilities could benefit from early intervention programs, to change from passive to active role in communicative activities (De Coste, 1997; Quiterio & Brando, 2011).

The literature has been emphasizing the importance of augmentative and alternative communication systems in providing not only a variety of pragmatic functions, but also in developing a potential for language acquisition and development, and in facilitating the underlying competences to comprehension and production of generated language skills (Light, 2003; Light & McNaughton, 2013; Mirenda & Locke, 1989).

Gulens, Kerbel, and Nobel (2006) considered the importance of professionals being aware of the kinds of strategies needed in intervention process with children and young people with complex communication needs. These authors emphasized that, at the moment of organizing and planning the strategies, professionals should identify and recognize the level of communicative skills already used by the children and youth. Thus, the intervention programs could contribute to the increase of communication skills in a more functional way (Delagracia, 2007; Deliberato, Manzini, & Guarda, 2004; Fernandes, 2001; Paula, 2007).

Intervention programs could support the development of linguistic competence of children and youth with complex communication needs. Disabled persons need to master the natural language of their environment. In addition they will have to learn a system of representation that can

ensure the quality of new learning and thus provide access to interaction and communication with different people (Beukelman & Mirenda, 2007; Deliberato, 2013; Nunes et al., 2011).

The challenge for the development of linguistic competence is greater for children who use AAC, at least for three reasons: 1) there is a significant difference between language input received by individuals who employ AAC and the language output used by them; 2) communication through AAC is typically multimodal, combining multiple linguistic codes to express meanings (e.g., hand signals, conventional gestures, pictures, graphic symbols); and 3) many of AAC systems do not have any link with a natural language, lacking phonological, semantic, syntactic, and pragmatic aspects (Light, 2003; Binger & Light, 2007; Light & McNaughton, 2013).

The literature in this area has argued that it is a challenge to systematize intervention programs based on augmentative and alternative communication systems, because of the diversity of people with disabilities who need resources for communication. The same literature has also considered that it is a great challenge to insert augmentative and alternative communication systems in different environments to both enhance the communicative possibilities and provide means to develop competent communication partners in the use of representation systems that are not employed in the general community (Deliberato, 2011, 2013; Schirmer & Nunes, 2011).

Discussing about augmentative and alternative communication systems is to think not only in the skills and needs of people with disabilities, but also to equip the partners, adjust the environment, activities, and tasks to be performed by nonspeaking children and youth with disabilities.

The concern of professionals and researchers to ensure the permanence of students with disabilities in regular schools has called for theoretical and practical actions, both in teachers' education and the implementation of programs involving partnerships between professionals from different areas (Deliberato, 2009, 2013; Deliberato & Manzini, 2006; Nunes et al., 2011; Schirmer, 2011).

Research studies have showed that the use of resources and strategies involving augmentative and alternative communication systems favors not only communicative skills, but also enables the participation of nonspeaking students with disabilities in educational activities programmed by the teacher (Deliberato, 2009; Rocha & Deliberato, 2012).

According to Brekke and von Tetzchner (2003), and Soto and Von Tetzchner (2003), full inclusion means admitting both that nonspeaking students with disabilities have competence in using augmentative and alternative communication, and that the resources and instruments should be used beyond the communicative function, i.e., they should be available in the routine activities of the students' classroom (Sameshima, 2011).

The school could be an important environment to foster the necessary support for children and youth with disabilities, the use of augmentative and alternative communication systems (Deliberato & Manzini, 2006; Von Teztchner, Brekke, Sjothun, & Grindheim, 2005). In fact, the school has two challenges: to ensure both the support for the communicative skills of nonspeaking students with disabilities and the participation of these students in the curriculum pedagogic activities.

Adapting the school environment to the diversity of students is an important goal, but it is a challenge given the diversity of students with disabilities. The literature has discussed the need to train teachers in the use of different assistive technology resources (Schirmer, 2011).

The definition of assistive technology is broad, involving different scientific areas so that its use addresses the different needs of people with disabilities, providing them with quality of life (WISE, 2012).

It is noteworthy that Brazilian law defines the term Technical Aids as a synonym of Assistive Technology. Technical aids were described in Article VII of Decree 5296 on December 20, 2004,

which regulates the National Policy for the Integration of Persons with Disabilities. They refer to the products, tools, adapted or specially designed equipment to improve the functionality of the person with disability or reduced mobility, encouraging fully or assisted personal autonomy (Brazil, 2004).

The Technical Aids Committee (TAC) was created by the Special Secretariat for Human Rights of the Presidency of the Republic (SSHR/PR) and consists of a Brazilian group of experts and representatives of government agencies. The Technical Aids Committee modified the proposed definition presented in Brazil (2004) and adopted the following definition and concept for Assistive Technology:

> Assistive Technology is an area of knowledge of an interdisciplinary feature, which encompasses products, resources, methodologies, strategies, practices, and services that aim to promote functionality related to the activity and participation of people with disabilities, disability or reduced mobility, aiming their autonomy, independence, quality of life and social inclusion. (Cat, 2007)

In this context, the regular classroom teacher and the regular students should be trained in the use of adapted resources and strategies to participate in academic tasks together with a disabled child. The augmentative and alternative communication resources have been critical for the disabled child's learning and the literature discussed their inclusion in school through collaborative work (Deliberato, 2013; Rocha, 2013).

The proposal of collaborative work is to bring the expertise of different specialists for the school context. This operating model aims to contribute to intervention strategies proposed to solve problems experienced by teachers in school. These results should encourage the construction of possibilities that enhance the educator's work and meet the needs of students with disabilities. The expert´s role is to assist the teacher to both build strategies and identify the skills of their students so that they can develop academic skills effectively. Collaboration is an intervention model proposed to both design and implement an educational plan that must be considered and supported by all those involved in the process (Machado; Bello, & Almeida, 2012; Mendes, 2008).

The assumption of this model is the responsibility of the researcher to help teachers better understand the practice of teaching, not just participating and bringing innovations, but helping to rebuild the knowledge in school context and raise teachers' awareness to the need for ongoing formation (Capellini & Mendes, 2007).

The collaborative work in school also aims to solve problems in the school setting and reduce the need for referrals students to specialists from different fields, promoting intersectoral work. Expert professionals are beginning to recognize the need to offer support to school teachers, becoming partners in this perspective, performing joint and collaborative work, through the sharing of knowledge for the solution of problems in the school setting (Machado, Bello, & Almeida, 2012).

Considering these issues, the aim of this study was to describe the introduction of graphic systems in the routine of a preschool classroom through collaborative work between the researcher and the teacher.

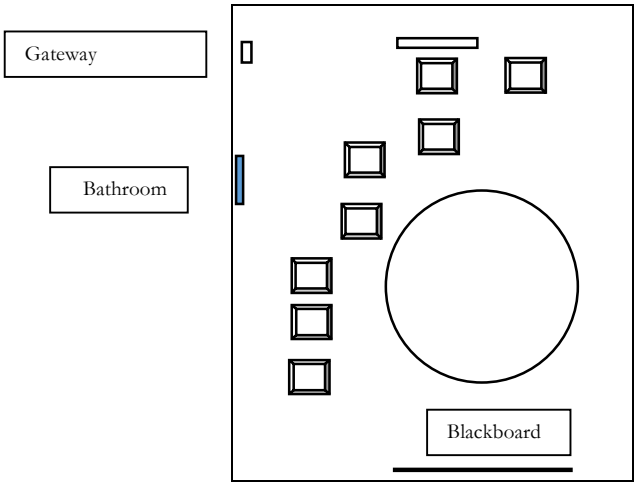
Method

This study is part of a larger research: Alternative Communication Technologies: resources and procedures for preschool students with disabilities; with the approval of Ethics Committee number 0446/2012. The informed consent form was signed by the participants and their parents. The selected school for this study was indicated by a specialized institution in monitoring students with disabilities in regular schools in a city the southeastern region of Brazil. The selection criteria

for the classroom in the specified school was the lack of experience with students with disabilities in preschool.

This study involved a 45-year-old teacher, 22 students in a kindergarten classroom at a school in the selected city, a Special Education Service teacher (SES) and the mother of Ana[1], a disabled child with six years and four months old. The activities were conducted in the classroom.

There were 22 students in the classroom: 17 girls and five boys, between four and six years old. According to the teacher's report, the classroom had novice students and students who could recognize the name, letters, numbers, and were establishing their hypothesis for writing. The teacher also reported that, in addition to the student with disabilities, there were students with difficult behavior who needed help from professional experts. As reported by Ana's mother and as the observations made in the classroom by the researcher showed, the girl was not able to understand the routine of the classroom, nor to interact with the other kids or even the teacher. She did not have, nevertheless, a definite diagnosis. The disabled student could remain for a short period of time on the tasks, even when they were especially tailored to her, and emitted sounds unintentionally, but sometimes she pronounced the final syllable of words, without directing her verbal response to a particular partner. The general behavior of the child was dispersed: she walked out of the classroom several times and demanded the support of her mother or the special education service teacher to return to the classroom. At the beginning of the research, Ana carried out activities outside the context of the classroom and could remain in some tasks in the classroom when the SES teacher was present. The physical structure of the classroom consisted of eight tables to accommodate four children in each one to perform tasks such as use of painting, writing, among others. These tables were close to the teacher's desk and next to the wall, near the bathroom. There was also a space near the blackboard designed to arrange all the students in a circle in order to develop the initial activities of the routine as soon they arrived at the classroom: "a chamadinha" (a warm-up activity), followed by the completion of the collective and individual calendar. At the end of the class, again the students gathered together in a circle for the explanation about the homework and other free activities. Figure 1 below illustrates the arrangement of the classroom.



Source: production of the first author.

Figure 1. Schematic layout of chairs and circle in the classroom.

[1] Fictious name

For data collection, the following instruments were used: protocol for assessing nonspeaking students' communicative skills in family setting (Delagracia, 2007) and the protocol for assessing nonspeaking students' communicative skills in school setting (Paula, 2007). In addition to the protocols, observation records of the classroom routine through a log book (Falkembach, 1987; Fonseca, 1999), and filming of the activities involving the child with disabilities were performed. The activities planned for the selected program were made using concrete materials (objects), pictures, pictographic images from Picture Communication Symbols communication system (Mayer-Johnson, 2004).

Organization of Information Collection

The planned and organized activities were performed according to the model of intervention program in schools proposed by Deliberato (2009, 2011, 2013), for a period of four months.

Table 1, below, describes the organization of the program and the data collection instrument:

Table 1
Description of Activities, Time of Observation and Recording Instruments

Day	Activities	Observation time	Recording instrument	Program steps
22/08/2013	Contact with institutions and school.			
26/08/2013	Authorization by the family. Observation of the classroom students with the Resource Classroom teacher.	30min	Continuous recording	Step 1
Period to obtain City Hall and Regional Coordinator of Education (RCE) approval of the project				
17/09/2013	School - coordination - Delivery of the of the city hall and RCE authorization. Discussion about the student selection with school board, educational coordinator and teacher.	40min	Continuous recording	
26/09/2013	Interview with the disabled student's mother from the selected classroom	52min13s	Audio recording	Step 2
04/10/2013	Classroom observation: characterization of routine Description of student characteristics through teacher's report (protocol).	4h30min	Continuous recording	
10/10/2013	Meeting with the coordinator.	4h30min	Continuous recording	

Table 1 (Cont'd.)
Description of Activities, Time of Observation and Recording Instruments

16/10/2013 17/10/2013	Routine observation. Discussion with the teacher about the school plan: insertion of adapted resources	4h30min	Continuous recording	Step 3
18/10/2013	Use of adapted resources in the classroom routine (previously assessed). Introduction of new resources: students and teacher assessment	4h30min	Continuous recording	
21/10/2013	. Use of adapted resources in the classroom routine. Guidance for the teacher. Visit to the Special Education Teacher.	4h30min	Continuous recording	
24/10/2013	Use of adapted resources in the classroom routine. Guidance for the teacher. Participation of the researcher in the routine.	4h30min	Continuous recording	
25/10/2013 01/11/2013	Use of adapted resources in the classroom routine. Guidance for the teacher. Participation of the researcher in the routine. Discussion on the resource for the student with disabilities.	4h30min	Continuous recording	
04/11/2013 07/11/2013 08/11/2013 11/11/2013 14/11/2013	Use of adapted resources in the classroom routine. Guidance for the teacher. Participation of the researcher in the routine. Discussion about the resource for the student with disabilities. Use of adapted material with the disabled student.	4h30min	Continuous recording	
29/11/2013	Guidance and discussion of the plan with the SES teacher.	1h 30min	Audio recording	
02/12/2013 09/12/2013	Use of adapted resources in the classroom routine. Guidance for the teacher. Participation of the researcher in the routine.	4h30min	Continuous recording	
12/12/2013 13/12/2013	Use of adapted resources in the classroom routine. Guidance for the teacher. Participation of the researcher in the routine. Discussion about the resource for the student with disabilities.	5h30min	Continuous recording	

Table 1 (Cont'd.)
Description of Activities, Time of Observation and Recording Instruments

18/12/2013	Assessment with the school board and the teacher.	2h30min	Continuous recording	Step 3 Assessment
20/12/2013	Assessment with the school coordinator.	1h20min	Continuous recording	

Source: Produced by the first author

Procedures

As shown in Table 1, the data collection was divided into three steps, as described by Deliberato (2009, 2011, 2013). The first step was devised to establish contact with the selected school and solving ethical issues requested by the Board of Education. Upon the permission of the responsible authorities, a first meeting with the school principal and coordinator was arranged at the school to discuss the criteria to select the classroom that would be participating in the program

Still in step 1, an initial contact with the selected teacher was scheduled and the teacher described the behavior of the student with disabilities, through the communicative skills protocol (Paula, 2007). During that first contact, it was possible to identify that the teacher had been aware of the behavior of the disabled student and had already contacted the Special Education Services (SES).

Then in step 2, it was possible to gather more information about the child with disabilities through the use of the communicative skills protocol applied to the mother of the disabled student (Delagracia, 2007). Also, in this step, it was possible to observe, present and discuss the adapted resources, using graphic systems, with the teacher and the other students in the classroom.

In step 3, as shown in Table 1, adapted resources constructed with graphic systems were used for the activities planned by the teacher with the aid and guidance of the researcher. At this step, the work of the researcher together with the teacher and other students was important for the collaborative actions (Rocha, 2013). At the end of step 3, an assessment of the work involving the teacher and the researcher was made.

Organization of the Information for Analysis

The audio recording of the protocol with the mother was fully transcribed, as well as the films shot during the use of adapted resources to the student with disabilities. The information from the log book was organized chronologically, the transcripts of the films and digitally recorded information were incorporated to the sequence of continuous recording done through the log book (Fonseca, 1999) to compose one single written text, for the purpose of data triangulation analysis according to Triviños (1992). This proposed analysis allowed the articulation of different sources of data collections constituting a single written text (Minayo, 2005; Triviños, 1992).

Data Analysis

After structuring and organizing information in a written text, themes were identified according to Bardin (2004). Significant selected units were defined as theme and sub-themes. From the written text it was possible to identify the following themes and sub-themes described in Table 2:

Table 2
Themes and Subthemes

Theme	Sub-theme
Classroom Routine	Pedagogical Activities
	Play Activities
Adapted Resource	Use of graphic systems with classroom students
	Use of graphic systems with the presence of the disabled student
Mediation of professionals in activities	Mediation of the teacher
	Mediation of the researcher
	Joint Mediation
Teacher's degree	Initial Training
	Continuing Education
Assessment	Characteristics of students
	Adapted Resource
	Students' performance
	Working Conditions in the classroom

Source: Produced by first author

The theme Classroom Routine was defined as the activities planned by the teacher and performed by the students during the school day. The sub-themes identified were: pedagogical activity and play activity.

The definition of Activity was supported by Rocha (2013): it is understood that the activity involves several tasks in sequence, i.e., to carry out an activity, several actions are required by the person who performs them. Thus, Pedagogical Activity was defined as the accomplishment of tasks planned by the teacher and performed by the students in the classroom routine. On the other hand, the Play Activity was the sequence of tasks performed by the students using different resources freely, without prior planning of the task sequence.

According to Rocha (2010), Resources are understood as school materials, teaching materials, games, toys, utensils used during meals and hygiene tasks by the student, resources used for positioning, and other materials and utensils, in addition to CDs of songs, storybooks and poetry used by the student in the school context. The author defined as Adapted Resources materials that are modified to attend the student with disabilities needs including adapted pedagogical resources in order to expand their motor, perceptual, communicative, and pedagogical performance. The sub-themes Use of Adapted Resource for Classroom Students and Use of Adapted Resource for Disabled Students refer to the person who used the adapted resource in the school routine.

The definition of the theme Mediation was supported in the definition proposed by Obelar (2011) and adjusted for the present study, i.e., mediation refers to the role of the educator who is in the classroom, helping the children with or without disabilities to perform school activities, through adapted and differentiated materials to develop, to learn and to experience school situations. The sub-themes identified relate to persons who performed the mediation, whether the teacher, the researcher, the Special Education Service (SES) teacher and even a joint action of these professionals.

The theme Teacher Training was defined by all theoretical, practical and theoretical-practical information carried out with the regular classroom teacher or SES teacher. The sub-theme Initial Training was defined as all information regarding the initial training of the teacher and the sub-theme Continuing Education was the teacher's report about her in-service training and (verbal and

nonverbal) orientations given by the researcher about the necessary adjustments for students with disabilities in the classroom.

On the theme Assessment, the following sub-themes were identified:

Assessment on Characteristics of Students: all information obtained regarding the students´ abilities and needs.

Performance was defined as the production and quality of the student's action while participating in activities using the existing conventional and adapted resources in school, i.e., the results obtained by the student through her participation (Rocha, 2013).

Assessment of Working Conditions in the Classroom is the information about the physical conditions of the environment, as well as the pedagogical teaching materials used routinely.

After identifying the themes and sub-themes of the written material, examples of each sub-theme were selected and sent to the evaluation of the agreement index. The criterion for the selection of examples was: select three examples of each sub-theme, two of greater difficulty in its characterization and one characteristic example of the defined sub-theme. In the assessment, the level of agreement between the researcher and the judge was 82.85%, and between the judge and researcher B was 96.6%. Given these results, the proposed and defined themes and sub-themes showed agreement and according to Carvalho (1996).

Results and Discussion

In this study the themes and sub-themes related to the proposed objective were analyzed: describing the use of graphic systems in a preschool classroom routine through a collaborative program. It is noteworthy that the samples were obtained through a single written text from different sources as the continuous recording information in the log book, transcripts of interviews with the mother and teacher and the filmed observational sessions. Following, the captions used for the selected examples for the themes and their respective sub-themes are described:

R: Researcher
CT: Classroom teacher
SES: Special Education Service teacher
M: Mother of the disabled student
C: Pedagogical Coordinator
P: Principal
VP: Vice-Principal
D: Disabled student
CS: Classroom Students
The names of the students are fictional: Maria, Fábio, Miguel, João.
( ) in brackets are de descriptions of the context for the perfomed activities to expand the understanding on the information obtained through continuous record.

Theme: Classroom Routine - Sub-theme: Pedagogical Activities

The identification of the school routine may help the insertion of materials adapted to the diversity of students in the classroom. Professionals and researchers working with the classroom teacher could, from the identification of routine activities, adapt resources to enable inclusion and enhance the participation of students in pedagogical activities, as the student with disabilities (Rocha, 2010). The following examples illustrate the routine activities according to the information from the teacher's plan:

Example 1. contact with the teacher during recess.

Context: Presentation of the classroom routine through the identification protocol of communication skills.

CT: our routine is displayed on the wall: Monday is Sharing Day, Tuesday is arts class and physical education; Wednesday is physical education and reading room activity; Thursday is the day to watch a DVD; and Friday is the day of Book Circle. (each day was represented by a drawing following the sequence of the weekdays on the wall).
R.: then the children already know what they will be working on?
CT: we have a routine, but sometimes it changes because we do not have the material, as in the case of the DVD player, which is broken. I've been working with stories a lot. I tell a story on Monday and then I work the content throughout the week. As the theme of the caterpillar. We have already had a picnic, photos and story too. But I follow the routine and they already expect it.

Example 2. classroom observation

Context: after the teacher called the students' names in the record book, she performed a "chamadinha" (warm up activity). The activity was intended to teach students to recognize written names. Each day the teacher had a different procedure, but in the end all the students put their own written names on a wooden panel in the wall.

CT: I'll put all your names that are written on this card on the floor (each student had his name written in capital letter in an orange cardboard). I'll call one of you to look up the name of one of our colleagues. Then, João looks up the name of Maria (fictitious names). Children, which is the first letter of the name Maria?
CS: letter M.
CT: Yes, very well, the same first letter as in Miguel (fictitious name).
CS: Fábio (fictitious name) stands up and points to letter M from the alphabet on the wall over the blackboard.
CT: Yes, that's right Fábio. You may put the name on "chamadinha" (wooden panel fixed to the wall)
CS: João puts the colleague´s name on the wooden board fixed to the wall ("chamadinha") and gets back to the circle. He puts the selected name under the girls' names column.

Exampes 1 and 2 enable identifying both from the teacher's report and the observation recording of the activity the teacher concern in organizing the tasks to be performed by students. Rocha (2013), in her research, found that routine planning through pre-established tasks allow the possibility to analyze the activity and adapt it, when necessary, for students that need assistive technology.

Examples of the sub-theme "use of graphic system with students" may describe the insertion of resources from the routine systematicity established by the teacher, as seen below:

Theme: Adapted Resource - Sub-theme: Use of Graphic Systems With Classroom Students

Example 3. classroom observation

Context: researcher introduces the adapted resource in the classroom presenting the material with the teacher and discussing it with students.

CT: The R. brought a very beautiful material for the class. She will work with A., but she has thought of you all. Everything she will carry out with A., she also thought of you. She wants to help. It's cool, very cool. I would like to thank, from the bottom of my heart, everything R. did.

R: I do appreciate the opportunity to work with you. (Then the researcher takes the material and puts in front of all children sitting in circle and starts the activity with the adapted resource)
R: You see this calendar is similar to what you already have in the classroom. It is not ready yet, but you will help me. Look, let's see the days of the week. (researcher goes on pointing the content on the calendar). Here, it is written: month. Let's read together.
R and CS: Oc-to-ber (R read with students offering support while reading with a finger on every syllable of the printed word). Look here we have the year: 2013. I also have done the written words of the other months and years for you to use later. Here, it is written Sunday: it is red: another week starts. Let's see the rest.
CS: Monday, Tuesday ... (R. provides verbal and visual support indicating with finger each syllable of the word read).
R: Here is Saturday. Look it is red: it is the last day of the week. Then it starts all over again. Here are the numbers, but I'll show the pictures of the weather, so then I can do more and leave with you. Here are the images of rain, sun, heat, cloudy. These pictures will help you to fill the calendar that belongs to you and A.

Exemplo 4. classroom observation
Context: R. introduces the adapted resource related to the arrangements the teacher and students use.

R: Do you remember you helped me write the arrangements? So I brought the pictures so you can tell me if you think they are good, and what you and the teacher think of the material.
CS: At the moment the kids were taking pictures, they noticed the writing and put their fingers to try to read.
CS: This picture is rain (Thais said)
R: That's right, let's read what is written. At this moment the teacher helped the student picking on her finger and reading: ra-in. And did the same with the other pictures.
CS: Those children who could not read, but could recognize the pictures were trying to read the printed words with the support of the finger, from the recognition of the pictographic image.
R: Look at this picture. The R. showed the picture that represents standing in a row.
CS: What is this?
CT: it is one person after another. It is a row.
R: the researcher went on showing each image representing the arrangement, indicating the printed word above the picture. (arrangements: washing hands, queuing , sitting in a circle,being silent, washing face, preventing from hitting the friend, helping friend, and putting away the material). After showing the pictures of the arrangements, the R. asked: is there any arrangement missing?
CT: No, it's good enough.

Examples 3 and 4 describe the researcher together with the students and the teacher assessing and adjusting the graphic systems images for the tasks and content that are part of their routine, such as the calendar and the arrangements established by the teacher and students to organize the classroom rules. It is noticeable that when the R. and the students explore and discuss about the content and format of the material, the students end up involved with visual stimuli that convey meaning and

provide the performance of the task, such as reading, for those students who are unable to perform it.

Massaro (2012) organized and implemented an intervention program using graphic systems in collaboration with the teacher in a preschool classroom for students with severe disabilities and students without disabilities. The author described the increased participation of students with disabilities in the routine tasks set by the teacher's planning and identified the interest and the ease of non-disabled children in the use of graphic images, especially in songs used in pedagogical and play activities.

In addition to these issues highlighted by the researcher, it is also noteworthy that the involvement of the students with graphic systems may allow the acquisition of competence in using the graphic system with students with disabilities (Alves, 2006; Deliberato 2012). The literature has discussed the need for students with disabilities to be in environments adapted to the diversity of alternative communication forms, considering the school as an important means to support these languages (von Teztchner, 2009).

In the following sub-theme, it is possible to identify the use of the graphic system targeted to the student with disabilities, but with the involvement of other students:

Sub-theme: Use of Graphic System With the Presence of the Student With Disabilities

> **Example 5**. Classroom observation
> Context: use of adapted calendar with students and A.
> CT: Wat day was yesterday?
> CS: Suday
> CT: Did you have class?
> CS: No.
> CT: So let's place a picture with an X
> R: The researcher went to the cabinet and grabbed the graphic systems material. Each drawer had an image representing the content. Look: each drawer has a picture: sun, rain, wind.
> CT: Look! This drawer has the sun. The sun is in the yellow drawer.
> R: At this moment, the researcher grabbed the enlarged and EVA material (adapted paper) for A. and places them right next to her. A. tries to pick up the box of materials and R. says: A., let's pay attention. A. lies down, and this time, the teacher is explaining the lettuce task and goes to the board and writes the word lettuce. The researcher takes the black support with lines of Velcro and the basket of letters and tries to write the word "lettuce" to A. (support for the teacher's speaking and writing). Meanwhile, the kids also want to handle the material and A. tries to get the material to take off and put on the Velcro.
> CS: The children become very interested in the material and begin to spell out the letters and seek them, and with their finger they perform the reading. They go on spelling letter by letter, especially Thais (fictitious name).

The actvity with the calendar is part of the daily routine of the classroom. The material had already been presented and used with students in the classroom without the presence of child with disabilities. Example 5 describes the researcher offering the usage model of a material in the context of a routine task, and also illustrates the participation of other children. The formation of speaking partners in the context of alternative communication forms have been discussed and identified as an accessible means for nonspeaking disabled students to enhance their participation in the communicative and academic situations (Deliberato, 2013; Massaro, 2012; Nunes et al., 2011).

In this process of training communication partners and supporting alternative communication forms, mediation of competent partners in the use of graphic systems is critical. The examples below illustrate the participation of the teacher, as well as the collaborative participation of teacher and researcher in the tasks with students.

Theme: Mediation of the Professional in Activities - Sub-theme: Mediation of the Teacher

Example 6. Classroom observation
Context: The teacher is using and explaining the homework in the notebook.
CT: After the calendar activity, the teacher took the didactic notebook. Each child has his own notebook. Then she said, I know some of you have done the homework, but many haven't yet. Then, let's go to the first page. We have the alphabet. Do you know the name of the letters? Let's read. Are the pictures like the ones we have in our board? (the teacher related the alphabet in the notebook with the alphabet fixed on the classroom wall)
CS: N. The children and the teacher went on reading the letters and the corresponding pictures, for example: letter J - picture of an alligator (*Jacaré* in Portuguese).
CT: Nw, let's go to page 3. Check the calendar for the month of August. How many days are there? Let's count!
CS: Th children had difficulty understanding counting the month. The teacher had to go one by one and count together.
CT: Look, then you should put the number 31 in the small square.

Sub-theme: Mediation of the Researcher

Exemple 7. Classroom observation
Context: the researcher helping with the tactile perception activity. The task, in groups, was: one of the children in the group drew a hand on paper and with the help of the others, they glued sensory material.
CT: The teacher divided the class into groups. Each group sat at the table. Look what you will do: a group activity. Whoever has the biggest hand in the group will be chosen to draw on the paper. Then R will pass the glue and then each group will glue something different: sand (green), thumbtack, cotton, colored chopped EVA, straw, string. Yesterday, we tried sandpaper and cotton on our skin. What did you like best? Cotton is the softest one and the sandpaper is the roughest one.
CS: Cotton said the children.
R: R passed the tables. Well, let's see who has the biggest hand: Miguel (fictitious name), let's compare your hand with Thais's (fictitious name) and with other children's hands. Then R. helped the children to choose the person in the group who would put the hand to be drawn on paper. Moreover, the R measured the children's hands by placing one hand against the other. So who has the biggest hand?
CS: Miguel does.
R: Then, asking them to wide open the fingers, M. placed his hand on the sheet of paper and R drew the outline. M. wide opens the fingers so we can outline your hand and get a good-looking drawing. Now let's pass the glue and feel what we will glue: cotton. It is very soft.

Example 8. Classroom observation

Context: mediation of the researcher and SES teacher in the regular classroom with the disabled student.

SES: SES teacher went to pick up toys: laptop computer toy and another toy with sound stimulus. A. did play activity with the doll: SES pretended she was preparing some food. For an instant A. grabbed the doll and placed in her arms and seemed to participate in the activity without maintaining eye contact with the SES.

R: At this moment, the researcher only watched SES performance with the child: the other students were performing the activity of sensory plate (collage of sensory materials in a cardboard plate to represent a plate of food). A. was out of this context. At this moment the researcher approached the CT. and asked: Could I make a sensory plate with A?

CT: Yes, you can. You can get the stuff to do it. I'll help you.

R: researcher approached A and SES with a cardboard plate with rice, beans, paper lettuce and egg. R. grabbed A's hand and asked SES: What is the hand of her preference?

SES: She uses her left hand. She is left-handed.

R: the researcher took A's hand and explored the materials before gluing them. To each explored material, R verbalized the situation.

SES: Look, how cool, A.! You are making food for your doll. Let's feed her!

R: Okay, now let's put your work together with the others on the teacher's desk.

Examples 6 and 7 describe situations in which both the teacher and the researcher offer assistance and information to help the students understand the new content. The researcher collaborated with the teacher in the routine, which allowed greater interaction and activities with students. Such interaction enabled joint actions in the routine, especially when the task to be performed requires collaboration among professionals, as in Example 8. Actions involving the researcher, teacher and SES teacher allowed the inclusion and participation of the disabled student in the content taught to the other students in the classroom. The collaborative work between teacher and researcher in preschool context was discussed by Rocha (2010, 2013). The author operationalized the proposal by Manzini and Souza (2002), i.e. through collaborative work between the researcher and the teacher, it was possible to prescribe, select, adapt, implement, and assess the use of assistive technology resources for children with cerebral palsy in the classroom.

Araujo, Deliberato and Braccialli (2009) discussed the need for professional training in the context of the area of alternative communication. The authors argued that due to the diversity of people with disabilities and with new approaches to working with people with disabilities, it is necessary that professionals in health and education are trained to the diversity of communication possibilities.

Swengel and Marquette (1997) considered the professionals working with alternative communication as a team, i.e., a group of people with different professional backgrounds who invest in working together to achieve common goals. These authors stressed the importance of collaborative work, discussing the importance of the performance of different areas of knowledge not only to ensure communication skills, but also quality of life of people with disabilities.

In professional training, these authors emphasized the training of teachers, both in initial and continuing education, as seen in the following examples:

Theme: Teacher's degree - Sub-theme: Initial Training and Continuing Education

Example 9. classroom observation and guidance for the teacher

Context: discussion on the adapted resource for the classroom: calendar. After the activity "chamadinha" (warm up activity), the teacher goes to the calendar: day of week, day of month and discusses the time of day and weather: sun, rain, cloudy, etc. The teacher had placed a calendar of the month in the wall, but with few resources for students' participation, especially the student with disabilities. Following, the discussion on the adapted material:

R: While the children performed the task, the R showed the material she agreed with the teacher: calendar for the classroom. The moment she showed the material, the teacher said:
CT: How beautiful! You did it?
R: Yes, I did it.
CT: I wanted you working with me all the time.
R: Me, too. I also wanted to work with people like you: you're organized and you plan your activities. It is very nice to work with people who plan and has a routine. Well, I had to put thicker EVA and laminate the images of weather, numbers, etc. so A. can use them and also have greater durability. I will also laminate the other materials.
CT: It's not necessary. Did you print them in your home?
R: Yes, I did.
CT: Geez ... It's pretty good.
R: here are letters and numbers in different sizes.
CT: Wow, that's good.
CS: At this moment, a student comes by and starts picking the images, the numbers.
R: go to your activity, then I'll show the new calendar for all of you.
The student stayed close and kept exploring the numbers, changing places and inserting images related to weather.

Sub-theme: Initial Training and Continuing Education

Example 10. classroom observation and guidance for the teacher
Context: guidance for the teacher
CT: Sowhy do you think the special classrooms were closed?
R: Wel, most of the classrooms turned out to be "storages" for children with disabilities. That is the big issue. There are discussions on the inclusion policy, everyone has the right to have access to a quality school. All students should share the same place at school. Finally, many teachers just failed in teaching the students with disabilities and it was a big problem.
CT: Ah!
R.: I think each child has his own specificity and needs specialized people to work with them.
CT: It's like the SES teacher here. When I arrived here, she worked with blind students. Gee, she did a great job! I've had a blind student she placed in the mainstream school. First she worked there, and when they were ready, they went to the regular classroom. Now, she has to serve all kinds of disabilities.
R: So, ven taking specialization courses, qualification, a teacher cannot work with everything.
CT: SoI think all undergraduate courses should have something.
R: Yes,they should, because it is the law. In the case of Sign Language, it is mandatory for undergraduate courses and speech and language pathology.

CT: I hd a discipline on disability.

The examples cited corroborate the study by Rocha (2010). The author found that, in addition to ensuring the adapted resource to the student at school, it is essential that professionals are able to offer strategies and opportunities for the student to use them. Only the set of actions taken by different professionals is able to guarantee accessibility of disabled students during school activities. The results of the study indicated that in fact, implementation, assessment and follow up of the use of adapted resource are part of a process that is directly related to the demands of the student, the school dynamics, pedagogical activities and the involvement of the teacher in planning.

In this context of discussion, Rocha and Deliberato (2012) and Pelosi and Nunes (2010) argued that it is not the exclusive responsibility of the teacher to identify, prescribe, build and create strategies for the use of assistive technology in the school context. The involvement of all school professionals, students, families and also network supports formed by professionals from different sectors, such as health professionals is crucial.

Rocha and Deliberato (2012), Rocha (2013), Nunes et al. (2011) warned about the need to identify the skills and needs of students to implement adapted resources using graphic systems. The examples below illustrate information about the characteristics of students who could collaborate with the design of materials for the classroom.

Theme: Assessment - Sub-theme: Characteristics of Students

Example 11. interview with classroom teacher

Context: researcher and teacher discuss the characteristics of the student with disabilities when students are at recess. (at recess, the students are with an employee of the school)

CT: I think A. can learn, but she can only stay a little time in an activity and she drools a lot. When she can do an activity, she drools more. When she has to do something she doesn't want, she gets angry, swears. I realize that she swears correctly.

R. Does she wear glasses?

CT: she has worn glasses already, but she does not keep them. She throws them and it is a hard time finding them. I realize she is well taken care of and she wears clean clothes. When she leaves school, she is dirty, but she comes here clean. She has little attention in tasks, she stays here little time.

Example 12. interview with the disabled child's mother

Contex: mother's report on the disabled student's behavior.

M: She is a calm child, like, in the sense of affection. She cannot be contradicted otherwise. If this occurs, it's the end of her world. She is an intelligent person. She doesn't forget what you say to her.

R: Do you think she understands things well?

M: Understand .... I think she doesn't understand well, but she keeps it.

The exmples given illustrate that there is a need for collaborative action to insert adapted resource in pedagogical tasks, but there is a need for collaborative action to plan strategies that allows the participation of the student with some specificity. Example 11 indicates that the student with disabilities may have visual impairment, which indicates the need for attention regarding the size of the images, as well as contrast of colors. Example 12 describes the student's behavior through the mother's report so that professionals can plan strategies with differentiated time according to the need of the student.

Besides organizing and inserting adjustments, it is necessary to monitor the students on the performed tasks. This assessment allows the maintenance and modification of the resource and

strategies established for the classroom and for the student with disabilities. The examples below show situations of immediate assessment of the task performed.

Sub-theme: Performance of Students

Example 13. classroom observation
Context: the teacher talked to the students in the circle about the task made with letters and numbers.
CT: the activity is very good, I really liked it, but we can do better. Overall it is good, but we need to pay attention to get better: do not cut the letters and numbers and also do not glue them upside down. It was very good, but we need to improve it. Next time, we will.

The exmple showed the teacher encouraging the students' performance on the task, but also the teacher warned about the issues that could be improved next time.

Another important aspect of the assessment for the implementation of adapted resources in classroom was the conditions of the teaching material and environmental conditions as demonstrated in the examples 14 and 15:

Sub-theme: Working Conditions in the Classroom

Example 14. observation and interview with the teacher
Context: The teacher reports the difficulty of the students because of the teaching material
CS: Few children knew the month of their birthday. The teacher went one by one and then the kids circled the month. The children could not do the activity on the textbook.
CT: the teacher commented: See how hard this material is for kids. There's something written here and they have to do it.
R: the commands are too difficult. It should be on the same page and the sentences should be simpler.
CT: some time ago it was even worse. The letters were tiny, like the ones on the bottom of the page. They hire scholars, but they do not know what happens in the classroom. The student may be impaired in his assessment.

Example 15. interview with the teacher
Context: conditions regarding the number of students in the classroom
CT: You see, the number of students in the classroom is alright. Today, with this number, I can cope with them and give them better assistance.
R: Yet, with more students, you would have to have a person helping, because you cannot cope with A. She has difficult behavior.
CT: Do you have a Doctoral degree?
R: I've gone further.
CT: So people who have doctoral degree should know what happens in the classroom.
R: I agree. I love staying in the classroom and understanding it to be able to propose a research work that will cooperate with the routine of the classroom.
CT: If it wasn't for you and SES, I could not cope with A.
R: You're right. I'll talk to SES to arrange a routine. You should also have a classroom with fewer students.

The literature has discussed the need for the school to be prepared to the diversity of students with special needs. The adjustments should not be directed only to physical accessibility, but to other key

elements to the process of teaching and learning, as in the case of communicative accessibility, educational textbooks and their adaptations, among other factors established by Law of Accessibility (ABNT, 2004).

Example 14 is related to the teacher's assessment regarding the textbook used for pedagogical activities. According to the example, the material is inappropriate for the students in the classroom in form and content. Whereas in example 15, the teacher reported her concern about the difficulty in giving attention to the needs of each student because of the number of students attending the classroom.

Final Considerations

The results obtained by the analysis of the themes and sub-themes have shown that the children used the graphic system in their routine activities, the graphic system helped the children in reading the words, the teacher inserted the graphic system in collaboration with the researcher, the routine of pedagogical activities planned by the teacher facilitated the introduction of the graphic system in the classroom with the students, providing support in the context of alternative language for the students in the classroom, the resources used through graphic system favored the participation of the student with a disability with the collaborative efforts between the researcher, the classroom teacher, and SES teacher.

Although the study has limitations, especially because it was designed with only one classroom, the results reinforce the need for collaborative action to work in the context of resource use in the area of assistive technology, but also indicated the importance of involving all children in the classroom in the context of new technologies, thus reinforcing the role of the competent communicative partner in the use of graphic systems.

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