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Assistive technology: social representations of teachers of visually impaired students

Tecnologia assistiva: representações sociais de professores de estudantes com deficiência visual

Thiago Sardenberg
Doutorando do Programa de Pós-Graduação em Educação da Universidade Estácio de Sá
Instituição: Instituto Benjamin Constant
Endereço: Av. Pasteur, 350 – Urca, Rio de Janeiro – RJ, Brasil
E-mail: tsardenberg@gmail.com

Helenice Maia
Doutora em Educação Escolar pela UFRJ, pós-doutora em Representações sociais, subjetividade e educação pela Fundação Carlos Chagas
Instituição: Universidade Estácio de Sá – Programa de Pós-Graduação em Educação
Endereço: Av. Presidente Vargas 642, 22º andar – Centro, Rio de Janeiro – RJ, Brasil
E-mail: helemaia@uol.com.br

ABSTRACT

Assistive Technology (AT) is a new term in Brazil, defined in 2006 by the Technical Assistance Committee (TAC) as products, equipment, devices, resources, methodologies, strategies, practices and services that aim to promote the functioning of people with disabilities or reduced mobility. Many professionals who act with VI(visually impaired) students seem not to have enough information about AT and, hence, do not use it appropriately. The goal of this research was to investigate possible social representations of Assistive Technology produced by Elementary School teachers who work in regular schools and have visually impaired students in their groups. The theoretical framework used was the Social Representations Theory by Serge Moscovici (1978; 2012). To collect the data, official documents related to AT were examined and semi-structured interviews were conducted with seven teachers, and their content was analyzed as proposed by Lawrence Bardin (2016). The interview analysis indicated that, for the interviewed teachers, their knowledge about AT is oriented, presumably, by the polysemy of the term "resource" found in the official documents, because the teachers associated AT to "any resource that includes", both in relation to AT and toa pedagogical perspective.We found some evidence of AT social representations, since eventhough they did not know the expression AT, the teachers associated resources, strategies and products used with VI students to AT. Therefore, it is possible that this representation is still developing, as the teachers are still discussing, debating and exchanging information about AT.

Keywords: Social Representations, Assistive Technology, Visual Impairment, Teachers, Elementary School.

RESUMO

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Tecnologia Assistiva (AT) é um novo termo no Brasil, definido em 2006 pelo Comitê de Assistência Técnica (TAC) como produtos, equipamentos, dispositivos, recursos, metodologias, estratégias, práticas e serviços que visam promover o funcionamento de pessoas com deficiência ou mobilidade reduzida. Muitos profissionais que atuam com alunos com VI (deficiente visual) parecem não ter informações suficientes sobre TA e, portanto, não o utilizam adequadamente. O objetivo desta pesquisa foi investigar possíveis representações sociais da Tecnologia Assistiva produzidas por professores do Ensino Fundamental que atuam em escolas regulares e possuem alunos com deficiência visual em seus grupos. O referencial teórico utilizado foi a Teoria das Representações Sociais de Serge Moscovici (1978; 2012). Para coleta dos dados, foram analisados documentos oficiais relacionados à TA e entrevistas semiestruturadas com sete professores, e seu conteúdo foi analisado conforme proposto por Lawrence Bardin (2016). A análise das entrevistas indicou que, para os professores entrevistados, seu conhecimento sobre AT é orientado, presumivelmente, pela polissemia do termo "recurso" encontrado nos documentos oficiais, pois os professores associaram AT a "qualquer recurso que inclua", tanto em relação a TA e para uma perspectiva pedagógica. Encontramos algumas evidências das representações sociais de TA, mesmo que elas não conhecessem a expressão AT, os recursos associados aos professores, as estratégias e os produtos utilizados com os alunos VI para a TA. Portanto, é possível que essa representação ainda esteja em desenvolvimento, pois os professores ainda estão discutindo, debatendo e trocando informações sobre AT.

Palavras-chave: Representações Sociais, Tecnologia Assistiva, Deficiência Visual, Professores, Ensino Fundamental

1 INTRODUCTION

A theme that is still new in Brazil, Assistive Technology (AT) can be generically defined as the use of resources and/or services that ensure the autonomy and independence of Disabled People (DP). The formulation and organizationof this concept has been constructed over time, due to the complexity that disabilities encompassand their impacts(model adopted, clinical definition, specific educational needs, barriers, social participation, among others), involving professionals from different areas such as Health, Education and Technology.

In Brazil, Assistive Technology or Technical Assistance was first defined by the Technical Assistance Committee (TAC) in 2006 as

> [...] products, equipment, devices, resources, methodologies, strategies, practices and services that aim to promote functioning, related to activity and participation of the person with disability or reduced mobility, targetingits autonomy, independence, quality of life and social inclusion(BRASIL, 2009, p. 9).

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This committee was established by Decree nº5.296, ofDecember 2,2004 (BRASIL, 2004) that regulated Law nº 10,048, ofNovember 8, 2000, prioritizing services for disabled people, the elderly aged 60 or over, pregnant women, nursing mothers, people carrying infants and the obese, the Law nº 10,098, of December 19.2000, that established general rules and basic criteria for the promotion of accessibility forpeople with disabilities or reduced mobility.

According to Oliveira (2012), inthe 2010 Demographic Census made bythe Brazilian Geography and Statistics Institute (BGSI – IBGE in Portuguese), 45,606,048 people, in other words, 23.9% of the Brazilian population,have some type of disability. This study focused primarily on visual impairment, which affects18.6% of the Brazilian population, followed by motor disabilities (7%), hearing impairment (5.1%) and mental or intellectual disabilities (1.4%), respectively.

According to the Social Representations Theory (SRT), we understand that AT is anobject of social representation because, when the term was defined in 2006 by TAC, the affected groups (health and education professionals, disabled people and their parents and/or guardians) began discussions and information exchanges, therefore creating a meaning for it., Several elements are relatedin ATas a phenomenon: "informative, cognitive, ideological beliefs, values, attitudes, opinions, images, always organized under the frameworkof a knowledge that conveys something about the state of reality" (JODELET, 2001, p. 21). Therefore, comprehending AT representations is important, once they guide different groups "in the manner of naming and defining collectively the diverse aspects of reality on a daily basis, in the manner of reading these aspects, making decisions and, eventually, taking a stand before them defensively" (JODELET, 2001, p. 17).

Social representations are not reality itself, but the interpretation of a group (Elementary School teachers) about a certain object (AT), considering the social context in which it is inserted (a regular school with included students). According to the SRT, it is very probable that the social representations of the AT object generated by these individuals are different from the ones found in official documents and different among themselves, showing how this group appropriates this object and interprets it.

The research about this theme is justified by the fact that many professionals who work with VI students seem not yet to have enough information about the resources, services, strategies and practices derived from AT and, consequently, do not usethemappropriately.

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Accordingly, the goal of this study is to investigate the feasible social representations of ATgenerated by Elementary School teachers who work in regular schools and have visually impaired students in their classes.

2   METHODOLOGY

This research is qualitative, allowing the interaction with the studied object and allowing a widerunderstanding of the social reality. The model used, appropriate for SRT-oriented studies, is from social constructivism, where, as explained by Poupart et al. (2016, p. 261), "the study object is designed not only as the interaction between the subject and the object, but as the product of a process in construction, in which the subject is involved. The meaning becomesco-constructed inside the observation field".

Initially, asurvey was made online, focusing on AT descriptors, technical   aids, supportive technology and social representationsof AT in A1 and A2 academic journals published between 2006, when this expression started being used in Brazil and appearing in legal documents, and January 2018, when we finished the survey.

The survey identified121 A1 and 380 A2 academic journals. We selected 72 of those that approached disabilities and analyzed 11 articles that contained issues related to disability and AT simultaneously. We concluded, then, that there was a small quantity of published work in a 12-yearperiodconcerning both types of journal. The first article was published in 2008 in an A1 academic journal, two years after the creation of the TAC. In the A2 journal type, there is an article in 2009 and a 5-yeargap without any articles published. This survey suggests that the discussions related to AT in the Education area are still incipient and need to be broadened. When using the descriptors "social representation(s)"and "AT", no articleswere found.

 Subsequently, semi-structured interviews were conducted with teachers, guided by a10-question script that involved professional development (initial and continuing), previous experience working with disabilities, mostly visual impairment, and specific questions involving AT. We chose to divide the AT concept into several questions to better understand the beliefs, values and signs attached by these professionals to this social representation object. According to the information collected during the interview, other questions were asked to better understand the issue.

Seven Elementary School teachers took part in this study. They work at a regular school considered by the Municipal Education Foundation (MEF) in Niterói, Rio de

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JaneiroState as a reference school for the inclusion of students with visual, hearing, physical and intellectual disabilities and Autism Spectrum Disorders (ASD).

Five of these teachers are women and two are men, aged between 30 and 39; one has a master's degree, three have post-graduate degrees and three have only a bachelor's degree; four of them have been graduated fora period between one and ten years; only two had previous experience working with VI students;six have been working at this school for a period between one and ten years. Only two of them have education in the VI area, all of them have been trainedon the Braille System and Assistive Technology, not focusing on a specific disability, promoted by MEF. Two teachers had disabilities, being one of them visually impaired and the other one physically impaired.

It should be clarified that, concerning specifically the number of subjects, in the SRT scope, "the representation manifested by a certain amount of people and by a larger one would be the same. It is common to use a criterion known as "saturation" to achieve this limitnumber (not defined previously) throughout the research" (SÁ, 1998 p. 92). In this research, we achieved the redundancy at the third or fourth interviewee, but we decided to perform other interviews to confirm this redundancy.

The interview analysis was made through Data Analysis,

> a set of communication analysis techniques aiming to obtain, through systematic procedures and goals of describing the content of messages, indicators (quantitative or not) that allow the inference of knowledge related to the production/reception conditions (inferred variables) of these messages (BARDIN, 2016, p. 48)

Bardin (2016)statedthat a set of good categories should possess the following qualities: mutual exclusion: each element can be present only in one category or subcategory; homogeneity: subordinate quality of the mutual exclusion principle. In this case, a single classification principle should organize the analysis; relevance: a category is relevant when it fits the material to be analyzed; objectivity and fidelity: very relevant principles since the beginning of the method. The analyst should specify what determines the input of an element in a category; and productivity: a set of categories is considered productive when it allows a high number of inferences and new hypothesis.

Thereby, four categories were established. The first one, **Teacher's Training**, was composed by statements about initial and continuing teacher qualification. The second one,

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Teacher's Work, gathered the utterances related to the specificity of the teacher's work with VI included students. The third one, **Assistive Technology Resources**, holds three subcategories: (1) Use, including equipment, strategies and resources used by the teachers, (2) Access to the resources, at school and at home, and (3) Definition of AT by the teachers, indicating how they define it. The fourth category, **Service,** assembled the utterances related to the specialized services and the association with professionals from the health area.

We emphasize that the categories above refer to a wider research held by the author for the master's degree. The results presented next refer to the **Assistive Technology Resources** category, precisely to the subcategories Use and Definition of AT by the teachers.

3   RESULTS AND DISCUSSION

According to the interviewed teacher's utterances, the period since graduation and professional experience were aspects that allowed to work more effectively with VI students. However, some interviewees seem not to be suitably trained properly able to, as presented in section 13, subsection VII on Resolution nº 4 of October 2, 2009 (BRASIL, 2009), "teach and use assistive technology in order to broaden students' functional abilities, promoting autonomy and participation". Some teachers named resources as slate and stylus, braillewriters and soroban to work with VI students, while others were restricted to concrete materials, such as geometric solids, shape sorters and MDF models.

The same Resolution mentions the terms "services", "pedagogical resources", "accessibility resources" and "strategies" defined only in section 2, sole paragraph, the term accessibility resources in education as:

> those that ensure access to the curriculum of the students with disability or reduced mobility, promoting the use of teaching and pedagogical materials, spaces, furniture and equipment, communication and information systems, transportation and other services (BRASIL, 2009, p. 1)

Regarding this definition, the term "equipment" generates a certain conceptual inaccuracy, for it can be interpreted as any equipment or as equipment in an AT perspective, same as the other terms, because once they are not defined, they allow different understandings.

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Concerning the information about AT, the teachers narrated that they have had information about how to use these products, equipment or resources, according to the following utterances[1].

> [*interviewer:Have you had any information on how to use AT?*] Yes, they give us all this information. [*interviewer*: *Any kind of strategy, specific methodology?*] No, this is the methodology, you bring the reality, right, truly bring closer to what is real, so this is what I want, that I say of using the concrete material to bring her closer to reality, due to the fact that she doesn't have, not, the vision. (P. 3)

> [*interviewer*: *Have you had any information on how to use equipment with these visually impaired children?*] The only information we have had was aboutBraille, right, and sensory, right, we even had a real course, but I can't bring this to my student. (…) [*interviewer: Have you had any kind of information on specific methodologies or strategies to use with the visually impaired student?*] Well, here we have the resource room, where they began explaining how to work, right, that's where I could get some ideas, they could explain the working method. (P. 5)

It is evident on the teachers' discourse that they have little information about AT use with VI students. They statethat, mostly, this information is created during their practice, through the work with disabled students and that the information they received was not enough to allow them to work effectively with AT.

When asked about the resources they use, they mentioned few of them, according to their area of use, for example, Braille-related (slate and stylus and braillewriters), math-related (PVC - place value charts adapted to Braille or with enlarged font, soroban and golden beads material) and adapted computing-related.

> [*interviewer: Do you use any kind of different resource with these students?*] I use the computer, soroban, concrete material, PVC (…) It's the place value chart. [*interviewer: Does the computer have any kind of specific adjustment?*] The DOSVOX is installed, this is an operational system that runs, right, on *Windows*environment. There is the NVDA that emulates the *Windows* environment. (P. 1)

> [*interviewer: Do you use any kind of resource to work with her?*] Resources that I take from this resource room. These solid materials, shape sorters, little boxes with

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[1]The statementsherein reproduced are the most significant ones and are representative of the group's views.

> the numbers in Braille and ink. [*interviewer: Any specific equipment?*] The cellphone, because she really likes listening to music. So, cellphone and earplugs. So, I try to negotiate with her. If I can have 10 minutes, she has 5 minutes of my attention. If I can have 10 minutes with her and she does the activity correctly, then she listens to the music she likes, Anitta(laughing). Sometimes she says "teacher, the cellphone, Anitta". Then, well, I let her listen to the song. (P. 2)

> [*interviewer: Do you use any specific resource to work with her?*] No, I still can't use any specific resource but the concrete. I work with her all the time using the concrete. [*interviewer: What kind of concrete material?*] I always look for toys, right, especially because she is still a 10-year old child, so we look for the toys so she can start giving purpose to these toys, to the actions that are done through these toys. (P. 7)

One of the teachers mentioned the expression"we have to get by" to describe the resources that he uses in his teaching practice, indicating the need of producing teaching material adapted to comply with the particularities of the VI students.

As reported above,in some parts of the teachers' utterances, what is considered AT doesn't fit the definition proposed by TAC (2006) as, for example, the "use of toys so she can start giving purpose to these toys". The indication of "toys" in a generic way is evidence ofa partial appropriation of the AT concept, suggesting that its social representation is still being generated by the studied group.

In the third subcategory, **Definition of AT by the teachers,** utterancesabout the definition of AT were grouped. Only one teacher defined the term as proposed by TAC (2006). It is important to mention that this teacher has congenital visual impairment and we believe that for this reason he is more acquainted with AT, as he is an active user of products, equipment and resources that promote his autonomy, such as the use of the computer through screen readers and mobility canes for independent locomotion, among others. According to this teacher, AT

> Well, there is the classical definition, right, that is every product, technology, service that makes the life of the disabled person easier, making them independent, and assistive technology for us, for those who don't have a disability, the assistive technology helps, for us, it makes things possible.(P. 1)

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The other teachers used the words resources and devices, mentioning magnifying glasses, tactile books, text to speech (TTS) software, zooming imagestools, low and high cost AT. The digital technologies also appeared frequently, although as they are considered AT, they should be specific resourcesfor the user on the promotion of some kind of autonomy and independence in the performance of an activity. The utterancesreproduced below express the group's understanding of AT.

[*interviewer: And for you, what is assistive technology?*] Well, I think AT is a resource for us to help, to help us at work and it is the way we can work, a resource. [*interviewer: Can you give me examples of these resources?*] It is (brief pause), for example, the book we make, or the cellphone that I give her when we negotiate. I believe that's it. (P. 2)

[*interviewer: And for you, what is assistive technology?*] AT is everything that makes it easier, right, the life of people, right, what includes. [*interviewer: And what about in the visual impairment scope?*]Assistive technology for visual impairment. Well, there are lots of programs out there, DOSVOX is one, it's one of them, for the visually impaired. I believe that from now on, better ones will emerge. But today, DOSVOX is for them, great! [*interviewer: Would you give me another example of assistive technology beyond DOSVOX for the visually impaired?*] For the visually impaired? (pause) Totally blind? There is the magnifying glass, that magnifying glass, right, there is (pause) audio description (pause), well, there are books, even here at school. The Foundation offers Braille training and several accessible books were made here. (P. 3)

[*interviewer: And for you, what is assistive technology?*] (Long pause, followed by laughing) Ouch, (long pause, followed by laughing again). You got me (long pause). Well, I don't know how to properly explain. [*interviewer: You don't know how to properly explain, but can you give me examples?For this student, what do you think assistive technology is?*] Hearing devices, right, computers for these children, right, it's going to make her able to interact, right, because everything is about her hearing. So, for me, this kind of technology, there must be more at schools, (…) This is my point of view, ok. This is my opinion. I don't have. There must be these computers, there could be some tablets for these kids to learn how to use. So, to be able to work with their hearing, not only our voice, right, because, sometimes, we mustcome up with resources ourselves. (P. 5)

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According to these teachers' lines, AT seems to be summarized as resources, as "everything that includes", "everything that makes someone's life easier", even when, sometimes, they use the words devices, equipment and instruments to define it, presenting examples like orthosis, tactile book, magnifying glass. It seems like some teachers associate AT to electronic devices, as computers, tablets, cellphones. We believe that this association happens due to, mostly, the daily use of Information and Communication Technologies. It is important to highlight that the association of AT to inclusion was constantly established, however, it does not promote the inclusion of the disabled student by itself.

According to the Brazilian Lawfor Inclusion of People with Disability, AT aims to facilitate the development of various functions, giving the person the opportunity to accomplish activities, supporting personal autonomy, total or assisted, quality of life and inclusion (BRASIL, 2005).To perform activities, we should consider de degree of independence, functioning, cognition and educational, social and familiar context, besides the dynamic of parents, guardians or caregiversregarding the person with disability. At some points, it seems that these questions are not considered by the teachers, complicating the learning process of visually impaired students and, thus, their social and scholar inclusion.

5   CONCLUSION

This study attempted to analyze the Assistive Technology social representations formulated by Elementary School teachers of a regular school with visually impaired students in their classes.

We verified that the information about AT wasacquired by the teachers through continued training promoted by MEF.This training, according to them, was restricted to the Braille System, to Autistic Spectrum Disorders and the use of Assistive Technology in a general context, not focusing on any particular disability. This made work with VI students more difficult, since part of the teachers haslittle information about the clinical aspects and specific educational needs of this disability, as well as aboutthe way these students function. Because of that, the teachers said they search for information on websites, but we observedthat their reliability is doubtful, for they are not always specialized websites or produced by reference institutes verified by Health or Education Ministries for the care of disabled people.

In accordance with the theoretical frameworkused, the analyzed teachers interpret and appropriate from AT in a different manner from that found in official documents. As

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stated by Moscovici (2012, p. 25) "(...) the social representations theory provides the explanatory framework both for making the representations visible and making them understandable as social practice forms".

The analysis of the interviews pointed that, for the interviewed teachers, the knowledge surrounding AT is oriented, likely, by the polysemy of the term "resource" found in official documents, as the teachers associated AT to "any resource that includes", both in the AT perspective and in the pedagogical perspective.

The word "resource" that appears in legal documents related to Special Education, and that were referenced by us, suggests a polysemy of the term, which certainly contributes to a conceptual inaccuracy of what is a resource from a pedagogical perspective or from an AT related to AT-related perspective.The vast rangeof the concept of ATestablished by the TAC (2006), which encompasses this technology and the complexity of this area, as well as the fact that the definitions adopted originated in foreign countries, whose reality is completely different from that of Brazil, sometimes allows for a totally mistaken interpretation of AT-related terms .

Finally, we conclude that we we have found evidence of social representations of AT in the studied group, since, even though the teachers do not recognizing the expression, they associatedstrategies and products they use with VI students to AT. Consequently, it is possible that this representation is still developing, as the teachers still find themselves engaged in discussions and debates and exchanging information about AT.

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