

Guidelines for the development of the IEP as an evaluation tool for educating students with autism: an intervention study

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Abstract

Recent research results reveal the difficulties of regular education systems in providing a school curriculum that meets the academic demands of learners with Autism Spectrum Disorder (ASD). Among the factors that contribute to this phenomenon are the precarious teacher training programs and the lack of strategies that promote accessibility. As a consequence, the student's lack of academic participation is registered in the common classroom. The purpose of this study was to propose guidelines for the elaboration of an Individualized Educational Plan (IEP), an instrument of curricular organization and evaluation for a student with ASD, enrolled in a pre-school context. The results, produced through an intrasubject quasi-experimental design, indicated qualitative and quantitative changes in student participation in academic tasks after the intervention program.

Keywords: Autism; Individualized Educational Plan; Inclusive education.

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Diretrizes para a elaboração do PEI como instrumento de avaliação para educando com autismo: um estudo interventivo

Resumo

Resultados de pesquisas recentes revelam as dificuldades dos sistemas regulares de ensino em oferecer um currículo escolar que atenda as demandas acadêmicas de educandos com Transtorno do Espectro Autista (TEA). Dentre os fatores que contribuem para esse fenômeno evidencia-se a precária formação docente e a escassez de estratégias que promovam a acessibilidade. Como consequência, é registrada a deficitária participação acadêmica desse alunado na sala de aula comum. O objetivo desse trabalho foi propor diretrizes para elaboração de um Plano Educacional Individualizado (PEI). Trata-se de instrumento de organização curricular e de avaliação acadêmica direcionado para um estudante com TEA, inserido em contexto pré-escolar. Os resultados, produzidos por meio de um delineamento quase-experimental intrassujeito, indicaram mudanças qualitativas e quantitativas na participação do aluno nas tarefas acadêmicas após o programa de intervenção.

Palavras-chave: Autismo; Plano educacional individualizado; Educação inclusiva.

Directrices para la elaboración del IEP como una herramienta de evaluación para educar con autismo: un estudio de intervención

Resumen

Los resultados de investigaciones recientes revelan las dificultades de los sistemas regulares de enseñanza en ofrecer un currículo escolar que atienda las demandas académicas de educandos con Trastorno del Espectro Autista (TEA). Entre los factores que contribuyen a este fenómeno se evidencia la precaria formación docente y la escasez de estrategias que promuevan la accesibilidad. Como consecuencia, se registra la deficiente participación académica de ese alumnado en el aula común. El objetivo de este trabajo fue proponer directrices para la elaboración de un Plan Educativo Individualizado (PEI). Se trata de un instrumento de organización curricular y de evaluación académica dirigido a un estudiante con TEA, inserto en contexto preescolar. Los resultados, producidos a través de un delineamiento cuasi experimental intra-sujeto, indicaron cambios cualitativos y cuantitativos en la participación del alumno en las tareas académicas después del programa de intervención.

Palabrasclave: Autismo; Plan educativo individualizado; Educación inclusiva

Introduction

Data from the 2017 School Census reveal an expressive increase, in the last few decades, in the number of students diagnosed with Autism Spectrum Disorder (ASD; BRASIL, 2018) enrolled in regular classrooms. Despite these records, studies suggest that low-quality education is offered to these individuals and that they typically present limited academic progress (NEVES; ANTONELLI; SILVA; CAPELLINI, 2014; NUNES SCHMIDT AZEVEDO 2013; OLIVEIRA PAULA, 2012). Scarcity of teacher training programs and lack of curriculum adaptations are some of the contributing variables for the occurrence of this phenomena. These same factors adversely affect the access of this population to academic knowledge and the acquisition of functional skills that should be developed in regular school settings (NUNES et al., 2013; NOZI; VITALIANO, 2012; OLIVEIRA; PAULA, 2012; SCHMIDT et al., 2016).

An alternative for remediating this problem is using Individualized Education Plans (IEP) as an instrument for promoting curricular accessibility. This pedagogical student-centered resource establishes academic and functional goals for students with disabilities (SMITH, 2008). Conceived as an educational map, the IEP essentially describes the current level of student performance as well as short-and long-term educational goals, aligned with the regular school curriculum. The achievement of these goals is favored by using alternative and individualized teaching and assessment formats, which are adapted to the cognitive, sensorial, social, communicative and behavioral characteristics of the student. It is worth noting that the IEP specifies if additional educational and rehabilitation services are needed as well as how student performance is measured.

The purpose of this study is to evaluate the effects of implementing an IEP in the academic progress of a student diagnosed with ASD. The investigation, conducted in a regular school setting, was designed in a collaborative perspective and used a single subject quasi-experimental design.

Method

Participants

Participants were João, his parents and three teachers, including the regular classroom instructor, an aide and a tutor. João was an only child, he was 5 years old and was enrolled in a regular preschool classroom. He was diagnosed with moderate autism, according to the Childhood Autism Rating Scale – CARS (PEREIRA et. al., 2008), applied in the beginning of the study. João did not communicate verbally and used a limited number of unconventional gestures as a form of expression. He had difficulties interacting with peers, presented motor stereotypies and behavioral inflexibility. João was assisted by the tutor and an occupational therapist, on a weekly basis, outside of the school.

The tutor and the regular classroom teachers had bachelor's degrees in Education, while the teacher aide was a sophomore in a teacher education institution. Of

the three teachers, only the aide had no previous contact with students with ASD. João's mother (age 44) was a housewife and his father (age 40), a civil engineer. The family lived in an upper middle-class neighborhood in the city of Natal (RN).

Intervention Agent

The first author (researcher) worked as the intervention agent. She was a pedagogue, enrolled in the second year of a master's degree program in Education and had experience working with children on the spectrum.

Setting

The data were collected at a private school located in the city of Natal. The context of the intervention was the classroom, during two classroom routines, writing and snack.

Research Design

A quasi-experimental single-subject design was used. The IEP, defined as an instrument for evaluating the educational development of students with disabilities, elaborated by a multiprofessional team, was regarded as the independent variable of the study.

Two sets of dependent variables were analyzed, being one of a qualitative nature and the other, quantitative. The first set contemplated two variables: (a) The development of the student's written productions and (b) the quality of his participation in the snack routine. Initially, the written tasks produced by João during the baseline phase were compared with those done during the intervention phase. The written activities were analyzed considering the Theory of Psychogenesis of Written Language, conceived by Emília Ferreira and Ana Teberosky (FERREIRA; TEBEROSKY, 1999).

The quality of João's participation in the snack routine was evaluated considering his repertoire of appropriate behaviors for a feeding routine, such as sitting at table, waiting for turn, using a glass, requesting a snack, etc.

The dependent variables, of quantitative nature, concerned the student's permanence (on task behavior) in the writing and snack routines. These variables were measured using a frequency count protocol (FAGUNDES, 2006).

The sessions were independently coded by a previously trained research assistant (1st judge) and the researcher (2nd judge). The average agreement index, calculated using the model proposed by Fagundes (2006), was 76% for writing and 94% for snack.

Instruments

Field notes, interview protocols and the CARS (PEREIRA, et al. 2008) were the instruments used to collect data.

Equipment

The equipment included a video camera and a laptop computer.

Procedures

After submitted and approved, the research project (Nº. 63139) was conducted in four distinct stages: characterization, baseline, intervention and social validation. The first involved interviews with João's parents and teachers, as well as the identification of the school routines that would be the focus of the intervention.

In the baseline, the teachers (classroom and aide) were instructed to freely interact with João in the two selected routines (snack and writing). The sessions were filmed and the dependent variables, analyzed. The baseline phase terminated when a stable or downward trend was detected in one of the two routines analyzed (on task behavior).

The intervention was conducted in three phases, comprising 30 experimental sessions. The purpose of the first, called the reflection phase, was to help teachers analyze the content and objectives of the class curriculum, considering João's academic and functional demands. By doing an autoscopia¹, the teachers analyzed the recorded sessions of the routines and, with the help of the researcher, pondered the possibilities of João participating in the activities.

In the second phase of the intervention a multiprofessional meeting was planned, including João's parents, teachers, the school coordinator, the school psychologist, the Pedagogical advisor and the occupational therapist. The purpose of this meeting was to present an IEP model to the team and to identify the contributions of each of the members.

Finally, in the third intervention phase, the IEP was structured and operationalized by the classroom teacher and the aide. A dialogic process involving planning, implementation of planned actions and reflection on the teaching practice was set up. In the last stage of the research, a semi-structured interview with the classroom teacher was carried out to evaluate the study's social validity.

Results and discussion

Research data were collected from field notes, educational planning reports, videorecorded sessions, photographs and interviews. In total, 36 sessions (6 baseline and 30 interventions) were conducted for 8 months.

IEP planning is a cooperative process, involving parents, teachers and other professionals who work with the student (SMITH, 2008). In the first segment of this study, each IEP member was individually interviewed.

The family was the first to be heard. During parent interview, João's mother revealed that her educational expectations for her son were that:

[...] he would identify his name, he is almost getting there, I think...socialize with other children... learn the letters of the

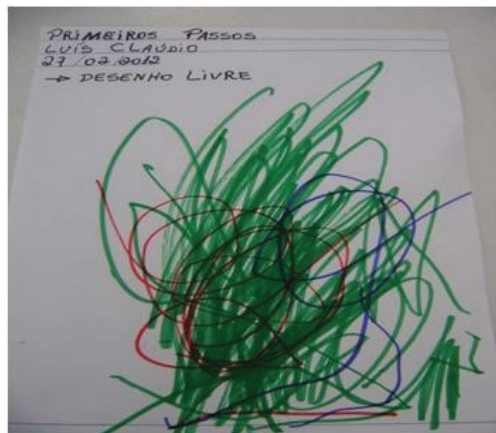
alphabet, the A, and, I, the, U, identify colors, numbers, until number 10 [...] receive formal education (Mother, 2012).

In other words, the family evinced the desire for João to develop basic academic skills, which he did not yet possess. In terms of expectations for the future, the mother declared, "[...] my dream is that João will be like Henri... with a degree, that he would speak, I hope he speaks" (Mother, 2012).

In this segment, the mother compares João to Henri, an acquaintance, with autism, who had an undergraduate degree. In addition to the expectation that João would go to college, the response reveals the hope that her son would speak at some stage of his life. It is worth pointing out that such expectations, due to intrinsic factors, may not always occur. The literature suggests that more than half of the people with ASD do not develop, for communicative purposes, functional speech (GANZ, 2015). That could be the student's case. Although the efforts for João to communicate verbally should not cease, it was necessary to consider other possibilities, such as the use of Alternative and Augmentative Communication (AAC). This interventional practice aims to minimise, in a temporary or permanent way, expressive and receptive communication deficits, using gestures, hand signals, communication boards, voice synthesizers, among other resources (GANZ, 2015).

Considering the videorecorded sessions and field notes, the researcher selected the writing and snack activities as the focus of the intervention. In the first case, the results revealed that João was typically instructed to engage in parallel activities, not related to the development of writing skills. His participation was restricted to spontaneously drawing on a sheet of paper. On these occasions it was observed that while the class engaged in various writing activities, João was instructed to freely draw. Thus, he sat at his desk performing circular movements, with markers, on the sheet of paper, as noted in Figure 1 below.

Figure 1 – Free drawing



Source: Own Source.

According to Ferreira and Teberosky (1999) scribbles represent the first expressions of the child's writing. In this first phase, there is no distinction between drawing and writing. Lines and strokes are spontaneously produced, without the intention of representing the image of an object. These scribbles gradually evolve according to biological, social and cultural factors (MOREIRA, 1984).

The importance of writing is highlighted in the National Curriculum for Children Education (NCCE; BRASIL, 1998). According to this document, writing activities for children who are from four to six years of age should contemplate:

[...] everyday situations in which writing is necessary; writing own name in required circumstances; production of individual and/or collective compositions dictated by the teacher, for various purposes; practice handwriting, using what the individual knows about the writing system in his/her first language. (BRASIL, 1998, p. 145)

João did not communicate to request food during the snack routines. In general, the teacher promptly provided his snack. It is important to highlight that the student used a feeding bottle instead of a cup and, unlike his classmates, failed to eat food from the school, as observed in Figure 2.

Figure 2 – João drinking juice from a feeding bottle



Source: Own Source.

In relation to the food consumption, the NCCE points out that the teacher must:

[...] provide opportunities for children to learn about various foods, the development of skills to choose their own food, to serve and to feed themselves with safety, pleasure, and independence. (BRASIL, 1998, p. 56).

In this sense, the NCCE considers feeding as a curricular component that provides opportunities for children to develop communication skills and autonomy.

Limited collaboration between the teachers was observed during these activities. While the classroom teacher was responsible for the typically developing students, the teacher aide had the function of guiding and "caring" for João. In many situations she seemed uncertain on how to proceed to meet the student's needs.

The use of autoscropy during the first stage of the intervention helped teachers acknowledge the student's level of participation in the target routines as well as the pedagogical practices implemented. When watching the baseline videos, the teachers recognized the student's limited involvement in the activities, as well as the lack of effective teaching strategies used. This is illustrated in the following comment from the classroom teacher:

Here he did nothing, and this is what I do not want... nobody came close to him... The class is very agitated... I have to prepare the activities, pay attention to everyone, but it is not always possible. (classroom teacher, 2012)

In this segment, João's lack of involvement in the curricular activity is attributed to the lack of support and teacher's work overload. In addition to these factors, crowded classrooms, lack of professional training, and limited time for the classroom teacher to work individually with the students interfere with the learning process of pupils with disabilities (GLAT; PLETSCHE, 2011).

The discomfort in working with the student is evidenced in the teacher aide's comment while watching the video:

I felt terrible... the feeling of not getting it, you know? Of weakening. I felt like running away... changing places to see if he was concentrating, I placed myself in front of him, but I preferred to stay beside him, I think it was better. (Teacher aide, 2012)

The feeling of incapability suggested by the participant is portrayed by teachers who work with students with autism investigated in other studies (NUNES et al., 2013; SCHMIDT et al., 2016).

The multiprofessional meeting scheduled in the second stage of the intervention had an interurrence. The occupational therapist was unable to attend, and the school coordinator prohibited parent participation, claiming that the family would not understand the proposal. This obstacle suggests that, in Brazil, family participation is not valued in the schools (BENTES; COLARES; SOARES, 2012). Polonia and Dessen (2005) stress that limited participation may arise from teachers' fears of being monitored and supervised by the pupils' parents or the perception that parents have no capacity or conditions to help their children.

Despite the absence of the therapist and the family, the IEP meeting was conducted with the school staff and the tutor. For 90 minutes the group discussed specificities of the IEP and the teaching procedures that could be used with João in the classroom context.

In the third stage of the intervention, 12 planning meetings were conducted with the classroom teacher and the teacher aide. The researcher individually met with the occupational therapist and the tutor who were unable to attend the school

meeting. The therapist clarified the student's sensory and motor demands, suggesting the elimination of stimuli and the use of materials with different textures. The tutor was instructed to work on the IEP goals outside the classroom.

Based on the classroom's goals, parent expectations, and input from other professional, the following objectives, methodologies and didactic resources were included in the student's IEP (Table 1).

Table 1 – Objectives, methodologies and didactic resources used for teaching João

Skills	General goals for the class	Goals for João	Methodology and didactic resources For João
Written	<ol style="list-style-type: none"> 1. Identify letters and printed words; 2. Write own name; 3. Compare own name with the names of classmates; 4. Copy the date and the name of the school; 5. Narrate life experiences; 6. Recount facts; 7. Produce texts with group; 8. Use the writing (spontaneous) in everyday situations; 9. Expose and defend ideas; 	<ol style="list-style-type: none"> 1. Identify the letters of the name; 2. Write own name; 3. Identify the letters in the name of the school; 4. Copy the name of the school; 5. Illustrate activities developed over the weekend; 6. Match letters and words; 7. Expand vocabulary; 8. Structure body in the drawing; 9. Construct new shapes/diagrams representations in the drawing. 	<ol style="list-style-type: none"> 1. Use pairing activities; 2. Use drawings, pictures and images in activities; 3. Make use of drawing and writing models; 4. Elaborate activities for writing letters with various materials, using cut out and dotted letters, with several levels of difficulty. 5. Use non-verbal forms of communication (funny facial expressions, fun prosodies and physical contact). 6. Structure sensory activities 7. Use an AAC picture-exchange system 8. Include João in group work.

Snack	<ol style="list-style-type: none"> 1. Make proper use of school materials; 2. Consume healthy food; 3. Request snack to the teacher; 4. Share the snack with peers; 	<ol style="list-style-type: none"> 1. Drink using glass; 2. Consume healthy foods (school snack); 3. Request snack to the teacher; 	<ol style="list-style-type: none"> 1. Provide cards with images on objects and routines of the school; 2. Provide a glass; 3. Organize the environment in a way that encourages the student to request food spontaneously
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Source: Own Source.

As seen in the table, João’s objectives were equivalent to the ones outlined for the group and the methodologies included the use of common practices used in children’s writing activities, but scarcely implemented by the teachers. Among them are the use of cut out letters, pairing activities and tracing exercises. Finally, teachers were asked to use non-verbal forms of communication, such as facial expressions and physical contact. Propositive actions of this nature favor, in Feurnstein’s and collaborators’ social-interactionist perspective (1987) ², engagement and learning.

In terms of resources, it was relevant to include an AAC system, organized in a picture-exchange format. To have access to an object, João was taught to hand a picture of a desired object to a social partner who, in return, would give him the requested item. The use of AAC was facilitated by the way the snack routine was reorganized. In other words, the teachers were instructed to wait for João to request food, instead of promptly giving him the snack. Finally, the feeding bottle was replaced by a drinking glass and João began consuming food from the school.

When the IEP was concluded, the teachers began implementing it. Student performance was evaluated during team meetings. In these occasions, the videorecorded sessions were, with the help of the researcher, analyzed as well as João’s written activities.

Following the IEP implementation, teachers’ comments during the autopsy sessions became more encouraging. When asked to point out positive aspects observed in the intervention session, the classroom teacher said:

The teaching strategies such as using pictures for him to communicate; working with things from João’s context; the use of images; the snack cards; his weekend pictures; constructing a body with dolls; using a model for him to perceive movement;... also activities conducted with other classmates, the ludicity, the affection were essential for his development. (Classroom teacher, 2012).

In this comment, the teacher reinforces the effectiveness of using AAC during snack, as well as the importance of including artifacts from the child's daily life, planning ludic activities and demonstrating affection while working with the student. In fact, research data have suggested that the use of audiovisual resources, associated with other non-verbal forms of communication, including expressions of affection, favors the engagement and learning of students with ASD (MARANHÃO; CUNHA, 2008; MACÊDO; NUNES, 2016).

"Learning with other classmates", as cited by the classroom teacher relates to cooperative learning (LOPES; SILVA, 2009), mediated by the teacher who included João in the activities. As a result, level of interaction with other classmates improved, as shown in Figures 3 and 4.

Figure 3 – Group activity with playdough



Source: Own Source.

Figure 4 – João receiving support from a peer during a writing activity

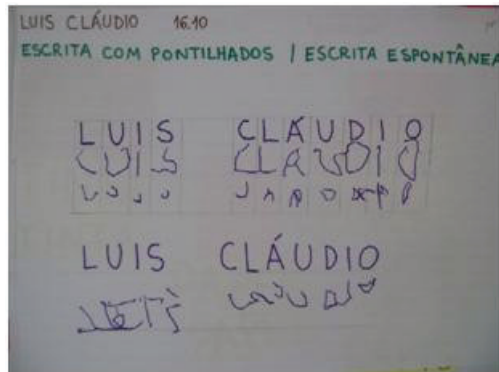


Source: Own Source.

In Figure 3, the students work with playdough following the teacher's intervention. In Figure 4, a classmate helps João make a written record during a cooperative activity proposed by the teacher.

Figures 5 and 6 suggest that the student accomplished writing objectives 1 to 4, shown in table 1.

Figure 5 – Name writing



Source: Own Source.

Figure 5 – Name writing

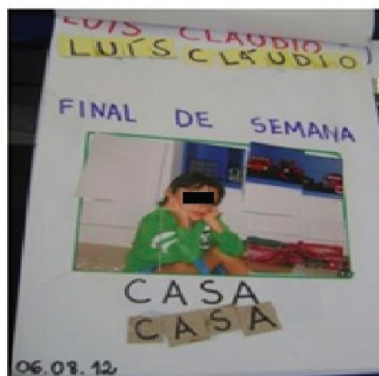


Source: Own Source.

In the above activities, João writes, using the dotted lines technique and cut out letters, his own name and the school's name. It is important to emphasize the similarities between his written work and the conventional writing of the letters.

The written activity noted in Figure 7 suggests that João was able to register events that took place during his weekend, as well as to communicate them, through images, to his classmates (5th writing objective).

Figure 7 – The weekend



Source: Own Source.

Figure 8 – Syllable pairing on St João's Project



Source: Own Source.

Figures 9 and 10 suggest improvements in the development of João's drawings. Specifically, in the activity illustrated on Figure 9, he not only structured his body scheme (8th writing objective), but also represented the sun and the ground from a model drawn by the teacher. In the activity shown in figure 10, João continued the drawing about traffic, initiated by the teacher (9th writing objective).

Figure 9 – Drawing of the body scheme



Source: Own Source.

Figure 10 – Traffic drawing



Source: Own Source.

João reached the 1st and 2nd goals from the snack routine, as observed in figure 11. He was able to drink juice from a glass and eat the snack offered by the school.

Figure 11 – João sipping juice in a glass and consuming school snacks



Source: Own Source.

In terms of communication, figure 12 suggests that he began using the picture-exchange system to request his snack to the teacher (3rd snack objective).

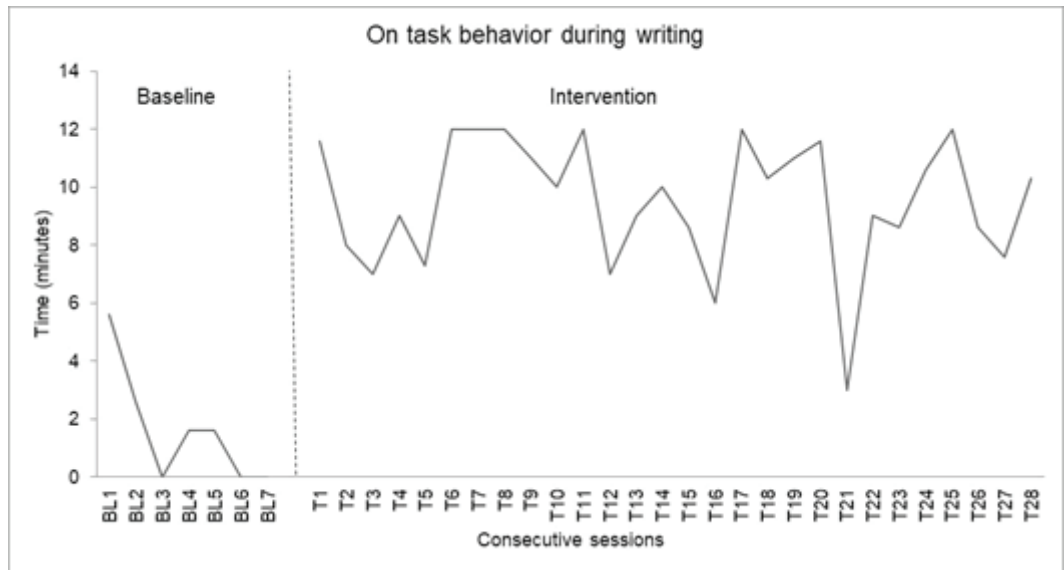
Figure 12 – João requesting the snack form the teacher aide



Source: Own Source.

In quantitative terms, a quasi-experimental intrasubject research design was used to evaluate the effects of the IEP on the level of student's participation in the routines that were focus of the intervention. In other words, the time João spent on task during baseline and intervention, after the IEP was implemented. In the writing task, the following data (Figure 13) were produced:

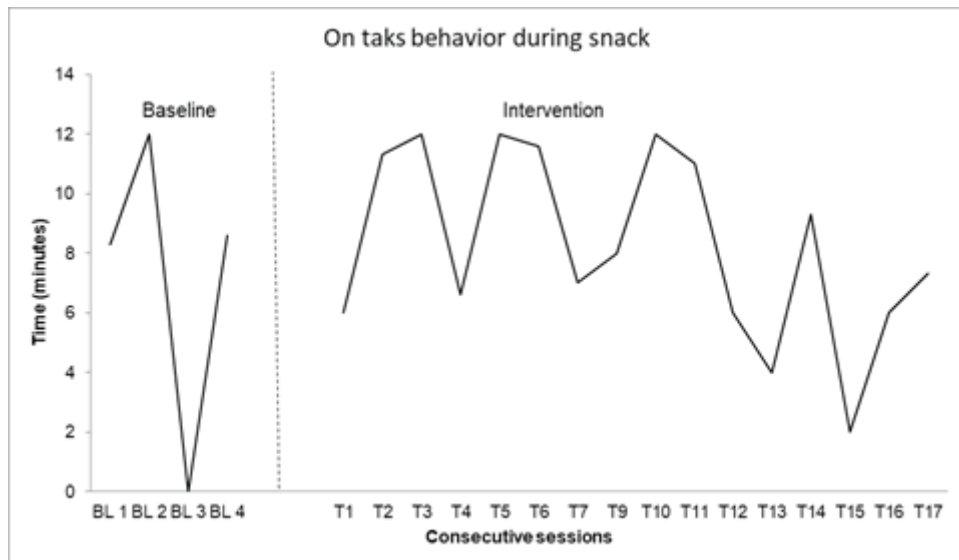
Figure 13 – On task behavior during writing routine



Source: Own Source.

Data from figure 13 reveal that the time he spent engaged on the written task increased following the implementation of the program. On the other hand, slight changes were identified in the snack routine, as seen in figure 14.

Figure 14 – On task behavior during snack routine



Source: Own Source.

Apart from the second baseline record, the student seemed well engaged during the snack routine. In general, he was able to sit and have snack with his classmates for a period of 5 to 12 minutes. Gains in the snack activity were more qualitative than quantitative, since João was able to feed himself in an independent way, using glass and requesting his food, as previously reported.

These sessions revealed that, during the snack routine, João used the AAC, replaced the feeding bottle for a glass and ate food provided by the school. Although not previously planned in the IEP, some classmates began using the pictograms with João. This behavior is illustrated in figures 15 and 16, where a peer shows a picture symbol to the student and helps him wash his hands:

Figure 15 – Peer communicating to João to wash his hands



Source: Own Source.

Figure 16 – Peer helping João wash his hands after painting



Source: Own Source

Social validation records revealed that the classroom teacher conceived the IEP as a guiding tool for her pedagogical work, which enabled her to meet the needs of the child on the spectrum. These ponderations are described below, when the researcher asks her to comment on the IEP:

A fundamental thing... very important moment because it makes the teacher pause and begin to realize what they can do to achieve the goals... present challenges according to their capabilities... I sincerely think it is a very enriching work, I pictured myself as the mother of a child... and that's what I would like my son to have, that type of support, that way... Which mother doesn't want to see her son improving? (Classroom teacher, 2012).

This fragment stresses the importance of using the IEP, within a collaborative perspective, for educating people with ASD.

Conclusion

The results of this study reveal the effectiveness of the proposed intervention program, both in the student's schooling process and in teacher practice. In academic terms, improvements were observed in the quality of the written tasks and the time the student spent engaged in these activities, following the implementation of the IEP. As for the functional skills, advances were registered in the child's communication, since he began interacting with peers and using an AAC to request food. Qualitative changes were also identified, as the boy developed a behavior repertoire equivalent to his peers'. Observational data indicated positive changes in teaching practice, driven by the use of collaborative intervention strategies. The intervention had a theoretical and practical nature and was, partially, operationalized using autoscropy.

Limitations are identified in this research. First, no follow-up data were collected. In this sense it is not possible to know if the intervention effects were maintained after the researcher terminated the project. Furthermore, because of previously mentioned interferences, the participation of key intervention agents, such as the parents and the occupational therapist, was diminished, affecting the dynamics proposed by the IEP. Despite the barriers identified, this study presents important guidelines for performing curricular adaptations, in a collaborative perspective, by using an IEP.

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Notas

¹ Autocopy is a research strategy and a training tool that aims at promoting a participant's self-evaluation by videorecording his/her behavior. Videorecording is the most appropriate instrument for research participants to revive situations, interactions and objects, in a given scenario (SADALLA; LAROCCA, 2004).

² Feurstein and Collaborators (1987) developed an intervention model called Mediated Learning Experience (MLE), which contemplates a set of propositive actions, set up by a more skillful mediator, who selects, modifies, expands and/or interprets the environmental stimuli for the student, making him more autonomous and independent.

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